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The effect of labor unions on capital markets: Evidence from seasoned equity offerings

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ABSTRACT

This paper examines the impacts of labor unions on the market reaction to firms' equity financing decisions (i.e., seasoned equity offerings; SEOs), suggesting that issuers' strategic disclosure in the face of pressure from labor unions impacts investor's perception of the firm value. Using a sample of U.S. SEO issuers between 2001 and 2015, we find that labor unions have a negative effect on SEO issuers' announcement return and are associated with lower SEO underpricing at the offer date compared to non-unionized issuers. These results suggest the market's adverse reactions towards SEO events of unionized issuers, supporting the signaling perspective. Significantly negative responses surrounding announcements support investors' suspicion about the potential misuse of SEO proceeds under the pressure of labor unions. The relatively low underpricing (i.e., lower offering date returns) of unionized issuers also reflects the economic consequences of firms fostering a pessimistic corporate information environment to gain bargaining power against labor unions. Additional analyses reveal that firms only exhibit such strategic disclosure in response to union pressure when they are in sound health (not a target for mergers and acquisitions) and when managers' compensation is not heavily affected by depressed stock prices. We also find that the negative responses to unionized firms' SEO announcements and offerings disappear during the global financial crisis, especially for firms that rely heavily on debt financing. Altogether, these results suggest that investors incorporate union-induced strategic disclosure into their decision-making and respond to such information based on market and firm conditions. Our findings are robust after controlling for SEO peer effects and firms' prior performance.

1. Introduction

This paper examines the impacts of unionization on firms' seasoned equity offerings (hereafter, SEO or SEOs). Labor unions are

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special interest groups that aim to enhance employee bargaining power and welfare with legal backing from labor legislation and regulations in the U.S.[1] Therefore, labor unions act on behalf of the interest of employees whose priorities are to maximize their utility in compensation increases, promotions, other benefits (e.g., allowances for travel expenses), and job security (John et al., 2015), and this, in turn, affects managers' corporate decisions.

The literature finds that firms facing a strong union presence are associated with more engagement in underinvestment (Bronars & Deere, 1993; Hirsch, 1992), worse profitability (Doucouliagos & Laroche, 2009), lower stock returns (Lee & Mas, 2012), dividend reductions (DeAngelo & DeAngelo, 1991), and higher investment-cash flow sensitivity (Chen & Chen, 2013), potentially stemming from labor unions extracting concessions from management. We thus argue that the pressure from unions to serve employees' benefits may cause concerns among investors about the firms' possible misuse of the SEO proceeds (i.e., paying employee benefits demanded by unions instead of capital investment), potentially adversely impacting future corporate performance. Therefore, investors likely perceive union presence as a bad signal and react more negatively to unionized firms' SEO announcements than non-unionized firms'.

We further investigate the impact of labor unions on SEO underpricing. The underpricing of seasoned offerings is defined as the return from the offer price to the offering day's closing transaction price, which relates to the level of uncertainty about firm value (Corwin, 2003). The literature suggests that managers in unionized firms are more likely to disclose information strategically to obtain more bargaining power from labor unions (Bova et al., 2015; Burke, 2016; Hilary, 2006). For example, Chung et al. (2016) find that unionized firms are more likely to withhold good news (i.e., optimistic expected earnings) than bad news to increase a firm's negotiation stances. Bova (2013) notes that unionized firms manage their earnings strategically by "taking a bath" (income-decreasing earnings management) to depict a relatively more pessimistic outlook of the firm when under union pressure. Because of the withholding of positive information and/or release of bad news, investors of unionized firms are more likely to obtain information that signals a relatively poor corporate performance compared to those from non-unionized firms. Therefore, we argue that investors are likely to form less favorable expectations about the firm's corporate fundaments and performance prospects for firms with strong union presence and, in turn, have pessimistic views of firm valuation, leading to a lower level of SEO underpricing (i.e., indicating lower returns on the offering date).

We focus our analysis on seasoned equity offerings for the following reasons. First, SEO is a popular and essential capital-raising method associated with corporate value-relevant financing decisions. For example, the total SEO proceeds during our sample period between 2001 and 2015 are about $745 billion for approximately 3500 U.S. firms.[2] Second, SEO is a setting that allows us to examine the signaling effect on firms' equity-raising activities with the influence of labor unions. Unlike initial public offerings (IPO), investors will likely obtain information about listed SEO firms through corporate disclosures. Such disclosures are not available before an IPO and, therefore, reduce the impacts of labor unions on investor sentiment caused by information asymmetry between IPO firms and their potential investors (Chantziaras et al., 2021). Finally, SEO is regarded as a largely unanticipated activity, and so its low predictability is likely to ameliorate the reverse causality problems associated with the relation between firm value and labor unionization (Dutordoir et al., 2018; Feng et al., 2018).

To examine the impacts of labor unions on a firm's seasoned equity-raising activities, we employ a sample of 3497 seasoned equity issues in the U.S. between 2001 and 2015. Following Huang et al. (2017) and Woods et al. (2019), we use industrial and firm-level unionization rates to capture the employee benefits that are obtained through labor union pressure and strong bargaining power, which may affect investors' perception of the purpose of SEOs and in turn, their announcement return. Consistent with our prediction, we find that the three-day cumulative abnormal returns (CARs) surrounding SEO announcement dates are, on average, 3.71 %–4.71 % lower for unionized issuers than non-unionized issuers.

We further examine the outcome of SEOs using a measure of underpricing at the offering date and find that SEO issuers affected by labor unions exhibit a significantly lower level of underpricing (i.e., lower offering date returns) than those issuers without union impacts by approximately 3.99 %–4.49 % or 0.12 %–0.14 % in absolute terms. This result is economically relevant as it suggests that investors price unionized issuers about $55 to $64 billion lower in firm value than non-unionized issuers from 2001 to 2015.[3] This finding is consistent with the explanation that unionized firms are more likely to withhold positive information (or release bad news) about the firms that create a negative signal to the market concerning future corporate performance and, therefore, reduce the SEO underpricing for unionized firms. These results are robust after controlling for various firm and SEO characteristics and industry or year factors.

We perform additional tests as follows. First, to further consider the variations in the influence of union power, we test whether the change in the strength of union power in negotiation likely affects SEO announcement return and SEO underpricing. We follow Chen et al. (2018) to use state-level right-to-work (RTW) laws and local unemployment rates as proxies of union strength as RTW laws weaken the union power by allowing employees to have a choice whether to join a union (John et al., 2015; Matsa, 2010); while employees are less likely to strike for more rights when unemployment rates are high meaning that their jobs are at risk (Cramton &

[1] For example, the U.S. National Labor Relations Act of 1935 endows employees the right to organize, conduct collective consultations with the company, and take strike action, allowing employees to bargain without being harmed by unfair labor treatment, following democratic principles. Subsequently, the Fair Labor Standards Act of 1938 was the result of mutual pursuit of benefits between employers and employees in the workplace, which set minimum wages and longer working hour prohibitions to protect labor rights.

[2] The proceeds value is based on our SEO data collected from the Securities Data Corporation (SDC) Global New Issues database.

[3] These numbers are calculated based on the aggregated proceeds collected by U.S. firms from SEOs being about $458 billion between 2001 and 2014 as reported by Chan et al. (2021). The value of 0.12 %–0.14 % less level of underpricing is equivalent to about $55 to $64 billion lower valuation to the unionized SEO firms.

Tracy, 1992). We find that the negative impacts of unions on SEO announcement returns and SEO underpricing drop when the unionized firms are located in a state with RTW laws and when the local unemployment rates are high.

Second, when firms employ strategic disclosure tactics to obtain a negotiation stance, it can be costly as it requires the firm to exhibit a weakened future financial position. Therefore, we perform further analyses to examine when firms are less inclined to engage in such strategic disclosure. We partition the sample 1) by whether firms become a potential target for mergers and acquisitions (M&As) and 2) by whether firms have a high proportion of equity compensation in CEO pay. We find that the adverse market reactions of the SEO announcement and underpricing towards unionized issuers only exist in the subsamples of 1) firms that are *not* a potential M&A target and 2) firms that use a *low* proportion of equity compensation in their CEO compensation. These results suggest that firms only engage in strategic disclosure in response to union negotiations when such a strategy is less costly.

Finally, we consider the potential offsetting impacts of downwards adjusting the SEO offer price entailed in SEO underpricing for the unionized issuers in response to potential lower demand for their SEO stocks (i.e., Loughran & Ritter, 2002; Corwin, 2003; Çolak et al., 2017). We find that unionized SEO issuers do not significantly reduce their offer prices after experiencing adverse market reactions to SEO announcements. This result is consistent with our expectation that the lowering offer price strategy to attract retail demand is effective only when the lower demand results from high information uncertainty (i.e., under the IPO setting). SEO investors are more likely to obtain sufficient and relevant information (including unions-related tension) through firm disclosures. Therefore, firms are less likely to use the strategy of lowering offer prices to increase retail demand and the associated underpricing as identified in prior literature. Our results still hold after performing a battery of robustness tests to control for the impacts of the global financial crisis (Di Guili et al., 2023), SEO peer effects (Billet et al., 2023), measuring market reactions using various time windows and endogeneity concerns.

Our study extends the literature in several ways. First, it differs from the literature on equity issuing, which mainly focuses on the level of information asymmetry induced by the agency conflicts between management and external investors (Brennan & Franks, 1997; Eckbo et al., 2007; Stoughton & Zechner, 1998). We examine the signaling impacts of firms' equity issuing when there is union presence in the context of SEOs and find that investors respond negatively to SEO announcements by unionized firms, which is consistent with the rationale that they have doubts about the purpose of such fund-raising activities in creating shareholder values (Jung et al., 1996). We further find that the lower underpricing associated with unionized SEO issuers results from engaging in strategic disclosures to obtain better union negotiation (Bova, 2013; Chung et al., 2016), negatively affecting investors' expectations of the firm's future performance.

Second, we contribute to the union literature by documenting the impacts of labor unions on firms' external capital-raising activities. The results from our study suggest that union pressure is likely to influence the information environment around SEOs through a negative signaling effect, which in turn affects the investment decisions of SEO investors.

Third, different from the concurrent study by Chantziaras et al. (2021) suggesting that the lower IPO underpricing for unionized issuers is induced by market negative sentiment on unionization considering firm's future performance when investors have limited information about the IPO firms, our paper takes advantage of the SEO settings where investors are exposed to a more transparent information environment that they can obtain information about the issuers through firm mandatory disclosures. Therefore, our findings reveal that the low underpricing for unionized SEO issuers results from investors incorporating all sources of information (about unions) relevant to assessing the firm value and making informed investment decisions rather than reacting to market sentiment.

Fourth and lastly, the results from our study may also be of interest to regulators as we contribute to the ongoing debate on RTW laws in the U.S. (Gondhalekar & Kessler, 2021) by shedding light on the efficiency of these laws. Our results suggest that strong union power induces firms to adopt strategic disclosure tactics during their SEO process. Nevertheless, adopting RTW laws curbs the financial supply of unions and reduces their influence on SEO issuers, which indirectly alleviates the negative signaling effect of unions on SEO investors. Our study is timely and relevant to lawmakers who acknowledge the need to introduce nationwide RTW legislation (Conklin, 2021).

The rest of the paper runs as follows. Section 2 reviews relevant literature and develops our hypotheses. Section 3 explains our sample selection process and models used in the empirical analysis. Section 4 presents the empirical results and provides further analyses. Finally, Section 5 concludes.

2. Literature review and hypotheses' development

2.1. Labor unions, signaling effects, and SEO announcement returns

Literature on labor unions suggests that labor unions are quasi-rent seekers that influence the corporate decision-making process related to operating investing and financing activities (i.e., Jensen & Meckling, 1976). The advocacy of labor unions for employee benefits can extract above-market rents from the firm (i.e., wage premia above the efficient, competitive market wage), leading to lower operating productivity and flexibility (Chen et al., 2011) and reduced profitability (Bronars et al., 1994). Labor unions can also influence managers' investment decisions by limiting the level of risk, resulting in underinvestment (Bronars & Deere, 1993; Hirsch, 1992).

One stream of literature also provides evidence of how labor unions affect firms' financing activities. Chen et al. (2012) find that unionization helps firms reduce their debt cost by lowering the bond yields. This is because firms operating in unionized industries are likely to employ more conservative investment policies, especially when they experience weak financial conditions. In the context of mergers and acquisitions (M&As), John et al. (2015) note that acquirers with strong labor rights experience significantly lower

acquisition announcement returns and combined announcement returns of acquirers and targets, particularly in labor-intensive industries and industries that prefer higher collective bargaining. Chantziaras et al. (2021) examine the impact of labor unions during equity issuing and find that unionized issuers experience a reduction of 11.2 % in underpricing at the initial public offering. They also suggest that such a reduction is induced by less investor participation and lower investor interest in buying the new shares of unionized issuers. Chantziaras et al. (2021) argue that the low demand for unionized IPO issuers is associated with investors' negative sentiment in response to information uncertainty around the impact of unions on firm performance and valuation.

Unlike other financing activities, SEOs are regarded as unexpected equity financing activities likely to indicate potential lower current cash flow relative to the future cash flows in the issuing firms (Miller & Rock, 1985). Therefore, the empirical literature finds that SEO issuers, on average, suffer a drop between 2 % and 3 % in their stock price in the U.S. (Asquith & Mullins, 1986; Corwin, 2003; Eckbo & Masulis, 1992; Masulis & Korwar, 1986). This is because investors treat the SEO announcement as a bad signal of an unexpected cash flow issue that might affect firms' future performance (Akerlof, 1970; Miller & Rock, 1985). Consistent with the signaling theory, we argue that the presence of labor unions negatively affects SEO issuers as it triggers additional concerns about misusing SEO proceeds. Because labor unions aim to serve the benefits of employees, investors may suspect whether the funds raised from SEOs will be used by the firms influenced by unions' aggressive demands to pay excess wages or other employee benefits above the efficient market level.

As prior literature indicates, unionized firms are more likely to experience underinvestment (Bronars & Deere, 1993), lower operating productivity (Chen et al., 2012), and reduced profitability (Bronars et al., 1994) caused by union activism. Therefore, investors are likely to question whether the funds they invest will result in an increase in firm value or not. With the fear of managers misusing the invested funds for purposes other than their firm's value-adding activities, investors may be concerned about the overpricing of the new shares (i.e., including the proportion that will be used to pay union benefits) to a greater extent compared to firms without the union's impacts. Based on the above discussions, we expect that firms with labor unions are likely associated with greater negative SEO announcement returns than non-unionized firms, and we posit our first hypothesis.

H1. Ceteris paribus, labor unionization is negatively associated with SEO announcement returns.

2.2. Labor unions, strategic disclosure, and SEO underpricing

The finance literature suggests that underpricing exists in equity issuance because there is information asymmetry about firm value between insiders and outside investors (Parsons & Raviv, 1985; Rock, 1986). To ensure the full subscription of the funds required in the offering, the underwriters would set an initial offer price low enough to encourage investors with a relatively high firm valuation to avoid undersubscription. Parsons and Raviv (1985) argue that the size of underpricing is affected by investors' perceptions of the firm's valuations. Therefore, given information asymmetry within the SEO context, firms can employ different disclosure strategies to signal their value to the market. This results in different magnitudes of SEO underpricing (i.e., size of the offer date return), particularly when the firm is affected by labor unions.

We contend that unionized SEO issuers are more likely to employ different disclosure strategies than non-unionized issuers to strengthen their negotiation power against labor unions (Bova et al., 2015; Burke, 2016; Hilary, 2006). First, unionized firms likely withhold good news (i.e., optimistic performance forecasts) from the market. Burke (2016) and Bova et al. (2015) suggest that managers tend to hide information, particularly about perquisites, excess compensation, information related to future capital expenditures, and optimistic forthcoming prospects (i.e., expected earnings and earnings growth) of the firm when facing strong union power. More specifically, Chung et al. (2016) find that information withholding is more pronounced for good news than for bad news in firms that face strong union pressure. They argue that firms strategically delay good news disclosures according to their bargaining schedules to display a pessimistic look about the firm's prospects.

Second, we argue that unionized firms are likely to disclose bad news (or less optimistic information) to the market when facing union pressure (Bova, 2013; Burke, 2016; DeAngelo & DeAngelo, 1991; Ogden & Bougen, 1985; Xing & Yan, 2018). This is because labor unions are likely to demand more detailed financial information (including both positive and negative news) to be released during the employment negotiation process to facilitate reconciliation or to reach agreements (Burke, 2016; Xing & Yan, 2018). In response to union requests, managers may choose to disclose more accounting information (i.e., related to expenses and losses) that can potentially disarm unions' opposition to managerial decisions (Ogden & Bougen, 1985) and achieve better terms in the final negotiation agreements. Therefore, the disclosures from unionized SEO issuers are likely to be less optimistically biased than those from non-unionized firms (Bova, 2013; DeAngelo & DeAngelo, 1991). Additionally, we argue that unionized SEO issuers are more likely to engage in earnings management (i.e., by "taking a bath") and to depict a relatively more pessimistic outlook of corporate performance to improve firms' bargaining position against labor unions. Bova (2013) finds that firms with strong union power are less likely to beat analyst forecasts compared to non-unionized firms, suggesting that unionized firms seek to manipulate profitability signals to strengthen their negotiation stances with the unions.

In summary, unionized SEO issuers are more likely to employ strategic disclosure tactics like withholding good news and/or releasing bad news (i.e., through income-decreasing earnings management) to signal to labor unions of a relatively weaker financial position, which helps to strengthen the firm's bargaining position. We argue that these disclosures affect investors' valuation of the SEO issuers. Hilary (2006) suggests that investors incorporate union information into their trading decisions and find that unionized firms are associated with larger bid-ask spreads and a higher likelihood of informed trading. With the negative signaling from the firm's strategic disclosure, investors are less likely to be confident in the future performance of these unionized SEO issuers, leading to a lower valuation of these unionized SEO firms than those for non-unionized issuers. The lower valuation is likely associated with the

lower closing price on the offering date of unionized issuers. This leads to lower SEO underpricing for unionized SEO firms than non-unionized firms, reflecting the lower return on the offering date. So, we propose the second hypothesis as follows.

H2. Ceteris paribus, labor unionization is negatively associated with SEO underpricing.

Prior literature also documents that SEO firms are motivated to reduce the offer price of the issuing (i.e., leaving money on the table) to attract retail demand and ensure the success of equity issuance (Benveniste & Spindt, 1989; Corwin, 2003; Loughran & Ritter, 2002; Çolak et al., 2017). Because of the negative signaling from unionized firms' strategic disclosure on valuation, the firms can offset the negative impacts of the union on the issuance by lowering the SEO offer price, leading to greater SEO underpricing. To address this concern, we perform tests on the SEO offer price in the Additional Tests section.

3. Research method

3.1. Data

Our initial sample starts from 5950 firm-year SEOs between 2001 and 2015 from the Securities Data Corporation (SDC) Platinum database. Following Kim et al. (2013), we exclude private placements, unit offers, rights offers, and unit investment trust offers. Then, we match all SEOs with industry and firm unionization rates to obtain 4390 firm-year observations before merging the control variables. We obtain individual stock prices and market index data from the Center for Research in Security Prices (CRSP) Stock Database and the financial fundamentals necessary to test those SEO deals from the Compustat Database. After eliminating observations with missing data for control variables, we obtain our final sample of 3497 observations to analyze the effect of labor unions on SEO announcement returns and 3517 observations for the regression tests pertaining to the union effect on SEO underpricing.

3.2. Models

3.2.1. Model for hypothesis 1: labor unions and SEO announcement returns

To test Hypothesis 1, which concerns the association between labor unionization and SEO announcement returns, we estimate Equation (1) on a sample of 3497 firm-year observations for the SEOs between 2001 and 2015. We use OLS regression with standard errors adjusted for clustering by Fama-French 48 industry classification.

$$\begin{aligned} SEOCAR_{it} = {} & \beta_0 + \beta_1 Mem_{jt}\ (Cov_{jt}) + \beta_2 Size_{it-1} + \beta_3 Leverage_{it-1} + \beta_4 MTB_{it-1} + \beta_5 Re\_offer_{it} + \beta_6 Secondary\_shares_{it} \\ & + \beta_7 Runup_{i,t} + \beta_8 Mktrunup_{it} + \beta_9 Nasdaq_{it} + \beta_{10} Hightech_{it} + Year + Industry + \varepsilon_{it} \end{aligned} \tag{1}$$

We define our primary dependent variable, $SEOCAR_{it}$, as the cumulative abnormal returns for three days centered on SEO filing dates, on which 90 % of the issuers publicly announce their offering (Jegadeesh et al., 1993). Following Feng et al. (2018), we calculate $SEOCAR_{it}$ based on the ordinary least squares (OLS) market model (Equation (2)), defined as:

$$SEOCAR_i\ (-1, +1) = \sum_{t=-1}^{+1} (R_{it} - \widehat{\alpha}_i - \widehat{\beta}_i \cdot R_{Mt}) \tag{2}$$

Here, R_{it} means the stock return of firm i on day t (we take the SEO filing date as event day 0), and R_{Mt} represents the equally-weighted average return of the CRSP market portfolio on date t. The coefficients $\widehat{\alpha}$ and $\widehat{\beta}$ are respective estimates of the intercept and slope coefficients in the OLS market model after we regress the stock daily return of firm i (R_{it}) on the daily return of the market portfolio (R_{Mt}) using an estimation window (−260, −11) before the event window. We calculate the abnormal return based on the market model (i.e., the difference between the actual return and the expected return based on the market model) on day t, and SEOCARi $(-1,+1)$ is the accumulated abnormal returns during the event window (−1,1).

We follow the extant literature to measure our interest variables of the workers' collective bargaining power. Mem_{jt} and Cov_{jt} identify industry-level union membership and coverage rates in year t within industry j that the firm belongs to, respectively (Bronars & Deere, 1993; Chen et al., 2018; Klasa et al., 2009; Rosen, 1969). Mem_{jt} is measured as the number of labor union members in industry j divided by the total employees in industry j in year t. Cov_{jt} is calculated by using the number of employees who are covered under union contracts in industry j divided by the total employees in industry j in year t. Following Huang et al. (2017) and Woods et al. (2019), both industry unionization rates are based on a 3-digit Census Industry Classification (CIC) industry classification and can be obtained from the Union Membership and Coverage Database. Higher industry-level unionization membership and coverage rates suggest that unions have more bargaining power to confront employers.[4]

Equation (1) employs control variables identified in prior research associated with SEO announcement returns. Specifically, we include firm size ($Size_{it-1}$) measured by the natural logarithm of total assets in the most recent prior year $t-1$ of the SEO announcement, which is expected to have a positive relationship with SEO announcement; and leverage ratio ($Leverage_{it-1}$), which is the firm's debt to total assets ratio in year $t-1$, which is expected to negatively relate to the SEO announcement return (Eckbo et al., 2007; Lee & Masulis,

[4] We develop a firm-level unionization rate, Ur_{it}, based on Chen et al. (2018). This rate is estimated by multiplying the industry unionization rate (Mem_{it}) by the number of employees and then dividing that value by the number of employees in firm i during year t. We obtain consistent results of all our main regression tests using the firm-level unionization rate, Ur_{it}, as the variable of interest.

2009). We also include the firm's market-to-book ratio (MTB_{it-1}) in year *t-1*, because stock prices surrounding the SEOs will react to the issuer's business growth potential. Shivakumar (2000) documents that a smaller offering size is associated with higher stock returns. We thus control for the number of shares offered scaled by total shares outstanding (Re_offer_{it}).

We follow Kim et al. (2013) to control for the proportion of SEO shares sold by existing shareholders divided by the total shares offered in the SEOs ($Secondary\_shares_{it}$). As per Masulis and Korwar (1986) and Shivakumar (2000), we capture the factors that influence investor perceptions towards the issuers' offerings, such as individual stock returns ($Runup_{it}$) and market index returns ($Mktrunup_{it}$) over 60 trading days prior to the SEO announcement. We also include a dummy variable, NASDAQ ($Nasdaq_{it}$), to capture the regulatory environment of the primary listing exchange market and a dummy variable, $Hightech_{it,}$ to control for the high technology industry, which more often seeks external capital by security issuances (Chan & Walter, 2014). Lastly, we include year and industry-fixed effects. All the continuous variables are winsorized at 1/99 % in the regressions to rule out the potential effect of outliners.

3.2.2. Model for hypothesis 2: labor unions and SEO underpricing

To examine Hypothesis 2 concerning the association between SEO firms' unionization rates and SEO underpricing, we conduct OLS regression analyses using Equation (3) following Corwin (2003) and Feng et al. (2018).

$$\begin{aligned} SEO\_Underpricing_{it} = {} & \beta_0 + \beta_1 Mem_{it}(Cov_{it}) + \beta_2 PreCAR_{it} + \beta_3 Volatility_{it} + \beta_4 Leverage_{it} + \beta_5 Cash_{it} + \beta_6 IPO\ underpricing_{it} \\ & + \beta_7 Lnprice_{it} + \beta_8 D\_Lowprice_{it} + \beta_9 D\_Highrisk_{it} + \beta_{10} D\_LowMV_{it} + \beta_{11} Re\_offer_{it} + \beta_{12} Re\_offer_{it} \\ & \times D\_Lowprice_{it} + \beta_{13} Re\_offer_{it} \times D\_Highrisk_{it} + \beta_{14} Re\_offer_{it} \times D\_LowMV_{it} + \beta_{15} Nasdaq_{it} + \beta_{16} LnAge_{it} \\ & + \beta_{17} Loss_{it} + \beta_{18} LnCAP_{it} + Year + Industry + \varepsilon_{it} \end{aligned} \tag{3}$$

We define SEOs' underpricing ($SEO\_Underpricing_{it}$) as the return calculated by using the closing price on the offer date minus the offer price, divided by the offer price for firm *i* and year *t*. Prior literature suggests that larger abnormal stock returns prior to the offering positively correlate with SEO underpricing (Benveniste & Spindt, 1989; Loughran & Ritter, 2002). Thus, we control for the pre-offer price movement by calculating cumulative abnormal returns from the filing date up to one day before the offering date ($PreCAR_{it}$), where the market return is defined as the return on the CRSP value-weighted index and the natural logarithm of the close price one day prior to the offering date ($Lnprice_{it}$) for firm *i* in year *t*.

We also include two proxies for price uncertainty and asymmetric information surrounding the SEO in the regressions: $Volatility_{it}$, defined as the standard deviation of daily stock returns over the 30 trading days prior to the SEO offering date, and $Leverage_{it}$, as the ratio of debt to total assets for firm *i* in year *t*. We add the value of cash and cash equivalent scaled by total assets for firm *i* in year *t* ($Cash_{it}$) to control for financial flexibility. We control for the level of prior IPO underpricing ($IPO\_underpricing_{it}$) because the literature suggests that an increase of IPO underpricing also contemporarily increases the subsequent SEO underpricing (Loughran & Ritter, 2002; Ritter & Welch, 2002).

Following Corwin (2003), we use relative offer size (Re_offer_{it}), calculated as the number of offered shares divided by the number of total shares outstanding prior to the offer, to capture the existing market's potential ability to absorb the new shares, which is expected to be positively associated with SEO underpricing. Corwin (2003) further suggests that this positive effect of relative offer size is more pronounced when firms' demand elasticity is limited, such as those with lower stock prices, higher uncertainty, and smaller market capitalization. We thus create three dummy variables to identify firms with relatively inelastic demand, $D\_Lowprice_{it}$, $D\_Highrisk_{it}$, and D_LowMV_{it}, which are respectively defined as 1 if the firm is in the lowest quartile of stock price, the highest quartile of standard deviations, and the lowest quartile of market capitalization across the sample and 0 otherwise. We then include four interaction terms between relative offer size (Re_offer_{it}) and each of the three dummy variables, where their coefficients are expected to be positive if SEO underpricing relates to price pressure.

Following Kim and Park (2005), we finally include the dummy variable $Nasdaq_{it}$ to identify the firms' SEOs listed on NASDAQ for controlling the regulatory environment of exchange markets. $LnAge_{it}$ refers to the natural logarithm of the number of years since the firm *i* has been recorded in the CRSP database until the SEO announcement year *t*. $Loss_{it}$ equals 1 if the firm *i* in year *t* reports a negative net profit and 0 otherwise. $LnCAP_{it}$ is the natural logarithm of the firm *i*'s market capitalization in year *t*. More details of variable definitions are provided in Appendix I.

3.3. Univariate analysis

3.3.1. Sample description

Table 1 reports the mean values of *CAR(-1,1)* surrounding SEO announcements across years and industries in our sample. Panel A shows that most average CAR(-1,1) in response to SEO announcements are negative over the years, consistent with prior studies suggesting that investors perceive companies conducting SEOs as having a bad signaling effect (Carlson et al., 2006; Ritter, 2003). Panel B shows the distribution of the firm-year observations in our regressions of SEO announcement returns by the Fama-French classification of 48 industries. We find a persistent pattern of negative cumulative abnormal returns surrounding SEO announcements with similar magnitudes across most industries except for the sectors of alcoholic beverages (average $SEOCAR = 0.0437$) and construction materials (average $SEOCAR = 0.0049$). Overall, the evidence suggests that the market reacts negatively to SEO announcements.

Table 1
Sample description.

Panel A: Sample distribution by year

Year	Number of offers	*SEOCAR* mean
2001	199	−0.017
2002	178	−0.011
2003	215	−0.015
2004	164	−0.018
2005	153	−0.014
2006	175	−0.013
2007	133	0.006
2008	160	−0.028
2009	409	−0.006
2010	320	−0.021
2011	275	−0.006
2012	351	−0.009
2013	302	−0.014
2014	266	−0.014
2015	197	−0.012
Total	**3497**	**−0.013**

Panel B: Sample distribution by industry

Industry	Number of offers	*SEOCAR* mean
Agriculture	11	0.0006
Food products	27	−0.0207
Candy and soda	4	−0.0122
Alcoholic beverages	2	0.0437
Tobacco products	1	−0.0023
Recreational products	3	−0.1134
Entertainment	27	−0.0255
Printing and publishing	3	−0.0255
Apparel	14	−0.0006
Health care	49	−0.0241
Medical equipment	131	−0.0116
Pharmaceutical products	543	−0.0190
Chemicals	49	−0.0130
Rubber and plastic products	9	−0.0165
Textiles	0	-
Construction materials	16	0.0049
Consumer goods	11	−0.0041
Construction	28	−0.0319
Steel works, etc.	17	−0.0125
Fabricated products	3	−0.0347
Machinery	54	−0.0286
Electrical equipment	24	−0.0314
Miscellaneous	0	-
Automobiles and trucks	35	−0.0217
Aircraft	19	−0.0322
Shipbuilding, railroad equipment	0	-
Defense	4	−0.0409
Precious metals	21	−0.0272
Non-metallic mining	25	−0.0064
Coal	8	−0.0075
Petroleum and natural gas	198	−0.0117
Utilities	253	−0.0091
Telecommunications	53	−0.0118
Personal services	19	−0.0104
Business services	228	−0.0200
Computers	35	−0.0208
Electronic equipment	111	−0.0232
Measuring and control equip	42	−0.0119
Business supplies	6	0.0462
Shipping containers	11	0.0042
Transportation	113	−0.0163
Wholesale	45	−0.0086
Retail	96	−0.0163
Restaurants, hotel, motel	47	−0.0162
Banking	265	−0.0130
Insurance	70	−0.0011
Real estate	17	0.0084

(*continued on next page*)

Table 1 (*continued*)

Panel B: Sample distribution by industry		
Industry	Number of offers	*SEOCAR* mean
Trading	750	−0.0026
Total	**3497**	**−0.0127**

Table 1 shows the sample distribution based on year and industry. We use the Fama-French 48 Industry classification. Detailed definitions of variables appear in Appendix.

Table 2
Descriptive statistics.

Panel A: Sample in the regression of SEO announcement return model (N = 3497)					
Variable	Mean	SD	Q1	Median	Q3
$SEOCAR_{it}$	−0.013	0.070	−0.040	−0.010	0.013
Mem_{it}	0.075	0.083	0.033	0.048	0.087
Cov_{it}	0.085	0.088	0.037	0.053	0.097
$Size_{it-1}$	6.417	2.173	4.829	6.591	7.880
$Leverage_{it-1}$	0.258	0.260	0.016	0.212	0.434
MTB_{it-1}	6.546	26.964	0.970	2.455	5.553
Re_offer_{it}	0.354	1.023	0.046	0.115	0.284
$Secondary\_shares_{it}$	0.183	0.371	0.000	0.000	0.000
$Runup_{it}$	0.135	0.519	−0.049	0.059	0.192
$Mktrunup_{it}$	0.022	0.085	−0.016	0.029	0.070
$Nasdaq_{it}$	0.482	0.500	0.000	0.000	1.000
$Hightech_{it}$	0.355	0.479	0	1	1
RTW	0.330	0.470	0.000	0.000	1.000
$High\_Unemployment_{it}$	0.520	0.500	0.000	1.000	1.000
Panel B: Sample in the regression of SEO underpricing model (N = 3517)					
Variable	Mean	SD	Q1	Median	Q3
$SEO\_Underpricing_{it}$	0.031	0.082	0.000	0.016	0.041
Mem_{it}	0.071	0.083	0.029	0.046	0.344
Cov_{it}	0.083	0.087	0.037	0.052	0.092
$PreCAR_{it}$	0.075	0.598	−0.094	−0.007	0.076
$Volatility_{it}$	1.077	1.678	0.347	0.687	1.259
$Leverage_{it}$	0.304	0.254	0.060	0.299	0.473
$Cash_{it}$	0.222	0.296	0.018	0.069	0.324
$IPO\ Underpricing_{it}$	0.146	0.093	0.087	0.136	0.207
$Lnprice_{it}$	2.795	1.110	2.270	3.042	3.514
Re_offer_{it}	0.128	0.630	0.029	0.058	0.110
$D\_Lowprice_{it}$	0.262	0.440	0.000	0.000	1.000
$D\_Highrisk_{it}$	0.216	0.411	0.000	0.000	0.000
D_LowMV_{it}	0.163	0.370	0.000	0.000	0.000
$Nasdaq_{it}$	0.467	0.499	0.000	0.000	1.000
$LnAge_{it}$	0.030	0.164	0.000	0.000	0.000
$Loss_{it}$	0.369	0.483	0.000	0.000	1.000
$LnCAP_{it}$	20.466	1.761	19.501	20.615	21.585
RTW	0.345	0.475	0.000	0.000	1.000
$High\_Unemployment_{it}$	0.488	0.500	0.000	0.000	1.000

Table 2 presents the descriptive statistics of all the variables used in the regression tests for the SEO announcement model (Panel A) and SEO underpricing model (Panel B). Detailed definitions of variables appear in Appendix.

3.3.2. Descriptive statistics

Table 2 reports descriptive statistics for the samples used to estimate the impact of unionization on SEO announcement returns (Panel A) and offering underpricing (Panel B). In Panel A, the mean value of *SEOCAR* for the sample regarding SEO announcement effects suggests approximately −1.3 % of cumulative abnormal returns within one day of SEO filing dates, which is close to −1.4 % of that reported by Feng et al. (2018). The mean values of the two industry-level proxies for unions' collective bargaining power based on union membership (*Mem*) and coverage (*Cov*) are 7.5 % and 8.5 %, respectively. These values are lower than those reported in prior literature (e.g., 13.7 % by Hilary (2006)). This is because we cover firms in more recent years (i.e., 2001–2015) that are well-recognized with a gradual decline in union membership and density in the U.S. (Schnabel, 2020).

Panel B of Table 2 presents the descriptive statistics for all the variables used in the tests to examine the effect of unionization on SEO underpricing in Equation (3). The mean level of *SEO_Underpricing* is 0.031 (median is 0.016), consistent with the literature (i.e., Li & Zhuang, 2012, Table 2 with a mean value of 0.0336 and median value of 0.0271). A mean of 0.031 suggests that 3.1 % of the offering proceeds are 'money left on the table' for investors in our sample. The mean values of *Mem* and Cov are 0.071 and 0.083, similar to those reported in Panel A of Table 2. The mean (median) values of *PreCAR*, *Volatility*, *Leverage*, *IPO_Underpricing*, *Lnprice*, and *Re_offer*

are respectively 0.075 (−0.007), 1.077 (0.687), 0.304 (0.299), 0.146 (0.136), 2.795 (3.042), and 0.128 (0.058) and generally similar to those documented by Feng et al. (2018).

3.3.3. Correlation matrix

Table 3 provides the Pearson correlation coefficients among variables of the *SEOCAR* regression analysis (Panel A) and the *SEO_Underpricing* regression analysis (Panel B). In Panel A, the bivariate correlation shows that *SEOCAR* negatively correlates with *Mem* (−0.040) and Cov (−0.039) at the 5 % significance level, suggesting firms with higher unionization rates are associated with lower SEO announcement returns. Broadly consistent with Feng et al. (2018), *SEOCAR* is significantly associated with most control variables. Panel B of Table 3 reports that *SEO_Underpricing* positively correlates with relative offer size *Re_offer* (0.141), *IPO_Underpricing* (0.03), *Cash* (0.061), and *Loss* (0.112) and negatively correlates with *Lnprice* (−0.172), *Leverage* (−0.129), and *LnCAP* (−0.163). Specifically, we examine the variables' variance inflation factor (VIF) statistics and find all the untabulated VIF values are less than 10.

4. Empirical results

4.1. Regression analysis on SEO announcement returns

To test Hypothesis 1 concerning labor unionization's impacts on the SEO announcement returns, we employ OLS regression analysis using Equation (1) and provide the results in Table 4. The Pseudo R^2 statistics are modest and in the 4.3–4.4 % range. Columns 1–2 show the results without controlling for exchange (*Nasdaq*) and industry (*Hightec*) attributes. The coefficients for our variables of interest, industry-level unionization membership rate *Mem* and coverage rate *Cov*, are both significantly negative ($\beta = -0.0471$ and $\beta = -0.0426$) at the 5 % significance level. Columns 3–4, with fully specified regressions, also show significantly negative coefficients for *Mem* and Cov ($\beta = -0.0469$ and $\beta = -0.0426$) at the 5 % significance level. Altogether, these results suggest that investors respond more negatively towards the SEO announcement by unionized issuers than those by non-unionized issuers, supporting Hypothesis 1. These results also imply that unionization seems to be an incremental negative signaling added to the generally observed adverse reaction towards firms' SEO announcements because investors worry about the potential misuse of proceeds raised from such issuing.

4.2. Regression analysis on SEO underpricing

Table 5 shows the results of the OLS regressions on Equation (3), which tests Hypothesis 2 concerning the impact of labor unionization on SEO underpricing. The Pseudo R^2 statistics are reasonable in the vicinity of 10.2–10.7 %. Columns 1–2 organize the results using the simplified regressions without controlling for the conditions based on relative offering size (*Re_offer*) for securities with relatively inelastic demand (i.e., the proxies are *D_Lowprice*, *D_Highrisk*, and *D_LowMV*). Columns 1–2 show significantly negative coefficients for industry-level union rates *Mem* and Cov ($\beta = -0.0404$ and $\beta = -0.0397$, respectively) at the 5 % significance level, supporting our H2 that proposes the negative impact of labor unionization on SEO underpricing.

Following Corwin (2003), we include the interaction terms between *Re_offer* and each of the three dummy variables for potential inelastic demand in our regressions of Columns 3–4, which are *D_Lowprice* capturing the securities at lowest prices, *D_Highrisk* identifying the securities with higher uncertainty, and *D_LowMV* presenting the securities with smaller investor base. Columns 4–6 reveal the significantly negative coefficients remaining for *Mem* and Cov ($\beta = -0.0399$ and $\beta = -0.0393$, respectively) at the 5 % significance level. Overall, our findings in Table 5 suggest that investors of unionized issuers are likely to experience lower SEO underpricing compared to non-unionized issuers because of their portrayed pessimistic outlook of the firms, supporting Hypothesis 2.

4.3. Additional tests

4.3.1. Labor unions' influence

In this section, we further explore cross-section variations in the impacts of unionization on investor responses to the two SEO events. We argue that the labor union's effects on negative SEO announcement returns and lower SEO underpricing depend on the magnitude of the union's bargaining position. Therefore, we employ two proxies for the unions' bargaining environment, right-to-work laws (*RTW*) and the local unemployment rate (*Unemployment*), and then investigate how the exogenous variations in unionization power affect its relations with the SEO announcement returns and underpricing.

4.3.1.1. Tests on right-to-work law. State-level right-to-work laws in the U.S., which 27 states have passed, provide employees a choice to not join a labor union as part of their employment requirement or condition (National Conference of State Legislatures, 2022). The state law also prohibits employees from negotiating contracts requiring non-union members to contribute to the costs of union representation, which effectively constrains the unions' rights regarding their entitlement to demanding union fees. We create a right-to-work law dummy variable (*RTW*), which equals 1 if the issuer resides in states subject to a right-to-work law and 0 otherwise. Our test variable is the interaction between the industry-level unionization rates and the *RTW* dummy that captures the strength of union power on SEO issuers.

Table 6 reports the results of the OLS regression analyses for testing the impact of unionization on SEO announcement returns and SEO underpricing, conditioned on whether the impact of the right-to-work law binds the unionized firms. In Columns 1 and 2, the coefficients for *Mem* and Cov are significantly negative ($\beta = -0.0625$ and $\beta = -0.0557$) at the 1 % and 5 % levels, respectively. The

Table 3
Correlation matrix.

Panel A: SEO announcement return model

	SEOCARit	$Mem_{i,t}$	$Cov_{i,t}$	$Size_{it-1}$	$Leverage_{it-1}$	Mtb_{it-1}	$Relative\_offer_{it}$	$Secondary\_shares_{it}$	$Runup_{it}$	$Mktrunup_{it}$	$Nasdaq_{it}$
$SEOCAR_{it}$	1										
Mem_{it}	−0.040**	1									
Cov_{it}	−0.039**	0.985***	1								
$Size_{it-1}$	0.095***	0.012	−0.011	1							
$Leverage_{it-1}$	0.073***	0.021	0.013	0.365***	1						
MTB_{it-1}	−0.063***	0.013	0.024	−0.161***	−0.078***	1					
Re_offer_{it}	−0.008	−0.067***	−0.071***	−0.142***	−0.115***	−0.13***	1				
$Secondary\_shares_{it}$	−0.045***	−0.002	−0.013	0.166***	0.085***	−0.018	−0.060***	1			
$Runup_{it}$	−0.066***	−0.033*	−0.025	−0.130***	−0.101***	−0.010	−0.017	0.020	1		
$Mktrunup_{it}$	0.015	−0.046***	−0.036**	−0.070***	−0.041**	−0.031*	0.019	−0.012	0.342***	1	
$Nasdaq_{it}$	−0.051***	−0.080***	−0.063***	−0.483***	−0.314***	0.116***	0.112***	−0.046***	0.108***	0.060***	1

Panel B: SEO underpricing model

	SEO_ Underpricingit	Memit	Covit	PreCARit	Volatilityit	Leverageit	Cashit	IPO_ Underpricingit
$SEO\_Underpricing_{it}$	1							
Mem_{it}	−0.005	1						
Cov_{it}	0.000	0.985***	1					
$PreCAR_{it}$	0.012	−0.024	−0.018	1				
$Volatility_{it}$	−0.007	0.038**	0.036**	−0.134***	1			
$Leverage_{it}$	−0.129***	−0.001	−0.023	−0.055***	−0.089***	1		
$Cash_{it}$	0.061***	−0.123***	−0.080***	0.111***	0.067***	−0.496***	1	
$IPO\_Underpricing_{it}$	0.030*	−0.111***	−0.101***	−0.021	0.004	0.010	0.017	1
$Lnprice_{it}$	−0.172***	0.012***	−0.012	−0.348***	0.498***	0.180***	−0.328***	0.007
$D\_Lowprice_{it}$	0.181***	−0.007	0.016	0.277***	−0.334***	−0.175***	0.341***	−0.008
$D\_Highrisk_{it}$	−0.010	0.054***	0.051***	−0.114***	0.713***	−0.081***	0.035**	0.008
D_LowMV_{it}	0.150***	−0.037**	−0.021	0.255***	−0.239***	−0.197***	0.225***	0.008
Re_offer_{it}	0.141***	−0.048	−0.049***	0.068***	−0.168***	−0.078***	−0.015	0.000
$Nasdaq_{it}$	0.096***	−0.053***	−0.031*	0.071***	0.028*	−0.395***	0.472***	0.007
$LnAge_{it}$	0.024	−0.022	−0.028*	0.015	0.005	0.033*	−0.049***	−0.013
$Loss_{it}$	0.112***	−0.008	0.024	0.203***	−0.068***	−0.245***	0.548***	0.035**
$LnCAP_{it}$	−0.163***	0.024	0.006	−0.238***	0.354***	0.264***	−0.320***	0.016

	$Lnprice_{it}$	$D\_Lowprice_{it}$	$D\_Highrisk_{it}$	D_LowMV_{it}	Re_offer_{it}	$Nasdaq_{it}$	$LnAge_{it}$	$Loss_{it}$	$LnCAP_{it}$
$Lnprice_{it}$	1								
$D\_Lowprice_{it}$	−0.813***	1							
$D\_Highrisk_{it}$	0.421***	−0.291***	1						
D_LowMV_{it}	−0.623***	0.546***	−0.192***	1					
Re_offer_{it}	−0.25***	0.192***	−0.153***	0.364***	1				
$Nasdaq_{it}$	−0.271***	0.252***	0.019	0.250***	0.083***	1			
$LnAge_{it}$	−0.015	−0.018	0.009	−0.197***	−0.078***	−0.037**	1		
$Loss_{it}$	−0.480***	0.465***	−0.065***	0.302***	0.034**	0.337***	−0.245***	1	
$LnCAP_{it}$	0.737***	−0.578***	0.296***	−0.715***	−0.365***	−0.383***	0.264***	−0.373***	1

Table 3 reports the correlation coefficient matrices of SEO announcement return (Panel A) and SEO underpricing (Panel B) models. *, **, and *** indicate respective statistical significance at 10 %, 5 %, and 1 % levels. Detailed definitions of variables appear in Appendix.

Table 4
OLS regression results for the impact of labor unions on SEO announcement returns.

	Dependent variable: *SEOCAR*			
Variable	(1)	(2)	(3)	(4)
Mem	−0.0471**		−0.0469**	
	(-2.30)		(-2.29)	
Cov		−0.0426**		−0.0426**
		(-2.18)		(-2.19)
Size	0.0023**	0.0023**	0.0026**	0.0027**
	(2.29)	(2.29)	(2.57)	(2.58)
Leverage	0.0076	0.0077	0.0085	0.0086
	(1.25)	(1.27)	(1.40)	(1.43)
MTB	−0.0002**	−0.0002**	−0.0002**	−0.0002**
	(-2.06)	(-2.05)	(-2.08)	(-2.06)
Re_offer	0.0001	0.0001	0.0002	0.0002
	(0.04)	(0.04)	(0.09)	(0.09)
Secondary_shares	−0.0099***	−0.0100***	−0.0099***	−0.0099***
	(-2.99)	(-3.01)	(-2.98)	(-2.99)
Runup	−0.0108*	−0.0108*	−0.0107*	−0.0107*
	(-1.89)	(-1.88)	(-1.87)	(-1.87)
Mktrunup	0.0177	0.0176	0.0172	0.0171
	(0.82)	(0.82)	(0.80)	(0.79)
Nasdaq			0.0034	0.0034
			(1.04)	(1.05)
Hightec			−0.0054	−0.0055
			(-1.10)	(-1.12)
Intercept	−0.0186	−0.0186	−0.0187	−0.0186
	(-0.82)	(-0.83)	(-0.82)	(-0.82)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	3497	3497	3497	3497
R^2	0.043	0.043	0.0439	0.044

Table 4 reports the regression results of the effects of unionization on SEO announcement returns based on Equation (1). The dependent variable, SEO announcement return (*SEOCARit*), is defined as cumulative abnormal returns within three days around the announcement date. The detailed definitions of the other variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at 10 %, 5 %, and 1 % levels with a two-tailed test.

results suggest that the negative effect of unions on SEO announcement returns remains for unionized firms located in states that do not have an RTW law. In contrast, the coefficients for the interaction terms between unionization rates (*Mem* and *Cov*) and *RTW* are positive and not significant, indicating that the effect for unionized firms in the states with an RTW law is not statistically distinct from those firms from states without an RTW law.[5]

Table 6 also shows similar results for SEO underpricing. The coefficients in Columns 3–4 for *Mem* and Cov ($\beta = -0.0388$ and $\beta = -0.0382$ at the 10 % level) are significantly negative, but their interaction terms with *RTW* are not. These consistent results suggest that, compared to firms in states with RTW laws, labor unions have no incrementally negative effect on SEO underpricing when the firms reside in a regulatory environment under the RTW law that effectively curbs the union's bargaining power with the firms. For brevity, tables onwards may omit the coefficients of controls and fixed effects.

4.3.1.2. Tests on local Unemployment rates. We use the local unemployment rate (*Unemployment*) as the second proxy to examine how the strength of union power affects the impacts of labor unions on SEO activities. Cramton and Tracy (1992) document that higher local unemployment rates are associated with lower union bargaining power. High unemployment rates may discourage employees from creating tensions with their employers via union strikes or bargaining as they may fear losing their jobs. We thus use a dummy variable $High\_Unemployment_{it}$, which equals 1 if the firm *i* resides in states with unemployment rates higher than the median in year *t* and 0 otherwise. We also include interaction terms between the industry-level unionization rates and $High\_Unemployment_{it}$, capturing

[5] We further incorporate longer windows of cumulative market-adjusted returns prior to and surrounding SEO announcement dates and/or issue dates in the regression models. *PreCAR* windows are replaced by extended periods (−30,0), (−90,0), (−120,0), and (−180,0) *prior to* the SEO announcement dates as well as are replaced by extended periods (−2,2), (−5,5), (−10,10), and (−20,20) *surrounding* SEO announcement dates. Our untabulated results show that labor unions' impacts on SEO announcement effects remain after incorporating anticipation effects before and/or surrounding their announcement of upcoming offerings. We also employ the same variations of windows for *PreCAR* surrounding SEO issue dates in the regressions used for SEO underpricing tests. The untabulated results show that our main findings still hold after controlling the anticipation effects.

Table 5
OLS regression results for the impact of labor unions on SEO underpricing.

	Dependent variable *SEO_Underpricing*			
Variable	(1)	(2)	(3)	(4)
Mem	−0.0404**		−0.0399**	
	(-2.16)		(-2.13)	
Cov		−0.0397**		−0.0393**
		(-2.11)		(-2.08)
PreCAR	−0.0096*	−0.0096*	−0.0095*	−0.0095*
	(-1.72)	(-1.72)	(-1.70)	(-1.70)
Volatility	0.0051**	0.0050**	0.0053**	0.0053**
	(2.37)	(2.37)	(2.49)	(2.49)
Leverage	−0.0288***	−0.0289***	−0.0288***	−0.0289***
	(-3.59)	(-3.60)	(-3.64)	(-3.65)
Cash	−0.0288**	−0.0288**	−0.0285**	−0.0285**
	(-2.19)	(-2.19)	(-2.15)	(-2.14)
IPO_Underpricing	0.0120	0.0119	0.0125	0.0124
	(0.69)	(0.68)	(0.72)	(0.72)
Lnprice	−0.0051	−0.0052	−0.0040	−0.0040
	(-0.86)	(-0.86)	(-0.68)	(-0.68)
D_Lowprice	0.0205***	0.0204***	0.0146	0.0146
	(2.77)	(2.76)	(1.60)	(1.60)
D_Highrisk	0.0032	0.0032	−0.0041	−0.0041
	(0.63)	(0.63)	(-0.51)	(-0.51)
D_LowMV	0.0023	0.0023	0.0130	0.0130
	(0.29)	(0.29)	(1.21)	(1.21)
Re_offer	0.0392*	0.0391*	0.0407	0.0405
	(1.73)	(1.73)	(1.41)	(1.41)
Re_offer × *D_Lowprice*			0.0594	0.0594
			(1.36)	(1.36)
$Re\_offer_{i,t}$ × *D_Highrisk*			0.1012	0.1014
			(1.25)	(1.25)
$Re\_offer_{i,t}$ × *D_LowMV*			−0.0629	−0.0628
			(-1.30)	(-1.30)
Nasdaq	0.0003	0.0003	0.0008	0.0008
	(0.06)	(0.06)	(0.15)	(0.15)
Lnage	0.0130	0.0130	0.0122	0.0121
	(0.87)	(0.87)	(0.81)	(0.80)
Loss	0.0062	0.0062	0.0060	0.0060
	(1.03)	(1.02)	(1.00)	(1.00)
LnCAP	−0.0012	−0.0012	−0.0009	−0.0009
	(-0.58)	(-0.57)	(-0.47)	(-0.47)
Intercept	0.0549	0.0552	0.0469	0.0472
	(1.12)	(1.13)	(0.94)	(0.95)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	3517	3517	3517	3517
R^2	0.102	0.102	0.107	0.107

Table 5 reports the regression results of the effects of unionization on SEO underpricing. The dependent variable, $SEO\_Underpricing_{it}$, is calculated as the closing price minus the offer price divided by the offer price. The detailed definitions of the other variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at 10 %, 5 %, and 1 % levels with a two-tailed test.

the impacts of labor unions on SEO announcement returns and SEO underpricing for firms in the states with relatively high unemployment rates.

Table 7 reports the results from OLS regressions testing the unionization effects on SEO announcement cumulative abnormal returns (CAR) and SEO underpricing, conditioned on whether the unionized firms are in states with higher unemployment rates. In Columns 1 and 2 of Table 7, the coefficients for *Mem* ($\beta = -0.0513$) and Cov ($\beta = -0.0465$) are significantly negative at the 5 % level. These results suggest that unionized firms in states with below the median unemployment rate are associated with greater negative SEO announcement returns than those of non-unionized firms. However, none of the coefficients for the interaction terms, *Mem* × *High_Unemployment* and *Cov* × *High_Unemployment*, are negative nor significant. These results imply that union power has weakened for firms in states with a higher unemployment rate, reducing investors' concerns about the purpose of SEOs. We also find consistent results regarding SEO underpricing in Columns 3 and 4 of Table 7. The results imply that unionized firms are less likely to engage in strategic disclosure when the local unemployment rate is high, reducing the likelihood of pessimistic valuation among SEO investors.

Table 6
OLS regression results for the impact of labor unions on SEO events including the impact of right-to-work law.

	Dependent variable: SEOCAR		Dependent variable: SEO_Underpricing	
Variable	(1)	(2)	(3)	(4)
Mem	−0.0625***		−0.0388*	
	(-2.71)		(-1.95)	
Cov		−0.0557**		−0.0382*
		(-2.53)		(-1.92)
RTW	−0.0043	−0.0043	−0.0030	−0.0028
	(-1.15)	(-1.12)	(-0.79)	(-0.72)
Mem × *RTW*	0.0397		−0.0160	
	(1.25)		(-0.53)	
Cov × *RTW*		0.0348		−0.0160
		(1.16)		(-0.54)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	3497	3497	3517	3517
R^2	0.0446	0.044	0.107	0.107

Table 6 shows the regression results of the effects of unionization on SEO announcement returns and SEO underpricing including the impact of right-to-work laws. The detailed definitions of the variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

Table 7
OLS regression results for the impact of labor unions on SEO events including the impact of local unemployment rate.

	Dependent variable: *SEOCAR*		Dependent variable *SEO_Underpricing*	
Variable	(1)	(2)	(3)	(4)
Mem	−0.0513**		−0.0377*	
	(-2.46)		(-1.93)	
Cov		−0.0465**		−0.0366*
		(-2.33)		(-1.83)
High_Unemployment	0.0037	0.0038	0.0108**	0.0109**
	(0.91)	(0.94)	(2.40)	(2.41)
Mem × *High_Unemployment*	−0.0285		−0.0042	
	(-0.86)		(-0.15)	
Cov × *High_Unemployment*		−0.0271		−0.0054
		(-0.87)		(-0.20)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	3497	3497	3517	3517
R^2	0.044	0.044	0.109	0.109

Table 7 shows the regression results of the effects of unionization on SEO announcement returns and SEO underpricing including the impact of local unemployment rate. The detailed definitions of the variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

4.3.2. Unionized firms' strategic disclosures

Consistent with prior literature (Bova et al., 2015; Burke, 2016), we argue that unionized firms are likely to employ disclosure tactics to portray a pessimistic (or less optimistic) financial position to obtain better negotiation stances when faced with union pressures. However, these disclosure strategies might be costly, especially when a firm is financially weak. To test this mechanism, we examine whether the observed effects of unionization are relatively weakened when unionized firms are less inclined to engage in such strategic disclosures. We consider two contexts: 1) when unionized firms are targets of potential M&A deals implying a potentially vulnerable financial shape, and 2) when the firms' CEO compensation packages contain a higher level of options or stock awards so that a depressing stock price may result in a lower value of compensation offered.

4.3.2.1. Tests on potentially being a target. We first construct a dummy variable, *Target*, that equals 1 if the firm has become or will be a

target in potential M&A deals within a two-year window centered on its SEO filing date for the SEO announcement tests (or SEO issue date for underpricing tests) and 0 otherwise.[6] Approximately 4 %–6 % of our samples of SEO-year observations are involved as targets in the M&A process.[7] Next, we report the regression tests based on the split samples by *Target* in Table 8. We find significantly negative coefficients (*Mem*: $\beta = -0.0525$; *Cov*: $\beta = -0.0478$ for SEO announcement tests; *Mem*: $\beta = -0.0382$; *Cov*: $\beta = -0.0372$ for SEO underpricing tests, all at least at 10 % significant level) for unionized firms/industries that are *not* a target within the 2-year window (i.e., *Target = 0*). However, there are no pronounced coefficients for those in the subsamples where *Target* equals 1, suggesting the unionized SEO firms/industries that become a likely target of potential acquirers do not experience the same negative SEO announcements and SEO underpricing effects as those that are not a target. Altogether, these results suggest that to survive from potentially being acquired in M&A deals, unionized SEO firms are less likely to disclose information strategically to signal a vulnerable financial position during the SEO process.[8]

4.3.2.2. Tests on CEO equity compensation. To identify the equity composition in CEO compensation packages, we follow Ertimur et al. (2011) to separate the equity pay (value of annual grants of equity awards) from cash pay (salary, bonus, and other compensation) for CEOs. We obtain compensation data from the ExecuComp database and calculate $CEOEquity_{it}$ as stock and options granted value for the CEO of firm *i* in fiscal year *t*.[9] We also define a corresponding dummy variable, *High_CEOEquity (Low_CEOEquity)*, which represents that CEO has a higher (lower) level of stock-incentive pay within the compensation package for firm *i* in fiscal year *t* if the value is greater than (smaller than or equal to) the 75th percentile of the sample and 0 otherwise.[10]

Table 9 reports the OLS regressions concerning the impact of labor unions on SEO announcement and underpricing, based on the sub-samples partitioned by high or low level of equity-related compensations for CEOs (*CEOEquity*). We obtain consistent results of significantly negative coefficients for *Mem* (or *Cov*) in the subsamples with low CEO equity-related compensation ($\beta = -0.0476$ for *Mem* in Column 2 at the 5 % significance level; $\beta = -0.0433$ for Cov in Column 4 at the 10 % significance level for SEO announcement tests and $\beta = -0.0472$ for *Mem* in Column 6 at the 5 % significance level and $\beta = -0.0457$ for Cov in Column 8 at the 5 % significance level for SEO underpricing tests). Our results suggest that the negative effects of unionization on CARs surrounding SEO announcements and SEO underpricing at the issue date are pronounced only for unionized issuers whose CEOs have a lower equity-related compensation package. Managers granted relatively high levels of options or stock awards are less likely to use strategic disclosures as a negotiation tactic against unions, as the pessimistic disclosures can cause the stock price to drop and, in turn, reduce the value of their equity remuneration.[11]

4.3.3. Tests on the impact of labor unions on offer price

Prior literature examining underpricing finds that lower underpricing indicates lower information uncertainty around the pricing of offer price within the equity issuance setting (i.e., Benveniste & Spindt, 1989; Corwin, 2003; Çolak et al., 2017). Differing from IPOs that suffer more information disadvantages regarding the retail demand for the stock (Chantziara et al., 2021; Santos, 2017), the negative market reaction surrounding the SEO announcement date of unionized firms may motivate the managers to downwardly adjust their offer prices to increase the demand for the new shares. This downward offer-price revision may positively result in greater SEO underpricing. To investigate this potential confronting effect of unionization on SEO underpricing via lower offer prices, we examine whether there is a difference in offer prices between non-unionized and unionized firms.

We adapt the method used by Chantziara et al. (2021), Purnanandam and Swaminathan (2004), and Çolak et al. (2017) and employ a price multiple measure of SEO offer price as offer price relative to fair value (i.e., price-to-value or PV ratio), where the fair value is based on the comparable IPO firms' market capitalization scaled the corresponding sales. Each SEO firm is paired with a nearest-neighbor IPO firm matched on sales controlled by industry fixed effect via propensity score matching (PSM) approach without replacement in the same year. We then calculate PV ratios, i.e., *PVRatio*, in which P presents the price multiple defined as SEO offer price times the number of common shares outstanding before offering scaled by sales, and V is the fair value of the matched IPO firm. We take the natural logarithm values of 1 plus *PVRatio* to obtain our dependent variable *Ln_PVRatio*.

Table 10 reports regressions results of the impact of unionization on offer price-to-sales ratio based on the PSM sample. We find that after suffering the negative market reactions in response to the SEO announcements, unionized issuers tend to adjust their offer prices

[6] We also conduct tests by setting the window for issuers to be targets within one year of the SEO issue dates and obtain consistent results and conclusions.

[7] The means of the variable Target are 0.0432 and 0.0589 (untabulated) in the samples of tests for SEO announcement effects and SEO underpricing, respectively.

[8] We also employ *Target* as an independent variable in the (untabulated) regressions to observe *Mem* and Cov and their interaction terms with *Target* (*Target* × *Mem* and *Target* × *Cov*). Our results still hold when using the interactions.

[9] TDC1, obtained from ExecuComp, is total compensation for the individual fiscal year, including stock options granted values estimated using the Black-Scholes model, salary, bonus, and other cash compensation. So *CEOEquity* equals TDC1 minus the sum of salary, bonus, and other cash compensation, for the CEO of firm *i* in fiscal year *t*.

[10] We also employ the sample mean as the benchmark to identify *High_CEOEquity* and *Low_CEOEquity* and obtain the same results (untabulated) as well as conclusions.

[11] In untabulated results we find consistent conclusions when we examine the equity compensation for all executives instead of only CEOs, as well as when we calculate CEO or all executives' equity pay by using alternative measures of total compensation from the *ExecuComp* database - namely, TOTAL_ALT1, which equals total compensation with stock and option awards based on the grant date's fair value of the award, and TOTAL_ALT2, which equals total compensation with stock and option awards using the value realized from option exercise or stock vesting.

Table 8
OLS regressions of the impact of labor unions on CARs surrounding SEO announcement and SEO underpricing based on *Target*.

Panel A: Regressions concerning SEO announcement effects				
	Dependent variable: *SEOCAR*			
	(1)	(2)	(3)	(4)
Variable	*Target = 1*	*Target = 0*	*Target = 1*	*Target = 0*
Mem	0.2017	−0.0525**		
	(1.19)	(-2.54)		
Cov			0.1889	−0.0478**
			(1.18)	(-2.42)
Intercept	−0.1449**	−0.0002	−0.1473**	−0.0003
	(-2.23)	(-0.01)	(-2.24)	(-0.01)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
Observations	151	3346	151	3346
R-squared	0.297	0.047	0.297	0.0463
Panel B; Regressions concerning SEO underpricing				
	Dependent variable: *SEO_Underpricing*			
	(1)	(2)	(3)	(4)
Variable	*Target = 1*	*Target = 0*	*Target = 1*	*Target = 0*
Mem	−0.0519	−0.0382**		
	(-0.57)	(-2.03)		
Cov			−0.0288	−0.0372*
			(-0.33)	(-1.95)
Intercept	−0.1719	0.0384	−0.1857	0.0387
	(-1.13)	(0.73)	(-1.22)	(0.74)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	207	3310	207	3310
R^2	0.573	0.109	0.573	0.109

Table 8 shows the regression results of the effects of unionization on SEO announcement returns (Panel A) and SEO underpricing (Panel B) based on the subsamples depending on *Target*'s values. *Target* equals 1 if the firm has become or will be a target in potential M&A deals within a two-year window entered by its SEO filing date for the SEO announcement tests (or SEO issue date for underpricing tests) and 0 otherwise. The detailed definitions of other variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

downwardly, evident in the negative coefficients for *Mem* and Cov in Columns 1 and 2 ($\beta = -1.5158$ and $\beta = -1.4419$, respectively). However, such a reduction is not significantly different from that of non-unionized issuers.[12] While Chantziara et al. (2021) show the negative effect of unions on the IPO offer price where firms face more severe information uncertainty, our results suggest that in the SEO context, where investors can obtain union and corporate information through firm or market disclosures, more money left on the table is less likely to offset the negative signaling impacts from strategic disclosure induced by unionization. Consistent with the baseline results, our findings suggest that the main driver of the SEO underpricing for unionized issuers is likely to be investor's lower valuation on the offering date based on the portrayed pessimistic outlook of the unionized firms in comparison to non-unionized issuers.

4.4. Robustness tests

4.4.1. Tests on the impact of the global financial crisis

From 2008 to 2009, stock markets suffered a dramatic downturn in market capitalization affected by the global financial crisis (GFC) after the bursting of the U.S. housing bubble. We observe a boom in SEO markets following 2008 in our sample (Panel A of

[12] We also conduct univariate analyses (untabulated), which the results show no significant mean differences in the variables *PVRatio* and *Ln_PVRatio* between lower-than-median unionized (*HighMem* = 0) and higher-than-median unionized (*HighMem* = 1) SEO firms.

Table 9
OLS regressions of the impact of labor unions on CARs surrounding SEO announcement concerning CEOs' equity-related compensation components.

	Dependent variable: *SEOCAR*				Dependent variable: *SEO_Underpricing*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	*High_ CEOEquity*	*Low_ CEOEquity*	*High_ CEOEquity*	*Low_ CEOEquity*	*High_ CEOEquity*	*Low_ CEOEquity*	*High_ CEOEquity*	*Low_ CEOEquity*
Mem	−0.0332	−0.0476**			−0.0298	−0.0472**		
	(-0.72)	(-1.99)			(-0.77)	(-2.20)		
Cov			−0.0296	−0.0433*			−0.0320	−0.0457**
			(-0.68)	(-1.89)			(-0.85)	(-2.10)
Intercept	−0.0862***	0.0066	−0.0863***	0.0067	0.1682**	0.0450	0.1684**	0.0452
	(-4.01)	(0.29)	(-4.01)	(0.29)	(2.25)	(0.76)	(2.24)	(0.77)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	857	2574	857	2574	868	2607	868	2607
R^2	0.121	0.047	0.121	0.047	0.196	0.103	0.196	0.103

Table 9 shows the regression results of the effects of unionization on SEO announcement returns and SEO underpricing based on the subsamples depending on *High* or *Low* of *CEOEquity*. *High(Low)_CEOEquity* equals 1 if the value of compensation packages of option/stock/warrant components for firm *i* in fiscal year *t* is greater than (smaller than or equal to) the 75th percentile of the sample and 0 otherwise. The detailed definitions of other variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

Table 10
OLS regressions of the impact of labor unions on offer price-to-sales ratio.

	Dependent variable: *Ln_PVRatio*	
Variable	(1)	(2)
Mem	−1.5158	
	(-1.53)	
Cov		−1.4419
		(-1.42)
Intercept	−3.4192*	−3.3456*
	(-1.76)	(-1.72)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
N	554	554
R^2	0.330	0.329

Table 10 shows the regression results of the effects of unionization on offer price-to-sale ratio. The dependent variables are explained as follows. $PVRatio_{it}$ represents offer price-to-sales ratio of SEO firm *i* in year *t*, relative to that of its comparable matching firm in the same year. $Ln\_PVRatio_{it}$ is the natural logarithm value of 1 plus $PVRatio_{it}$. We use PSM method to find the matching IPO firm, which price-to-sales ratio is calculated by using the matching IPO firm's capitalization scaled by total sales revenue in the same SEO year *t*. ***, **, * indicate that the means and medians are significantly different at the 1 %, 5 %, and 10 % level, respectively.

Table 1) due to market optimism's upturn after GFC (Feng et al., 2018). We thus re-run our analysis, excluding observations between 2008 and 2009, to alleviate the impacts of these extraordinary economic conditions. Columns 1 and 2 of Table 11 report the test results concerning the negative effect of labor unions on SEO announcement returns (H1). We find significantly negative coefficients for industry-level union proxies, *Mem* and Cov ($\beta = -0.0526$ and $\beta = -0.0520$, both at the 1 % significance level). Columns 3 and 4 of Table 11 provide the test results regarding the negative effect of unionization power on SEO underpricing (H2). The coefficients for *Mem* and Cov ($\beta = -0.0399$ and $\beta = -0.0394$) are still significantly negative at the 5 % level. Our results remain after excluding the 2008–2009 financial crisis impacts.

The literature suggests that the impact of unions on corporate events, particularly those that require heavy equity or debt financing, reverses in times of financial crises, specifically in GFC (Di Guili et al., 2023; Akdoğu et al., 2021). We further investigate whether the reverse effects of unionized firms on market reaction to SEO announcements and SEO underpricing are also observed in our tests.

Table 11
OLS regression results for the impact of labor unions on SEO events excluding the impact of financial crisis.

	Dependent variable: *SEOCAR*		Dependent variable: *SEO_Underpricing*	
Variable	(1)	(2)	(3)	(4)
Mem	−0.0526***		−0.0399**	
	(-2.73)		(-2.04)	
Cov		−0.0520***		−0.0394**
		(-2.81)		(-2.07)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	2928	2928	3105	3105
R^2	0.051	0.051	0.118	0.119

Table 11 shows the regression results of the effects of unionization on SEO announcement returns and SEO underpricing excluding the impact of financial crisis. The detailed definitions of the variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

Adopting Di Guili et al. (2023)'s method, we construct a variable *Crisis*, which equals 1 if the year of SEO announcements falls between 2008 and 2009 (i.e., the GFC period) and 0 otherwise. We also construct variables, *HighMem* and *HighCov*, which equal 1 for firms with higher than the sample median of unionization level and 0 otherwise. Specifically, we conduct a difference-in-differences analysis based on unionization at the firm/industry level (*HighMem* and *HighCov*) and run the following regressions.[13]

$$SEOCAR_{it} \text{ or } SEO\_Underpricing_{it} = \beta_0 + \beta_1 Crisis_t + \beta_2 HighMem_{jt}\left(HighCov_{jt}\right) + \beta_3 Crisis_t \times HighMem_{jt}\left(HighCov_{jt}\right) + Controls + Year\ FE + Industry\ FE + \varepsilon_{it} \quad (4)$$

Table 12 reports regressions of testing the impacts of labor unions on CARs surrounding SEO announcements between 2006 and 2009 concerning the global financial crisis period.[14] Columns 1 and 2 show that the coefficients *Crisis* × *HighMem* (or *Crisis* × *HighCov*) are insignificantly positive ($\beta = 0.0100$ and $\beta = 0.0172$), indicating during GFC that unionized firms do not incur more negative market reactions surrounding their SEO announcements.

To identify issuers that require heavy debt financing, we construct a dummy variable *High_Debtfinancing*, which equals 1 if the firm's debt to total assets ratio in year *t-1* is greater than (smaller or equal to) the sample median and 0 otherwise.[15] Columns 3 and 4 of Panel A in Table 12 show for SEO announcement tests that the coefficients for *HighMem* and *HighCov* are significantly negative ($\beta = -0.0569$ and $\beta = -0.0479$; both at the 1 % level) for the firms with higher financial (debt) leverage. This suggests before GFC that unionized firms with heavy debt financing engagement are associated with negative market reactions surrounding SEO announcements. However, we also observe similar insignificant patterns for the coefficients of the interaction terms. Overall, we conclude that the reverse effects do not seem entirely observed in our tests across various samples.

4.4.2. Tests on SEO peer effects

Billet et al. (2023) report peer effects in SEO announcements, particularly for constrained firms. Their findings suggest that information asymmetry around the firm's SEO drops when peer firms have conducted an SEO within the prior six months. This is possible because some information about the firm's SEO has already been incorporated by the previous peer firms' SEO announcements. Therefore, the information effects of labor unions on the firm's SEO announcements might be attenuated by peer information releases. Following Billet et al. (2023), we identify peer's prior SEO activities based on the whole market rather than restricting to the SIC industry only to construct our test variable Ln*(Peer SEO)*. We employ the Whited-Wu index (Hennessy & Whited, 2007; Whited & Wu, 2006) to identify financially constrained SEO issuers as these peers are likely to have a stronger informational effect on the subsequent peer offerings (Billet et al., 2023). The untabulated results indicate that our main results still hold for both the SEO announcement and underpricing tests after considering the peer effect. Our results suggest that after incorporating industrial and market information from recent offering events, investors still react negatively towards unionized firms on the SEO announcement dates, and the information

[13] Following Di Guili et al. (2023), we focus on the beginning of the crisis to restrict our sample between 2006 and 2009.

[14] We also conduct the similar tests (untabulated) examining the effect of unionization on SEO underpricing and result in insignificant coefficients for *Crisis* × *HighMem* and *Crisis* × *HighCov*, which suggest no pronouncedly incremental negative effect of unionization on SEO underpricing observed between 2008 and 2009, relative to prior period.

[15] We also conduct the same tests (untabulated) by employing the cases of SEO firms with heavy equity financing (i.e., firms that are higher than the sample median level of equity financing; *High_Equityfinancing*) but do not find consistent results.

Table 12
OLS regressions of the impact of labor unions on CARs surrounding SEO announcement concerning the global financial crisis.

	(1)	(2)	(3)	(4)
Variable	*Full Sample between 2006 and 2009*		*Firms with High_Debtfinancing*	
Crisis	−0.0239**	−0.0265***	−0.0167	−0.0206
	(-2.45)	(-2.74)	(-1.30)	(-1.37)
HighMem	−0.0171		−0.0569***	
	(-1.52)		(-3.13)	
Crisis × *HighMem*	0.0100		0.0213	
	(0.87)		(1.39)	
HighCov		−0.0302***		−0.0479***
		(-2.88)		(-3.19)
Crisis × *HighCov*		0.0172		0.0196
		(1.50)		(1.21)
Intercept	0.0196	0.0291	0.0853*	0.0819*
	(0.81)	(1.24)	(1.71)	(1.71)
Controls	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect (SIC)	Yes	Yes	Yes	Yes
N	876	876	438	438
R^2	0.124	0.129	0.233	0.224

Table 12 shows the regression results of the effects of unionization on SEO announcement returns interacting with the impact of financial crisis. The sample period is between 2006 and 2009. *Crisis* equals 1 if the year of SEO announcements fall between 2008 and 2009 (i.e., the global financial crisis period) and 0 otherwise. *High_Debt financing* is a dummy variable that equals 1 if the firm debt financial leverage level is higher than the median in the restricted sample and 0 otherwise. The detailed definitions of other variables appear in Appendix. We report coefficients with standard errors adjusted for clustering by firm. *, **, and *** indicate respective statistical significance at the 10 %, 5 %, and 1 % levels with a two-tailed test.

about labor unions still negatively impacts SEO underpricing, particularly for those financially constrained firms. We thus conclude that the attenuated information effect from previous SEO activities within the same industries or market does not explain our results.[16]

4.4.3. Tests on self-selection bias and controlling for macro-level variables

To mitigate self-selection bias in the main analyses, we adopt the Heckman (1976, 1979) two-stage selection estimation method and use the following Probit regression as the first-stage model to estimate the inverse mills ratio (*IMR*).

$$P(SEO=1)=\beta_0+\beta_1\,Slack+\beta_2\,Leverage+\beta_3\,Payout+\beta_4\,Mtb+\beta_5\,Runup_{it}+\sum_k\beta_k\,Year_k+\sum_j\beta_j\,Industry_j+\varepsilon \quad (5)$$

The dependent variable, *P(SEO = 1)*, is a dummy variable equal to 1 if the firm decides to conduct SEO and 0 otherwise. $Slack_{it}$ represents financial slack, defined as a ratio of cash and short-term investments to total debt for firm *i* in year *t*. $Leverage_{it}$ represents the ratio of long-term debt to total assets for firm *i* in year *t*. $Payout_{it}$ is the ratio of cash dividend to net income for firm *i* in year *t*. Mtb_{it} is the market-to-book ratio for firm *i* in year *t*. $Runup_{it}$ is the individual stock return over 60 trading days before the SEO announcement (Wu & Lo, 2022) for firm *i* in year *t*. Additionally, the study incorporates *IMR* into the original SEO announcement return and underpricing models as the second-stage models.

The untabulated results of the first-stage regression for Heckman's two-stage estimation procedure show that all coefficients of explanatory variables are statistically significant. This indicates that the first-stage model effectively captures a firm's decision process for SEO events. Overall, the untabulated results of the second stage of Heckman's selection model report that both *Mem* and Cov exhibit significantly negative coefficients on SEO announcement return (*SEOCAR*) and underpricing (*SEO_Underpricing)* in the second-stage regressions, which reconcile with the main findings and show the robustness of the main findings even after controlling for self-selection bias. Finally, we also incorporate macro-level variables such as the U.S. gross domestic product (GDP) growth rate and inflation rates in Equations (1) and (3), which are retrieved from the World Bank. We obtain consistent results with the primary tests.[17]

5. Conclusions

This paper examines the effect of labor unionization on a firm's seasonal financing decisions through its impact on SEO

[16] We also conduct tests controlling for the impact of information environment (i.e., anticipation effects) by incorporate various longer-horizon event windows of cumulative market-adjusted returns prior to and surrounding SEO announcement dates and/or issue dates in the regression models. We obtain consistent results that are qualitatively similar hence robust.

[17] For brevity, we do not tabulate the results for controlling the macro-level events.

announcements and SEO underpricing on the offer date. We find a negative relationship between union strength and SEO announcement date return, suggesting that investors react negatively toward unionized issuers' SEO announcements concerning the potential misuse of SEO proceeds. We also find that firms with higher labor union membership and coverage are associated with lower SEO underpricing. This finding supports that issuers facing high union pressure are likely to promote a relatively pessimistic firm outlook to obtain a better bargaining position (Bova, 2013; Chung et al., 2016), leading to a lower firm valuation by investors on the offer date, reducing SEO underpricing. Our results suggest that SEO investors incorporate relevant union-related information to arrive at a lower valuation of the unionized SEO issuers supporting the signaling theory.

We further show that union impacts on SEOs are more pronounced for firms in the states with no right-to-work laws and those in the states with lower unemployment rates but not for firms subject to right-to-work laws or in the states facing high unemployment. These findings suggest that labor union's power to impose bargaining pressure on unionized firms is the main driver of the relationship between unionization and shareholders' wealth during the SEO process. However, promoting a pessimistic outlook to fight union pressure can put the firm into a vulnerable position, so we find unionized issuers only employ strategic disclosures when doing so is less risky (e.g., not potentially being a target by acquirers) and less costly (e.g., not affecting CEO pay). Our results still hold after controlling for the impacts of extreme economic events, peer information effects, and selection bias.

Our study contributes to understanding the impact of unionization on a firm's equity financing activities and the corresponding outcomes. Future research may explore whether the style (i.e., fully marketed) or speed (i.e., accelerated) of offering changes based on the level of union pressures and the potential changes in union activism in the post-issue period for those firms suffering high union pressure during the SEO process.

Author statement

Yen-Jung Tseng conducted data analyses and completed a draft paper in the second round. Yen-Jung Tseng replied comments of reviewers, collected new data, and conducted data analyses in the second round.

Minzhi Wu contributed to proofreading this paper and provided suggestions for the replies to reviewers' comments. Minzhi Wu also revised and proofread the hypotheses development and the wording of the article.

Zhi-Yuan Feng developed the research idea and collected data. Also, Zhi-Yuan Feng contributed to the research methodology and design in the first round, and is responsible for contacting the editor and summit a paper.

Sung-Yun Tan conducted data analyses and completed a draft paper in the first round.

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Appendix. Variable Definitions

Dependent variables	
$SEOCAR_{it}$	*CAR(-1,1)*; i.e., cumulative abnormal stock return of SEO announcement from the day before offering date to the day after offering date
$SEO\_Underpricing_{it}$	Closing price of offering date minus the offer price divided by the offer price
Independent variables	
Mem_{it}	Ratio of the number of labor union members to total employment in 3-digit Census Industry Classification (CIC) industries, collected from the Union Membership and Coverage Database
Cov_{it}	Ratio of the number of employees in an industry who are covered by union contracts to total employment in a 3-digit Census Industry Classification (CIC) industry, collected from the Union Membership and Coverage database
$Size_{it-1}$	Natural logarithm of the book value of total assets in the year prior to SEO announcement
$Leverage_{it}$	Ratio of debt to total assets in the year of SEO announcement
MTB_{it-1}	Market-to-book ratio for SEO firm *i* in year *t-1*, calculated as the market value of equity divided by the book value of the equity in the year prior to SEO announcement
Re_offer_{it}	Number of shares offered divided by total shares outstanding preceding to SEO announcement in year *t*
$Secondary\_shares_{it}$	Number of shares sold during SEO by existing shareholders divided by the total number of SEO shares offered in year *t*
$Runup_{it}$	Individual stock returns for firm *i* over 60 trading days before SEO announcement
$Mktrunup_{it}$	Market returns over 60 trading days before SEO announcement
$Nasdaq_{it}$	Indicator variable that equals 1 if SEO firm *i* is listed on the NASDAQ in year *t* and 0 otherwise
$Hightech_{it}$	Indicator variable that equals 1 if the primary business of firm *i*'s is high technology in year *t* as identified by the SDC database and 0 otherwise
$PreCAR_{it}$	Cumulative market-adjusted returns over the period from the day after the filing date to the day prior to the offer
$LnAge_{it}$	Natural logarithm of the number of years the firm has been listed in the CRSP database for firm *i* in SEO announcement year
$Volatility_{it}$	Standard deviation of daily close-to-close returns over the 30 trading days ending one day prior to the offer
$Cash_{it}$	Cash scaled by total assets for firm *i* in year *t*
$IPO\_Underpricing_{it}$	Average underpricing across all IPOs during the same month as SEO, where monthly underpricing estimates for IPOs are obtained from Jay Ritter's webpage at https://site.warrington.ufl.edu/ritter/ipo-data/
$Lnprice_{it}$	Natural logarithm of the closing price of the day prior to the offering date

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(*continued*)

$D\_Lowprice_{it}$	Indicator variable that equals 1 if firm *i*'s closing price before the offering date is in the lowest quartile and 0 otherwise
$D\_Highrisk_{it}$	Indicator variable that equals 1 if firm *i*'s stock volatility is in the highest quartile and 0 otherwise
D_LowMV_{it}	Indicator variable that equals 1 if firm *i*'s market capitalization is in the lowest quartile and 0 otherwise
$Loss_{it}$	Indicator variable that equals 1 if the firm reported a negative net profile in year *t* and 0 otherwise
$LnCAP_{it}$	Natural logarithm of the firm's market value (i.e., capitalization)
RTW_{it}	Indicator variable that equals 1 if the firm is located in states that implement a right-to-work law and 0 otherwise
$High\_Unemployment_{it}$	Indicator variable that equals 1 if the firm is located in states with its unemployment rates above the median and 0 otherwise
$Target_{it}$	Dummy variable equals 1 if the firm has become or will be a target in potential M&A deals within a two-year window entered by its SEO filing date for the SEO announcement tests (or SEO issue date for underpricing tests) and 0 otherwise.
$High\_CEOEquity_{it}$ $Low\_CEOEquity_{it}$	*High_CEOEquity* (*Low_CEOEquity*) equals 1 if the value of compensation packages of option/stock/warrant components for firm *i* in fiscal year *t* is greater than (smaller than or equal to) the 75th percentile of the sample and 0 otherwise.
$PVRatio_{it}$ $Ln\_PVRatio_{it}$	$PVRatio_{it}$ represents offer price-to-sales ratio of SEO firm *i* in year *t*, relative to that of its comparable matching firm in the same year. $Ln\_PVRatio_{it}$ is the natural logarithm value of 1 plus $PVRatio_{it}$.
$Crisis_t$	Dummy variable equal to 1 if the year of SEO announcements falls between 2008 and 2009 (i.e., the global financial crisis period) and 0 otherwise.
$HighMem_{it}$ $HighCov_{it}$	$HighMem_{it}$ ($HighCov_{it}$) equals 1 for firms with higher than the sample median of unionization at the firm (industry) level, respectively, and 0 otherwise.
High_Debtfinancing *High_Equityfinancing*	*High_Debtfinancing* (*High_Equityfinancing*) equals 1 if the firm's debt to total assets ratio in year *t-1* is greater than (smaller or equal to) the sample median and 0 otherwise.
Ln*(Peer SEO)*	*Peer SEO* is the number of firms conducting SEOs in the same SIC division range of industry in the 6 months prior to the event date (SEO announcement date or SEO issue date). Ln*(Peer SEO)* is the natural logarithm of (1 + *Peer SEO*).
Ln*(Market SEO)*	*Market SEO* is the number of firms conducting SEOs across all industries (i.e., the market), as opposed to just by the SIC division range of industry peers, over the prior 6 months, minus the number of peer firms conducting SEOs in the prior 6 months prior to the event date (SEO announcement date or SEO issue date). Ln*(Market SEO)* is the natural logarithm of (1 + *Market SEO*).

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