

# Does Corporate Social Responsibility Impact the Market for New Issues?

Taylan Mavruk<sup>1</sup> and Russ Wermers<sup>2</sup>

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## Abstract

We examine the relation between corporate social responsibility (CSR) information when IPOs are offered, the level of their first-day underpricing, and investors' post-IPO holdings using a new text-based Swedish dictionary that measures the level of CSR information contained in IPO prospectuses. Examining IPOs for the effect of promised CSR efforts on investor behavior avoids many of the potential confounding effects present in studies of seasoned equities—by their very nature, IPOs have little public information prior to their offering. We also exploit detailed Swedish information on stock ownership for all investors, both institutional and individual, as well as detailed Swedish household-level demographic information.

Using this unique approach, we find that first-day IPO returns and investor holdings increase with positive “environment” information in the business descriptions. In contrast, statements related to other CSR categories, such as employees, human rights, and social and community involvement made at the IPO seem to generally be “cheap talk” that investors discount. The investor response to CSR statements in the environment category are mainly driven by wealthy Swedish individual investors with large portfolios, as well as institutional investors. This result is consistent with the limited attention hypothesis, where investors only pay attention when there are larger financial stakes. We also find that domestic institutions have a stronger overall reaction to CSR information than foreign institutions, indicating that local Swedish investors exhibit a greater degree of concern about (local) CSR information for Swedish IPOs.

JEL classification: M14, G30.

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<sup>1</sup> Corresponding author. University of Gothenburg, Vasagatan 1, Box 100, Gothenburg, 405 30 Sweden. E-mail: [taylan.mavruk@handels.gu.se](mailto:taylan.mavruk@handels.gu.se). Phone: +46-31-786 59 58.

<sup>2</sup> University of Maryland. Robert H. Smith School of Business, College Park, MD 20742-1815 USA. E-mail: [wermers@umd.edu](mailto:wermers@umd.edu) Phone: +1 (301) 405-0572.

## **1. Introduction**

Corporate social responsibility (CSR) has become an increasing focus of research during recent years, with mixed findings on how it is related to firm profitability and investor behavior. While some papers find a positive relationship, others find a negative or no relationship between CSR activities and corporate profitability (see e.g., Renneboog, Horst, and Zhang, 2007; Margolis, Elfenbein, and Walsh, 2009; Edmans, 2020). Similarly, some studies indicate that companies that prioritize CSR, such as diversity in the workplace or reducing carbon emissions, have higher stock prices; others have shown that these companies can sometimes exhibit lower stock prices. There is also some evidence on the relation between CSR and stock market participation and portfolio diversification (Baschieri, Carosi and Mengoli, 2015, 2021; Jiang, Lowry, and Qian, 2022). The results indicate familiarity or attention-based explanations of investment behavior, although it is difficult to separate an investor preference for high CSR or Environment, Social, and Governance (ESG)-oriented firm stocks from purely attention-based investment behavior (Grinblatt and Keloharju, 2001; Huberman, 2001; Barber and Odean, 2008).

In this paper, we examine how “expressed” CSR efforts affects companies during their initial public offerings and underpricing. By saying “expressed,” we refer to what companies communicate they intend to do and what “social values” they emphasize in their prospectus offerings to the market before the IPO. Such information in the business descriptions of IPOs may also affect attention-based investment behavior. That is, the well-examined limited attention hypothesis suggests that investors are limited in their ability to simultaneously process information for a large number of stocks. This hypothesis predicts that attention spent on certain stocks reduces the attention available for other stocks (Kahneman, 1973; Corwin and Coughenour 2008). We test this hypothesis by examining whether investors pay limited attention to different types of initial public offerings (IPOs). Information about IPO firms tends to be limited, which leads to information asymmetries between issuers and investors (Welch, 1989) and different investor groups (Rock, 1986). El Ghoul, et al. (2011) suggest that information asymmetry is lower for firms with higher ESG ratings because these firms garner greater attention by stock analysts and the media.

We focus on IPOs because they involve new companies in the market, reducing the risk of other factors affecting stock prices on the first day, apart from the CSR effect. Previous studies have often used stocks that have been on the market long after their IPOs, which can lead to other factors correlating with the CSR effect and affecting stock price changes, instead of CSR itself. We believe that, at the time of a public offering, a firm is more likely to strategically present its value-relevant CSR activities (although we also explore whether this conjecture is true). In addition, limited firm information is available prior to a stock's IPO, allowing a cleaner test of the impact of CSR-related information on investor behavior.

We study Sweden because detailed records of individual portfolio holdings are available, giving us the opportunity to examine the types of investors that pay attention to CSR information as well as their geographic proximity to the IPO firms. By searching and analyzing the percentage of CSR words/bigrams in the business descriptions of IPOs that are presented in IPO prospectuses, we examine whether and how such IPOs garner investors' attention through their trades. We also examine how the CSR activities in IPOs are related to IPO underpricing, which is measured as the percentage difference between the closing price on the first day and the offer price.

For the CSR words/bigrams, we generate textual information indices by searching for CSR-related information in IPO prospectuses using a previously developed word list of Pencle and Malaescu (2016).<sup>3</sup> Pencle and Malaescu (2016) develop a content analytic dictionary using computer-aided text analysis (CATA) to analyze CSR-related information in IPO prospectuses, and its relation to IPO offering price, total shares offered, and underpricing on the first day of trade. They suggest that using the CSR word list increases the predictive power in models estimating the level of underpricing present in IPOs. Since IPO prospectuses are not documents labeled as sustainability or CSR reports, they are not considered traditional avenues for disseminating CSR information (see Unerman 2000). We use this dictionary to examine how investors respond to claimed CSR related activities in IPO firms and to predict underpricing of IPOs; in contrast to Pencle and Malaescu (2016), our study examines investor-level reaction to the CSR-related information contained in prospectuses. Further, we investigate the

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<sup>3</sup> Available online: <https://provalisresearch.com/Download/CSR.zip>.

characteristics of investors who react to CSR-related information through their purchases of stocks.

There is substantial evidence in both the theoretical and empirical finance literature that investors are not able to process all available information and thereby know about only a subset of securities (see e.g., Merton, 1987). Investors tend to allocate their limited attention across sources of uncertainty to reduce portfolio risk (Peng, 2005). Such investment decisions lead to categorization that can partly explain patterns in asset return correlation (Peng and Xiong, 2006). Findings in empirical research are consistent with these predictions. Investors exhibit familiarity based investment behavior and focus on attention grabbing stocks. (see Huberman, 2001; Huberman and Regev, 2001; Barber and Odean, 2008). While most of this research provides supportive evidence on the attention hypothesis, it is difficult to measure limited attention and its allocation across stocks.

Examining different types of IPOs provides an ideal setting for analyzing the effects of limited attention for several reasons. First, CSR activities in IPO prospectuses (examined during the study period) are voluntarily disclosed. Our data reveals that 24% of the words are CSR related in the business descriptions in all the IPO prospectuses. Thus, we can directly identify the type of investors who have a preference for IPOs with greater promised CSR activities. Following the investor groups in Sweden studied by Giannetti and Simonov (2006), we examine the limited attention hypothesis among small/large and domestic/foreign individual investors as well as domestic/foreign institutional investors. We measure investors' excess holdings in IPOs by calculating the weight placed on IPOs—that is, the market value of investor purchases normalized by the total value invested in IPOs in the period.<sup>4</sup>

Second, we measure the tone of CSR in IPO prospectuses and type of CSR activity, more precisely, employee, environment, human rights, and social and community-related words. We also measure the tone of CSR words within each subcategory in IPO prospectuses and directly relate it to investors' post IPO holdings. Our main measure of CSR is similar to the net CSR score used in Bansal, Wu, and Yaron (2021) and Brown, Elliott, Wermers, and White (2022) and is calculated as the difference between the number of positive CSR words and the number of

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<sup>4</sup> Normalizing the IPO purchases by firm value or portfolio value of investors both yield similar results.

negative CSR words in each category for each IPO firm. As a robustness measure we also calculate and study how a relative measure of importance—the so-called (CSR) term frequency-inverse document frequency (TF-IDF) attracts investors' attention. We examine these TF-IDF scores of CSR words in IPO business descriptions by category and tone and calculate the net scores. These proxies for limited attention allow us to explore how the occurrence of CSR related words in business descriptions influence IPO underpricing and investors' post IPO holdings.

We use detailed hand collected data on 779 IPOs introduced in Sweden (average of 56 IPOs per year) with full first day return information between 2006 quarter 1 and 2019 quarter 3, and match this data together with our granular quarterly investor data obtained from Euroclear Sweden. We identify that 218 (28.0%) of these IPOs represent a simple change of stock market listing, while 561 (72.0%) of them are pure primary offerings, the first time IPOs. We obtain stock price and firm characteristics data from the Thomson Eikon and Serrano databases.

We find that the overall CSR score is weakly related to first-day returns and to investors' holdings. However, the result is different when we examine the subcategories of our CSR score. Particularly, both underpricing and investors' holdings increase with our net environment score calculated by using expressed CSR news in the business descriptions of IPOs. A one-standard-deviation increase in the net environment score increases the first day return by 4.8% and MAR by 4.9%. This result is consistent when we use our net environment TF-IDF measure instead.

Our analyses also reveal substantial effects of net environment score on investors' post-IPO holdings. A one-standard-deviation increase in the net environment score increases capital weight placed on IPO firms by 1.4%. The net environment TF-IDF measure yields similar results. Regarding our investor groups, Swedish individual investors increase their weight on IPO stocks by 2.3% for a one standard deviation increase in the net environment score. There is a larger increase in holdings of Swedish individuals with larger portfolios; they increase their holdings by 3.8%, while Swedish individual investors with small portfolios exhibit virtually no reaction to environment information in the IPO prospectuses. This result is consistent with the limited attention hypothesis, where investors only pay attention when there are larger financial stakes. Among the institutional investors, only the Swedish institutional investors react to

environment information, by 7.6%. while foreign institutional investors do not consider environment information in the IPO prospectuses. These results hold after controlling for detailed investor characteristics and a large number of IPO characteristics including pre-IPO ownership concentration.

Our results make several contributions to the previous literature on limited attention and IPOs. One of the seminal papers on limited attention hypothesis by Corwin and Coughenour (2008) focuses on limited attention of market makers and the resulting allocation of effort across securities. The results show that market makers attention is limited, which influences supply side of liquidity. Our results provide direct evidence on outside investors' demand for liquidity in financial markets in a setting where outside investors are often unfamiliar with the pre-IPO characteristics of the firms. This contributes to the studies on the familiarity type investment behavior and the limited attention hypothesis (see Merton, 1987).

Examining both private and public firms, Li and Wu (2020) find a significant difference in ESG performance between privately owned and publicly traded firms. After committing the United Nation's Global Compact program, which is used as a proxy for firm's CSR engagement, private firms reduce their negative ESG incidents. However, public firms, by contrast, do not seem to achieve similar success. One explanation for this result is that public firms have more shareholder pressures. We contribute to these findings by examining IPOs and show that IPO firms seem to "toe the line" on only environment related activities. However, statements related to other categories of CSR made at the IPO seem to be generally "cheap talk", likely exhibiting some decoupling patterns (see Meyer and Rowan, 1977).

This explanation is also consistent with the results from socially responsible investing (SRI) literature. Heath, Macciocchi, Michaely and Ringgenberg (2023) find that SRI funds simply select firms that already have better levels of environment and social performance, which is inconsistent with them trying to have a social impact but trying to maximize fund flows. SRI funds do not seem to change firm behavior. Similarly, examining the relationship between private equity (PE) advisers' ESG disclosure and the advisers' ability to raise capital, Campbell et al., (2024) find that only the environment disclosure affects the capital raising, other categories

of disclosure such as social and governance disclosures have no effect on raising new capital. Particularly, the tone of environment information seems important as the study finds that when the environment disclosure is negative PE funds are less likely to raise new capital. Our results are similar and imply that when the conflict of interest between shareholders and other stakeholders gets stronger (through IPOs) the impact of environment related activities on underpricing and investors' holdings is still influential. Overall, we find that when the conflict of interest between shareholders and other stakeholders gets stronger the impact of environment related activities on underpricing and investors' holdings is still influential.

Previous literature on IPOs is consistent in showing some evidence that IPOs contribute with new information production and thereby garners attention to the stock market. For instance, google searches related to IPOs tend to increase by about 40% during the IPO week (Da, Engelberg and Gao, 2011; Liu et al. 2014). IPOs seem also influence social interactions in the chat rooms by increasing conversations about the stock market and thus resulting in increased stock market participation (Hong, Kubik and Stein, 2004; Kaustia and Knupfer, 2008). Our results are consistent with these credible evidence by showing that trading activity increases with IPOs. To contribute to these results, we examine limited attention hypothesis by showing evidence from IPOs and their engagement in CSR activities. A closely related research by Rau, Sandvik, and Vermaelen (2023) suggest that investor preferences for board gender diversity affect IPO underpricing. They find greater underpricing for gender-diverse board IPOs, which indicates positive CSR/ESG activities. To this end, our contribution to this evidence is to show that net positive environment score in the business descriptions of IPOs increase first day returns, thus underpricing, and investors' post IPO holdings. These results also add new dimension to the evidence provided by Giannetti and Wang (2016) and Agarwal, Aslan, Huang and Ren (2022) who show that fraud among publicly traded companies and political uncertainty tend to decrease stock market participation among investors.

Consistent with Rau et al., (2023), we also find that large investors and institutions derive our results. This finding concurs with those in Dimson et al. (2015) who find that institutional ownership increases with ESG ratings and in those in Hartzmark and Sussman (2019) who suggest that mutual funds with high ESG rating firm portfolios charge higher fees and can still

attract higher fund flows. We contribute to these results by showing that the holdings of large investors and institutional investors in IPO firms increase with net positive environment score in the business descriptions of IPOs. In a sense this result is consistent with Starks et al. (2018) who find that investors are reluctant to sell stocks with high ESG ratings following negative news or following poor performance.

Our results also contribute to the literature that show IPOs potential positive economic benefits. Arguably, the new wealth and liquidity induced by IPOs could have positive spillover effects on the economy (see Butler et al., 2019; Cornaggia et al., 2020). Guiso, Sapienza, and Zingales (2008) and Lins, Servaes, and Tamayo (2017) suggest that firms' CSR engagement may generate social capital for firms that can be perceived more trustworthy. Investors may place a valuation premium on such firms, particularly, when overall trust in firms is low, as in the financial crises period of 2008-2009. Our analysis is consistent for the environment related activities. We show that there is a substantial increase in these positive spillover effects for net positive environment information in the business descriptions of IPOs.

Evidence from US suggests that IPOs in more concentrated industries are more underpriced than other IPOs (Harris, 2018). This higher underpricing of IPOs in industrial districts seems to represent investor compensation for the location premium associated with more isolated (rural) areas, in which information costs tend to be higher than in urban areas. Hong, Kubik, and Stein (2008) show that firms located in areas with a lower concentration of other local listed firms exhibit a location premium via an "only game in town" effect. In our paper, we also consider industry concentration in a given location and measure it by the geo-industry cluster ratio (GICR), computed as the number of firms in a given industry and the same area scaled by the total number of firms within the industry. We find that investors subscribe to IPOs in these local areas with more industry concentration.

The literature on local IPOs finds that local firm clustering affect IPO underpricing (Baschieri, Carosi, and Mengoli, 2015). Isolated firms tend to increase in value when they cluster due to local IPOs. There is also evidence that issuers headquartered in rural areas are associated with lower IPO underpricing relative to urban firms (Nielsson and Wójcik, 2016). These results

provide detailed information to investors on IPO returns. Using data from Finland between 1995 and 2000 that cover 57 IPOs Kaustia and Knüpfer (2008) examine investor experience and IPOs and show that investors learn the return distribution of IPOs and then decide whether to continue investing. We find that variables related to experience such as age, income, and education increase investors capital weight on IPO firms.

There is also some evidence from Sweden. Using Euroclear data between 2004 and 2010, Abrahamson (2018) shows that IPOs attract new investors (rookies) into the market. Rookies investing in IPOs seem to have a higher income and hold larger stock portfolios, but they receive lower returns compared with other rookies who do not invest in IPOs. In Sweden, IPOs with low initial return seem to have higher holdings by individual investors. Institutional investors, to a greater extent than individuals, subscribe to underpriced IPOs (Abrahamson and De Ridder, 2014). We show consistent evidence with these studies using data from Sweden. Investors with higher income and larger portfolios invest more in IPO firms.

Our contribution to these studies is the examination of CSR disclosure in IPO prospectuses and exploring its relation to share ownership as well as to underpricing of IPOs. We combine rich and granular ownership data with detailed firm level data on socially responsible activities extracted from IPO prospectuses as well as detailed both pre-IPO and post-IPO characteristics of ownership and firms. Our setting also allows us to link the investor heterogeneity to IPO industry clustering in a locality, as documented underpricing of IPOs in rural and urban areas seem to be different (Nielsson and Wójcik, 2016). Taken together, with our detailed analysis we are able to examine how different types of investors understand and subscribe to the widely documented IPO underpricing.

Finally, while our evidence is generally consistent in all our regressions, we note that cross-sectional analyses of limited attention might be difficult to interpret given the endogenous relation between stock characteristics and outside investor portfolios. However, our empirical specifications include a battery of detailed both pre-IPO and post-IPO characteristics, investor characteristics and various fixed effects, which mitigates many concerns related to endogeneity. We can thus directly test whether variation in limited attention affects the first day returns and

investors' holdings. Together, our results indicate that policy makers could feasibly consider IPOs' environment related initiatives that increase information in business prospectuses and attention among potential investors. This has benefits not only for investors' trades but also for first day stock returns.

The remainder of the paper is organized as follows. Section 2 presents the IPO process, literature review and hypothesis development. Section 3 describes the data and sample characteristics and econometric models. In Section 4 we provide the main empirical tests of the limited attention hypothesis on the first day returns. We also examine limited attention hypothesis on investors' trade behavior and Section 5 concludes.

## **2. Hypothesis development**

### **2.1 IPO process**

Initial public offering provides the firm access to equity capital and through attracting more diversified owners, firm can lower the cost of capital and funding for new investments (Ljungqvist, 2005). Once the firm decides to go public there are several steps in the IPO process. First, firm needs to make sure to follow the regulations imposed by the stock exchange that it wants to be listed. As most IPOs become public through a book building process the firm then needs to decide whether the offer price will be fixed or within a price range, the shares will be newly issued or offer already existing shares, or perhaps a mixture of the two. In Sweden, it usually takes four to six months for an IPO to be publicly traded, although the timeline depends on the stock exchange market (Tipner and Pousette, 2018). Nasdaq Stockholm offers a fast track for those IPOs that are well documented and prepared, which takes roughly five weeks for some additional costs.

The IPO process begins with employing a number of advisors (so called underwriters) including investment banks, legal advisors, and auditors who, at the initial phase, assess whether the IPO is appropriate to list. The quality and reputation of underwriters tend to give signals to investors, indicating the quality of the IPOs through third party certification (Booth and Smith, 1986; Titman and Trueman, 1986; Michaely and Shaw, 1994; Carter, Dark, and Singh, 1998; Cronqvist and Nilsson, 2005). At the initial phase, due diligence (legal, financial, tax, etc.) practice is also

carried out, prospectus drafting and other documents (such as publicity guidelines and potential lock-up undertakings) are prepared. After this stage, the issuer submits the prospectus to the Swedish Financial Supervisory Authority for a review and approval and receives a response within 20 days of the submission. The process thereafter involves analyst presentations, Q&A sessions, investor meetings, and roadshows. This is also the book building process where the underwriter of the IPO examines the interest among often institutional investors and gather information about their preferences of the IPO stock. The underwriter uses this information to provide an estimate of valuation, price and share allocation among investors.

When the issuer is ready to proceed with the IPO, it makes the prospectus public along with a press release including the price (range), size of the offer, and share allocation. Then the issuer makes a formal application to the stock exchange market. The application period usually takes a couple of weeks. The decision on price, share allocation, lock-up undertakings, agreement etc. often occur the day before the first day of trading (price revisions are possible before this day). On the first day of trading the offer price is announced via a press release.

## 2.2 Expressed CSR in IPO prospectuses and underpricing

On the first day of trading the stock price of IPO tends to increase and the closing price of IPO substantially exceeds the offer price, so called underpricing. It means that the offer price was set too low and did not reflect the demand from all the investors during the book building process (Willenborg et al. 2015). The discussion is about the offer price and not often about the closing price as it is unlikely that the fundamentals of the IPO firm change during the first day of trading (see Rau et al, 2023). Because the offer price is set too low the pre-IPO owners lose money, so called leaving money on the table. The size of underpricing tends to vary substantially over time and across the markets (Ibbotson, 1975; Ritter and Welch, 2002; Rau et al, 2023).

There are several theories proposed to explain IPO underpricing (see e.g., Ljungqvist, 2007) and the most researched one is information asymmetry (Booth and Smith, 1986; Benveniste and Spindt, 1989; Megginson and Weiss, 1991; Myers and Majluf, 1984), where the manager of the firm has more information than outside investors. It is not only about having more information or facts but also about that managers know more about what those facts mean for the firm. Myers

and Majluf (1984) suggest that information asymmetry related to new equity issues can lead to market failure, similar to the market for “lemons” (Akerlof, 1970), although the issuer does not offer a product as in Akerlof (1970) but a claim on the asset-in-place and the new project. In the IPO process buyer does not know about the true quality of the firm, and thus faced with buying a lemon, the buyer demands a discount on the offer price. This, in turn, discourages the issuers who do not have lemons to proceed with the IPO, which is not optimal from the market theory point of view. Good quality firms would not proceed with the IPO.

Theory of information asymmetry is the driving mechanism behind agency costs (Jensen and Meckling, 1976), signaling (Spence, 1973), adverse selection, financial slack (having high financial slack allows to avoid external financing (Myers and Majluf, 1984)), market timing (Barry et al., 1990; Gompers, 1996; Gompers and Lerner, 1998), and so on. The other theories explaining IPO underpricing include, for example, control or bonding theories, suggesting that underpricing is used as a mechanism to change the ownership structure to prevent outside intervention (Barry et al., 1990; Ljungqvist, 2007). There are also some behavioral theories proposed, suggesting that investors prefer certain IPOs and increase their demand, leading to a price increase beyond its fundamental value (Ljungqvist, 2007).

Interestingly the information asymmetry theory during the book building process extent also to institutional investors who have true interest in the firm but may not disclose how optimistic they are about the firm, they tell half-truth (Benveniste and Spindt, 1989). This is because the institutional investors may think that disclosing their interest about the firm in detail may influence underwriters to increase the offer price. If the institutional investors are interested in buying the firm they would prefer to buy it at a lower offer price. Some of these institutional investors are venture capitalist who make subscription precommitments to participate in the IPOs, which can help certify firm value, influence price revisions during the book building period and affect the subscription decisions of small, relatively uninformed shareholders (Eckbo and Masulis, 1992; Singh, 1997; Jeppsson, 2018). Overall, this situation leads underwriters to partially adjust the offer price to incentivize institutional investors (Hanley, 1993; Willenborg et al., 2015; Rau et al., 2023).

Institutional investors' opinion may also be influenced by non-pecuniary reasons during the book building process. One reason is that society and law-makers demand for corporate social responsibility (CSR) as a response to market failures. Benabou and Tirole (2010) define CSR as sacrificing profits in the social interest. Firm goes beyond its legal and contractual obligations on a voluntary basis and invest in being employee-friendly, environment friendly, invest in social and community activities as well as human rights activities. These investments are duties that can extend beyond shareholder value maximation. Some empirical studies show that financial performance and metrics based on social performance such as corporate social responsibility are competing factors. Boards design compensation contracts to managers with the aim of maximizing shareholder wealth. However, shareholders want CSR investments in addition to, or even at the expense of, shareholder wealth (see Homroy, Mavruk, and Nguyen, 2023). Some other studies find that investors receive non-monetary benefits from investing in ethical funds (Renneboog et al., 2007) or investing in the stock of firms with greater levels of board gender diversity (Rau et al., 2023).

If these investors believe that their investments are spent in social capital that align with their social values, they will be willing to pay a higher offer price for such IPOs than otherwise. Investors may also value CSR because they think firms that engage in CSR are more reliable and their products and services are of higher quality (McWilliams and Siegel, 2001). This means they will require a lower cost of capital from the IPOs, which will increase their valuations of the IPOs, regardless of the IPOs future cash flows. If products and services offered by the firm are not aligned with social values of investors (e.g., sin stocks), investors will require a higher returns from such firms, which means a higher cost of capital (see Fabozzi et al. 2008). Knowing that some investors may have preference for CSR, firms may also use CSR as a differentiation strategy. For example, McWilliams and Siegel (2001) mention Ben & Jerry's who differentiate its products by using high-quality ingredients, supporting the local community, promoting diversity in the workplace, and investing in R&D that may result in CSR related process and product innovations, which are valued by customers and investors.

Given that some institutional investors may have preferences for CSR and these investors have communicated their preferences to underwriters during the book building process, the offer price

set by the underwriters would be greater than otherwise. Thus, if the CSR is priced during the book building process there should not be any relation between expressed CSR information in IPO prospectuses and underpricing. This is because the offer price would have already been adjusted upwards for the CSR information. Our first hypothesis is given more formally as:

H1. If expressed CSR information in IPO prospectuses is fully incorporated into the offer price, IPOs with higher CSR information should not realize greater underpricing than IPOs with lower CSR information.

Studies examining the relationship between firms' CSR activities and stock returns suggest that the effects are attenuated when the tone of CSR information and the type of CSR activity are considered. Regarding the tone of CSR, the effects on stock returns seem to be mixed. While some studies show a positive relation between stock returns and the net (positive minus negative) CSR tone some studies find either no relationship or negative relationship. (see Renneboog, Horst, and Zhang, 2007; Margolis, Elfenbein, and Walsh, 2009; Edmans, 2020; Bansal, Wu, and Yaron, 2021; Brown, Elliott, Wermers, and White, 2022). Regarding the type of CSR activity, the evidence seems to suggest that environment related information has the most influence on stock returns among other CSR activities such as employee, human rights, and social and community-related activities (Pencle and Malaescu, 2016; Campbell et al., 2024). If we find effects of environment on underpricing but the other types of expressed CSR activities are not related to underpricing one explanation could be that these other types are generally cheap talk and show some decoupling patterns (see Meyer and Rowan, 1977). Of course, some opponents would argue that these other types of CSR activities may have been incorporated into the offer price. However, it is unlikely that the underwriters price the other types of activities but not the environment related activities.

### 2.3 Expressed CSR in IPO prospectuses and post holdings of IPOs

Our next hypothesis concerns the question who have preferences for IPOs with expressed CSR information in their prospectuses. Put differently, we examine whether IPOs with CSR information garners the attention of certain investors and, in that case, who are these investors? Historical information on IPO firms is limited, which creates information asymmetries between

issuers and investors (Welch, 1989) and different investor groups (Rock, 1986). In the seminal paper by Myers and Majluf (1984) the existing (old) investors are not passive when they learn that firm issues to invest, they rebalance their portfolios and hence conflicts of interests between old and new investors occur. Besides this conflict, it is interesting to study the heterogeneity among new investors of IPOs. Our study focuses on specific non-financial information about CSR activities that is already revealed in the IPO prospectuses. Thus, the firm conveys such information to all investors, including old and new investors and its competitors, allowing us to examine the heterogeneity in investor preference for IPOs with CSR activities. Investors' preferences for such IPOs are likely to be explained by a type of information story related to familiarity or attention as CSR information is already released to all investors. Therefore, limited attention hypothesis, suggesting that investors pay attention to certain stocks and ignore the others because their time and ability are limited (Kahneman, 1973; Corwin and Coughenour 2008) can explain such preference for IPOs.

Examining the heterogeneity in investor behavior and identifying some investors who hold IPOs with CSR activity also allow us to make inferences for potential underpricing due to CSR activity. It would suggest that some investor groups are important to invite to meetings and roadshows during the book building process. Their opinion and preferences about CSR activities seem to affect for underpricing. These investors are likely be the (domestic) institutions or large investors (Rau et al., 2023). They will pay more attention to certain stocks since they are willing to invest more money in these IPO stocks. Indeed, Rau et al., (2023) show that large investors and institutions prefer firms with a greater level of board-gender diversity. Dimson et al. (2015) document that institutional ownership increases with ESG ratings. Hartzmark and Sussman (2019) show that mutual funds with high ESG rating firm portfolios attract fund flows even if they charge higher fees. Thus, our second hypothesis is given more formally as:

H2. Expressed CSR in IPO prospectuses increases post IPO holdings of institutional owners.

As in the underpricing hypothesis we focus on the tone of CSR information and the type of CSR activity. There is also some evidence suggesting the existence of home bias in IPO holdings (Baschieri, Carosi, and Mengoli, 2015; Nielsson and Wójcik, 2016). The reason could be related

to either information asymmetry or familiarity. In the first case, there seems to be location premium related with more isolated areas (Hong, Kubik, and Stein, 2008) as well as some premium for industry clustering (Harris, 2018). IPOs in rural areas and in more concentrated industries tend to be more underpriced than other IPOs, suggesting more information asymmetry in these areas. Local owners' investments can also be familiarity based. In our case, local owners pay more attention to local IPOs with CSR information because perhaps they are more familiar with the location, they are closer to these firms and can easier understand and follow whether the expressed CSR is a cheap talk.

### **3. Data and Methodology**

#### **3.1. Data**

Our data on detailed IPO characteristics are hand collected from an online database, Nyemissioner.se that provides information on new issues and stock market listings. In this database we search the stock market listings, Nasdaq Stockholm (17.6%), First North (43%), NGM (9.6%), and Spotlight (29.8%) and collect data on total of 779 completed IPOs (average of 56 IPOs per year) with full first day return information between year 2006 quarter 1 and year 2019 quarter 3. We identify 218 (28.0%) of these IPOs to be a change of stock market list and 561 (72.0%) of them are actually what we call the first time IPOs. We choose the mentioned period to be able to match the data to our detailed quarterly investor dataset obtained from Euroclear Sweden. Nyemissioner.se provides information on the name of IPO, branch, the date for IPO, headquarter location, information on prelisting ownership, pre and post value of IPO and other information provided in the IPO prospectuses such as underwriters and if the firm makes new equity issuance. We also download prospectuses of the IPOs which includes business descriptions among other relevant information. Using the name of the IPOs and date, we then manually search for ISIN and organization numbers in our investor dataset and thereby match our IPO data to Euroclear Sweden.

Our investor data, Euroclear Sweden, include quarterly holdings of all shareholders of firms listed in the Swedish stock markets and span 55 periods, from March, 2006 to September, 2019. The dataset displays the number of stocks held in each firm, personal identification number, five-

digit postal zip code, age, and gender, as well as firm organization data (ISIN, and register number). For the stock price and firm specific characteristics of IPOs, we use Thomson Eikon. For pre-IPO firm characteristics we use Serrano database.

Table 1 describes all the variables that are used in our underpricing and holdings regression analysis.

[Insert Table 1]

IPOs have earned 11.11% return on their first day, on average. Since market return (Nasdaq OMX return) on the IPOs' first day has generally been low, MAR has similar values to first day return. On average, net environment score is 0.51 and net environment TF-IDF score is 0.12, while the overall CSR score is 1.3 and overall CSR TF-IDF score is 0.16. The data include 7.7% foreign IPOs (headquartered abroad). On average, 18.9% of the IPOs is VC backed and 72% of the IPOs is first time listed (not a change of stock market list). The average pre-IPO ownership concentration measured by the Herfindahl index is 25.4%, the average Geo-industry cluster ratio is 22.8% and 62% of the IPOs are headquartered in urban areas. It appears that 9% of the IPOs have a popular advisor. The average pre-IPO values of net sales is 19.09 TSEK, profit is 1.89 TSEK, intangible asset ratio is 0.18, Debt/Equity value is 1.92, profit margin is -13.05, and ROA is -0.17. The average number of IPO introduction during the year is 80 and half of the IPOs in the data have been introduced in good economic times where the Swedish Economic Uncertainty Index is greater than its median index in the data.

Regarding those variables that are used in holdings regressions, the average weight placed on IPOs is about 2% and the average cumulative market returns is also 2% during the period. In the sample, 75% of the investments in IPOs are made by males, the average investor is 52 years old, and about 11% live in the local municipality where the IPOs are headquartered. The average annual mean income of the individual investor cohorts is 332.784 TSEK, and the average number of individual investors with a postgraduate degree is 318. In the sample, 89.7% of the investors is Swedish individuals, 50% (determined by the median) of them have large portfolios, 6.2% is Swedish institutions, 4.1% is Foreign institutions, and only 0.1% is Foreign individuals.

### 3.2. Descriptive statistics and bivariate analysis on IPOs

Table 2 provides descriptive statistics and bivariate analysis on first day return and pre-IPO market value.

[Insert Table 2]

Panel A shows that after year 2013 the number of IPOs are more than doubled in the sample, covering 12% of the sample in each year with most listing appeared in 2017 (18%). Years before 2013 the panel shows an IPO coverage of 3% of the sample, on average. Pre-market value of IPOs are given in the prospectuses. For those 60 IPOs (7.7%) that are headquartered abroad pre-market value is given in the local currency. Thus, we transfer the value to Swedish krona using the corresponding exchange rate on the particular day. The panel shows an average pre-market value of 759. MSEK with a standard deviation of 2,331 MSEK. Normalized by the number of IPOs in each year, IPOs introduced in 2006, 2011, and 2012 have the highest pre-market value over the period.

We compute the first day return as the percentage difference between the offer price (obtained from prospectuses) and the first day closing price. Panel A shows that IPOs introduced in the sample gained about 11.1% first day return (t-value: 4.85) with a standard deviation of 63.8%. This means that for the average IPO, the closing stock price of the first trading day is 11.1% greater than the offer price for the IPO. Ignoring those firms that exhibit a change of stock market list, the average first day IPO return decreases to 1.3%. Compared to the underpricing in U.S. (22.61%) in Rau et al., (2023), IPOs in Sweden earn about 12 percentage points less returns on their first day of trading. Year 2013 was the most profitable IPO year with a 37.7% first day return, followed by year 2011 (31.1%), year 2019 (21.5%), and year 2009 (20.2%). The least profitable IPO year was the year known as financial crises, 2008 with -6.3% first day return. This is followed by year 2014 (-2.8%) and 2010 (-1.1%).

In Panel B, we observe that Nasdaq Stockholm lists the largest IPOs with an average pre-market market value of 3,070 MSEK and also the most profitable IPOs with an average first day return

of 19.8%. The smallest IPOs are listed in Spotlight, an average of 171 MSEK pre-market value and 5.8% average first day return. There are relatively much less IPOs listed in NGM (75) with an average pre-market value of 310 MSEK and an average first day return of 3.6%, which provides the least profitability among the other markets. First North receives the largest number of IPOs with an average pre-market value of 322 MSEK and a substantial average first day return of 12.9%, which ranks as the second highest profitable IPO market.

In Panel C, we seek whether there is any difference between the first time IPOs (72%) and a change of stock market list (28%) in terms of pre-market value and first day returns. We find no difference in the pre-market value but IPOs that are identified as a change of stock list gain much more (35.2%) first day return than first time IPOs do, on average. This result could be related to familiarity with the firm before the change of stock market list. Next, we examine whether there is any difference in the average proceeds and the average first day return of IPOs that are headquartered in rural areas vs. in urban areas. We determine urban and rural areas according to the definitions of Statistics Sweden<sup>5</sup> and map the IPOs to these areas based on their zip codes of headquarters. We find no difference in either the pre-market values or in the first day returns of IPOs headquartered in rural vs. urban areas.

Panel E examines the difference in industries. We group IPO firms in Telecommunication, computer/IT, medicine, healthcare, and media industries as high tech industry and the remaining industries as others. We find that IPOs in high tech industries smaller, they have about 811.40 MSEK less pre-market value (t-value: -4.99), on average, than IPOs in other industries. In Panel F, we examine the average proceeds and the average first day returns of IPOs by pre-market ownership concentration. We define a high pre-market ownership concentration as if pre-market Herfindahl index (HHI) of an IPO is greater than the median HHI in the data. We compute the pre-market HHI based on the cashflow rights of 25 largest owners that we identify in the IPO prospectuses. We find no difference in the pre-market value of IPOs. However, the results show that IPOs with low pre-market HHI earns 9.2 percentage points higher first day returns than IPOs with high pre-market HHI do.

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<sup>5</sup> See Lista Kommungrupsind 2017 - SCB <https://www.scb.se>.

Finally, Panel G examines whether there is any difference in the average pre-market value and the first day return in the hot IPO period vs. cold IPO period. We define a hot IPO period if the number of IPOs in a given year is greater than the average (median used as robustness) number of IPOs in the data. We observe larger IPOs listed during the hot IPO period, the average pre-market value tends to be 382 MSEK larger than the average pre-market value of IPOs listed in the cold IPO period. There is some weak evidence that IPOs listed during the hot IPO period gain 8.7% less first day returns, on average (t-value: -1.90).

### 3.3. Methodology

Using a traditional bag-of-words approach, we subtract CSR related words/bigrams from the business descriptions of IPOs that are presented in IPO prospectuses. To determine which words might belong to CSR we use a previously developed word list of Pencle and Malaescu (2016), which is available online.<sup>6</sup> The word list is in English, thus we first translate the word list into Swedish by considering all the synonyms and obtain 779 CSR words/bigrams in Swedish. We then manually assign the tone of these words using the definitions in the tone of (CSR) words in the dictionaries provided by Dahlsrud (2008), Loughran and McDonald (2011), Pencle and Malaescu (2016), and Mavruk (2021). We first compute the percentage of CSR words and determine the tone of these words both for the overall sample and for each category separately. Campbell et al. (2024) use a slightly different method than the traditional bag-of-words approach to measure the ESG information disclosed in the private equity advisors' brochures. They implement a large language model, FinBERT, that considers ESG-related topics in the context of a sentence. However, their robustness analysis, using the traditional bag-of-words approach, confirms that the results from these two approaches are very similar. Appendix A presents statistics on our measure of the percentage of CSR words.

Appendix A shows that there is 24% CSR related words in all the business descriptions in IPO prospectuses. On average, 23% of these CSR words have a positive tone and 3% of the CSR words have a negative tone. This result indicates that IPOs mostly provide information when they engage in CSR activities that generate positive externality. Moreover, we identify 12% of these words to be employee related of which 22% has a positive tone and 4% has a negative

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<sup>6</sup> See <https://provalisresearch.com/Download/CSR.zip>.

tone. Roughly 12% of the words are environment related with a 30% positive tone and 2% negative tone. We find that 8% of the words belongs to human rights category of which 20% has a positive tone and 6% has a negative tone. Finally, the percentage of CSR words that are related to social and community category is 12% of which 15% has a positive tone and 4% has a negative tone.

Next, we compute TF-IDF (term frequency-inverse document frequency) scores for all the CSR words and for each category separately. TF-IDF is a relative statistical measure that evaluates how relevant a word is to a document (business description of an IPO) in a collection of documents (all the business descriptions of IPOs in the data). The maximum words in a business description in the data is 75. We first calculate TF-IDF for each word in a business description. Then we aggregate TF-IDF scores over the business description of an IPO to represent the TF-IDF at business description level. Thus, for each IPO we have a total TF-IDF score in the data. The higher the score the relatively more important (CSR) words the business descriptions contain. This is a relative score as, in the calculation, the number of times a word appears in a document is offset by the number of documents that contain the word. Thus, the words that are common in every document will rank low even though they may appear many times. Finally, we repeat these calculations of TF-IDF for each CSR category and tone. Appendix B summarizes the scores of TF-IDF across the business descriptions of all IPOs in the data.

The average TF-IDF score for all the CSR words in the business descriptions is 1.66 with an average positive TF-IDF score of 0.20 and a negative score of 0.04. The average score for employee related words is 0.43 (with an average 0.11 score for positive words and 0.02 for negative words), the environment related words have an average score of 0.45 (an average 0.13 score for positive words and 0.01 for negative words), the average score for human rights is 0.29 (an average of 0.07 for positive words and 0.02 for negative words). Finally, the average TF-IDF score for social and community related words is 0.43, with an average score of 0.07 for positive words and an average score of 0.02 for negative words. Regarding the tone of the categories the scores show an almost uniform distribution, although the overall score for each category varies to a small extent.

### 3.4. Main measure of CSR score

Our main measure of CSR score is similar to the measure used in Bansal et al. (2021) and Brown et al. (2022) and is calculated as the net CSR score for each category and IPO firm. More specifically:

$$Net\_CSR\_score_{c,j} = Nr.Pos.words_{c,j} - Nr.Neg.words_{c,j}, \quad (1)$$

where the net CSR score is the difference between the number of positive CSR words and negative CSR words per category  $c$  and firm  $j$ . Thus, to begin with, we have a net CSR score for four different categories: net employee score, net environment score, net human rights score, and net social and community score. We then aggregate these scores to obtain a net overall CSR score for each IPO firm. Our alternative measure is the net TF-IDF score for CSR variables. In a similar way, we compute the net TF-IDF score for each category and IPO firm. Finally, we aggregate all the category scores to obtain a net overall TF-IDF score for CSR. As we find only significant effects of environment score, we proceed with this variable in our main analysis but present the results from the overall CSR score and CSR TF-IDF score in Appendix E-G.<sup>7</sup> Table 3 shows our regression analyses that validate the CSR measures used in the main analysis.

[Insert Table 3]

In these analysis, for each IPO firm we obtain CSR news information from Mavruk (2023) who examine the effects of local CSR engagement on local ownership and firm value. The CSR news information in the data covers those IPO firms that entered the stock market(s) between the first quarter of 2006 and the third quarter of 2019 and survived during this period. In other words, CSR news in the dataset reflects IPO firms' future CSR engagement. We obtain and match firm level all CSR news and positive CSR news written about these firms to our IPO sample. In addition, we obtain overall ESG score of these IPOs from Thomson Eikon, however, the number of observations with available ESG score of the IPO firms is limited. In Panel A of Table 2 we correlate our main measure of net environment score with these future CSR news variables

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<sup>7</sup> The results from the other categories are not tabulated as we find no significance relation between those categories and underpricing or investors' holdings.

controlling for other variables and various fixed effects. In Panel B of Table 2 we revise our analysis for the net environment TF-IDF score. The panels show that both our environment score variables obtained from IPO prospectuses are positively correlated with the future CSR news variables, regardless of including the control variables and fixed effects. In Appendix C and D we show that our overall CSR score and overall TF-IDF score for CSR are also positively correlated with these future CSR news variables. Taken together, these results validate our CSR score variables.

### 3.5. Model specification for Underpricing

We run two sets of regressions, one set is for the first day return regressions and the second set is to examine the investors' trade behavior for given these CSR words in the business descriptions of IPOs. More specifically, our cross-sectional regressions for first day returns are given by Equation 1.

$$\begin{aligned}
& \textit{FirstDayReturn}_j \\
& = \beta_1 \textit{Environment\_score}_j + \beta_2 \textit{ForeignIPO}_j + \beta_3 \textit{VCBacked}_j \\
& + \beta_4 \textit{Initial\_listing}_j + \beta_5 \textit{PreIPOHH}_j + \beta_6 \textit{GICR}_j + \beta_7 \textit{Urban}_j \\
& + \beta_8 \textit{PopularAdvisor}_j + \beta_9 \textit{PreIPO\_NetSales}_j + \beta_{10} \textit{PreIPO\_ProfitLoss}_j \\
& + \beta_{11} \textit{PreIPO\_IntangibleAssets}_j + \beta_{12} \textit{PreIPO\_Debt/Equity}_j \\
& + \beta_{13} \textit{PreIPO\_ProfitMargin}_j + \beta_{14} \textit{PreIPO\_ROA}_j + \beta_{15} \textit{Nr. IPOs}_t \\
& + \beta_{16} \textit{GoodEconomicTimes}_t + \partial_j + \gamma_j + \delta_j + \tau_t + e_j,
\end{aligned} \tag{2}$$

where the dependent variable is the first day return of the IPO. As a robustness we also compute the market adjusted return (MAR) as the first day return in excess of the market return, which is proxied by the daily return on Nasdaq OMX Stockholm 30 index that is obtained from the webpage of national data center in Stockholm School of Economics. Environment score represents the net number of positive and negative CSR words related to environment score in the IPO business descriptions in the prospectuses. From the IPO prospectuses and Serrano database, we obtain and include control variables (the pre-IPO) in our regression analyses that follow the robust determinants of IPO underpricing identified by Loughran and Ritter (2002, 2004), Butler et al. (2014) and Rau et al., (2023). Although the number of control variables

seems large in our regression analysis, it is still smaller compared to, for example, 57 control variables used in Rau et al., (2023). Inclusion of these control variables in our models reduces concerns regarding omitted variable bias.

We assign and include whether the IPO is foreign (has headquarters abroad), a dummy whether the IPO is VC backed at the time of the introduction, a dummy indicating whether it is the initial listing or a change of stock market list. The pre-market Herfindahl index (HHI) of an IPO as a measure of ownership concentration. The geography industry cluster ratio GICR, which is calculated as the number of firms in a given industry and the same area scaled by the total number of firms within the industry. A higher GICR value indicates more industry concentration in a locality. A dummy variable indicating whether the IPO is headquartered in urban areas at the time of introduction. A dummy for popular advisor, which indicates whether the underwriter/advisor of the IPO covers top 25 percent of the distribution of IPOs in the data. The pre-IPO Net Sales and Profit and Loss, both are represented in TSEK. The pre-IPO Intangible Assets, Debt/Equity ratio, Profit Margin, and Return on Assets (ROA). The total number of IPOs introduced in the year of introduction for firm  $j$ . The dummy for good economic times is assigned as 1 if the Swedish Economic Uncertainty Index (obtained from Economic Policy Uncertainty) is greater than the median, else it is 0. Bansal et al. (2021) show that high socially responsible stocks have significantly higher alphas during good economic times, but slightly negative alphas during bad economic times. In untabulated Pearson correlation analysis we find no multicollinearity among these independent variables.

In addition, we include advisor fixed effects ( $\theta_j$ ), industry fixed effects ( $\gamma_j$ ), stock market list fixed effects ( $\delta_j$ ), and IPO year fixed effects ( $\tau_t$ ). We use robust (White) standard errors in these regressions and present our results stepwise, those with only the main variable of interest, those with the main variables and all the fixed effects, and finally our full model that include all the control variables as well. To examine the effects of our relative measure, in separate regressions, we replace the net environment score with the net environment TF-IDF score.

### 3.6. Model specification for Investors' post IPO holdings

Our second set of regression analysis relates to investors' post IPO holdings where we use the market value of investor purchases normalized by the total value invested in IPOs in the period as a dependent variable, referred to as weight.<sup>8</sup> The unit of analysis in these regressions is investor-stock-quarter that match the IPO date. For instance, if the IPO is introduced on March 4 we identify the investor holding in the IPO on March 30 and compute the buy value as the number of shares investor holds times the closing price of the IPO in March 30. We normalize this value by the market value of total IPO purchases on March 30. We scale the weight measure by multiplying it by 100. Our investor data refer to quarter-end holdings and do not allow us to identify exactly the date of purchase within the quarter. However, this setting allows us to examine post-IPO investors' holdings, which is examined using Equation 3:

$$\begin{aligned}
Weight_{ij} = & \beta_1 Environment\_score_j + \beta_2 VCBacked_j + \beta_3 PreIPOHHI_j + \beta_4 GICR_j \\
& + \beta_5 PopularAdvisor_j + \beta_6 Initial\_listing_j + \beta_7 PreIPO\_NetSales_j \\
& + \beta_8 PreIPO\_ProfitLoss_j + \beta_9 PreIPO\_IntangibleAssets_j \\
& + \beta_{10} PreIPO\_Debt/Equity_j + \beta_{11} PreIPO\_ProfitMargin_j \\
& + \beta_{12} PreIPO\_ROA_j + \beta_{13} FirsDayReturn_j + \beta_{14} CumMarketReturn_j \\
& + \beta_{15} GoodEconomicTimes_t + \beta_{16} Gender_i \\
& + \beta_{17} LocalMuni_{mt} + \beta_{18} Age_i + \beta_{19} MeanIncome_{mt} \\
& + \beta_{20} Nr.PostGradEdu_{mt} + \partial_j + \gamma_j + \pi_m + \tau_t + e_j,
\end{aligned}
\tag{3}$$

where the dependent variable, *Weight*, is the number of shares held in IPO at the end of the quarter times the closing price of the IPO stock on the holding day, normalized by the total market value of IPO purchases on the holding day. The main variables of interest the net environment score obtained from the IPO business descriptions. In separate regressions we also replace the net environment score with the net environment TF-IDF score. The results from the overall CSR scores are presented in Appendix E-G.

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<sup>8</sup> In additional analysis we also normalize the value of investor purchases by the total market value of the IPO firm and total market value of investors' portfolios and obtain similar results (untabulated and available on request).

We use similar IPO characteristics as in the underpricing Equation (2) but drop some of the variables due to multicollinearity (Foreign IPO, Urban, Nr. IPOs in the year) with the investor characteristics observed in our Pearson correlation analysis. Instead, we include first day return, Pre-IPO 90 days cumulative market return, investor characteristics, gender, coded 1 for male and 0 for female, investor age, defined as the difference between the current year in the data and the birth year of the investor, and a dummy indicating whether the IPO is headquartered in local municipality where the investor lives.

Moreover, mean income in Eq. 3 represents the mean income (in thousands kronor) for persons registered in the national population register during the whole year and matched to investor data by municipality, gender, 5 years of age interval, and year. Nr. post-graduate education in cohort represents the number of persons registered in the national population register with post-graduate education during the whole year and matched to investor data by municipality, gender, individual age, and year.<sup>9</sup> Finally, our large investor dataset allows us to include advisor, industry, municipality, and time fixed effects. We cluster standard errors on investor id and IPO date.

## 4. Results

### 4.1. Expressed CSR and IPO underpricing

In Panel A of Table 4 we examine the relation between our net environment score and underpricing proxied by first day return and market adjusted return (MAR), controlling for other factors and various fixed effects.

[Insert Table 4]

We find that one standard deviation increase in our net environment score increases the first day return by 4.8 percentage points (pp.) and increases MAR by 4.9 pp.<sup>10</sup> Regarding the control variables, underpricing seems to decrease by 25 pp. if the IPO is foreign and decreases by 34 to 35 pp., depending on the underpricing measure, if the IPO is a first time listing (not a change of stock market list). We also find that pre-IPO net asset value and the number of IPOs introduced

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<sup>9</sup> For details see SCB at <https://www.scb.se/contentassets/0c0089cc085a45d49c1dc83923ad933a/in-english-ssyk-2012.pdf>.

<sup>10</sup> We calculate the economic effects, for example, on first day return as the coefficient (0.037) times the standard deviation of net environment score (0.838) divided by the standard deviation of first day return (0.638).

during the year, representing the hot IPO period decreases underpricing, while profit margin increases underpricing.

In Panel B, we revise our regressions for the net environment TF-IDF score and find that one standard deviation increase in the net environment TF-IDF score increases first day return by 66 pp. while it increases MAR by 65 pp. Appendix E shows results from overall CSR score and Appendix F shows results from overall CSR TF-IDF score. It appears that there is no significant relationship between overall CSR scores and underpricing.

Overall, our results are consistent with Rau et al. (2023) who suggest that investor preferences for board gender diversity affect IPO underpricing. Similarly, our results concur with the findings of

Campbell et al., (2024) who show that only the environment related information in the PE advisors' brochures affects PE funds' capital raising. Our results contribute to these findings and suggest several interesting implications about the book-building process. Before the IPO, a range of price for the IPO stock is set. Then the underwriters ask and obtain information from some investors about their interest. Thus, the information both from IPOs' business descriptions and potential outside investors is used to set the final offer price of the IPO (Willenborg et al., 2015; Blankespoor et al., 2017). Underpricing refers to that on the first day of IPO it is common for the price to rise significantly. The percentage difference between the price on the first day and the offer price is then defined as underpricing. As it is unlikely that the fundamental value of the firm will change on the first trading day, the level of offer price set is crucial for underpricing. If underpricing is high it indicates that not all information about investor preferences in IPO is incorporated into the offer price.

Our results suggest that environment related information is not incorporated in the offer price efficiently, which is consistent with the argument raised by Baker, Boulton, Braga-Alves, and Morey (2021) who suggests that underwriters are unlikely to possess firm-level ESG ratings. The authors exploit the variation in ESG government ratings and find that IPO underpricing tends to be lower in countries with stronger ESG ratings, particularly, stronger environmental risk management.

Together, our findings suggest that only the CSR information related to environment is important for underpricing and this information is not incorporated in the initial price by underwriters and advisors. This result implies that the underwriters may overestimate the firm's cost of capital by ignoring environment related information in the IPOs' business descriptions during the IPO process (see Leone et al., 2007). Thus, to a certain extent, underwriters by considering, particularly, the environment related information may lower information asymmetry between IPO firms and outside investors at the time of IPO (see El Ghoul et al., 2011). Underpricing is known as primary cost of going public (Ritter, 1987), our results suggest that considering, particularly, environment related information in business descriptions underwriters can lower IPO costs and improve access to capital markets for private firms.

An alternative explanation of our results is that some investors have high preferences for stocks with CSR activities and they particularly consider environment, in other words, they screen out IPO firms that potentially misbehave in terms of environment. This interpretation would be consistent with the idea that ESG information is part of the institutional investors' decision making during both due diligence and ownership. This means that institutional investors expect the firms to perform well in ESG and they screen out if the firms exhibit poor ESG performance. Next, we examine investors' holdings in IPOs for given CSR information in their business descriptions.

#### 4.2. Expressed CSR and investors' post IPO holdings

Table 5 Panel A relates environment scores to weight placed on IPO firms by all investors in the data. Panel B examines the post IPO holdings of Swedish individual investors and Panel C examines the post IPO holdings of Swedish institutions, and foreign institutions including foreign individuals (which cover only 0.1% of the data).

[Insert Table 5]

In Panel A, we find that capital weight placed on IPO firms by investors increases by 1.4 pp. for one standard deviation increase in the net environment score and it increases by 0.2 pp. for one standard deviation increase in the net environment TF-IDF score. These results are consistent with those obtained from our underpricing regressions. The economic interpretation of the control variables follows the net environment score regressions but the results are robust in the net environment TF-IDF score regressions.

Regarding the control variables, there is some weak evidence that investors disinvest in VC backed IPOs. One standard deviation increase in pre-IPO HHI decreases Weight by 5 pp, while one standard deviation increase in GICR increases Weight by 4.4 pp. If the IPO has a popular advisor Weight decreases by 0.9 pp. but if the IPO is a first time listing, not a change in stock market list, Weight increases by 0.9 pp. The results also show that one standard deviation increase in Net Sales decreases Weight by 1.6 pp., one standard deviation increase in Profit Margin increases Weight by 0.5 pp., and one standard deviation increase in Intangible Asset increases Weight by 3.8 pp.

Regarding the investors characteristics, male investors invest 0.1 pp higher in IPO stocks, and investors increase their capital weight by 0.6 pp if the IPO is local. One standard deviation increase in investor age increases Weight by 0.22 pp. and one standard deviation increase in investors' income increases Weight by 1.7 pp. There is also some weak relation between the post graduate education and investment in IPOs.

In Panel B we find that Swedish individual investors increase their capital weight on IPO stocks by 2.3 pp. for one standard deviation increase in the net environment score. Swedish individuals with large portfolios (with a larger market value of the portfolio than the median portfolio value in the data) increase their weight even more, 3.8 pp. for one standard deviation increase in the net environment score. The results from the net TF-IDF measure are similar. However, there is no relation between the net environment score and weight placed on IPOs by Swedish individual investors with small portfolios. Regarding the institutional investors in Panel C, only the Swedish institutions consider environment information in IPO prospectuses. One standard deviation increase in the net environment score increases the weight placed by Swedish

institutions by 7.6 pp. In Appendix G we revise all the regressions for the net overall CSR score and the net CSR TF-IDF score and find some weak relation with investors holdings of IPO stocks.

Overall, we find consistent result with Rau et al. (2023) by showing that large domestic investors and institutional investors derive the relationship between environment information and demand for IPOs. Rau et al. (2023) show that increased demand for the shares of gender-diverse board IPOs mainly come from large investors and institutional investors. The small individual investors tend to be relatively indifferent to CSR (see Moss et al., 2020). Our results indicate that institutional investors increase their demand for IPOs with positive environment information in their business descriptions. This increase in demand is likely the reason for a greater underpricing realized by the net environment score. This result is similar to the findings in Campbell et al., (2024) who show that negative environment disclosure in PE advisors' brochures decreases the likelihood of raising new capital.

We relate our findings to limited attention story. If investor attention is associated with high first day IPO returns (see e.g., Baker et al., 2021) then the environment information in business descriptions of IPOs would increase the attention based trading activity as described in Barber and Odean (2008). Also, it is unlikely that these results are driven by institutional investors who are involved in the book-building process. If the institutional investors who were involved in the book-building process communicated their thoughts on environment to underwriters, we would have expected to see a higher offer price and hence less of underpricing among these IPO. The underwriters would have incorporated this information and adjusted the offer price upwards. Our results contrast this alternative explanation.

Moreover, our finding that small domestic investors exhibit no reaction to environment information is consistent with the idea of the limited attention hypothesis. Investors seem to pay attention when there are larger financial stakes and this type trading behavior may put pressure on the price of the stock over and above its fundamental value (see Ljungqvist, 2007). It seems as investors exhibit various degrees of preferences for environmental externality in addition to their standard utility for financial wealth. This preference depends on their wealth (see Yang,

2023) as we find that individual investors with large portfolios exhibit preference for environmental externality. We also find some home bias in Swedish IPOs. Both large domestic individual and institutions seem to have a stronger overall reaction to environmental information than foreign investors. There is also significant evidence that Swedish institutional investors place more weight on local IPOs than Swedish individual investors do.

One explanation for why investors place more capital weight on IPOs with environment information in their business descriptions is that they receive non-monetary benefits from owning ethical firms (see Renneboog et al., 2007). We observe that the positive environment information in IPO prospectuses influence firm profitability at the time the firm goes public. However, there is a weak relation between the overall CSR information in the prospectuses and underpricing. This result suggests that using positive CSR information strategically at the time of IPO is unlikely to attract attention from institutional investors. Thus, CSR information at the time of the IPO cannot be used as window-dressing to garner the attention of institutional investors. However, institutional investors seem to screen out IPOs with negative environmental spillovers. This preference may influence the firm's cost of capital at the time of the offering. This result is consistent with findings in Hong and Kacperczyk (2009) who show that firms that operate in the alcohol, tobacco, and gaming industries have lower institutional ownership and analyst coverage than firms in other industries. Our results may also infer to the findings in Fabozzi et al. (2008) who suggest that investors require higher expected returns from companies in sin industries, such as the gaming, tobacco, and alcohol industries. Investors may need to be compensated for buying such stocks as products and services of the firms may not align with investors' interests.

## **5. Conclusions**

In this paper, we document that net positive environment information in the business descriptions of IPOs increases underpricing as well as investors' post IPO holdings. In contrast, overall CSR information has some weak effect on underpricing and investors' holdings. Information on other CSR categories such as employees, human rights, and social community in IPO prospectuses do not seem to affect underpricing and investors' post IPO holdings. We interpret this finding as statements related to these other categories of CSR made at the IPO seem to be generally "cheap talk", likely exhibiting some decoupling patterns. The results from CSR activities related to

environmental category are mainly driven by large investors and institutional investors. Small domestic investors exhibit much lower reaction than large domestic investors, which is consistent with the limited attention hypothesis, where investors only pay attention when there are larger financial stakes. We find also that domestic institutions have a stronger overall reaction than foreign institutions, which supports the idea that domestic institutions pay more attention to Swedish IPOs than foreign institutions. These results hold after controlling for detailed investor and IPO characteristics including pre-IPO ownership concentration.

Our results suggest that CSR activities particularly related to environmental category are not incorporated in the offer price efficiently, suggesting that underwriters are unlikely to possess firm-level CSR information. This means that the underwriters may overestimate the firm's cost of capital by ignoring environment information in the IPOs' business descriptions during book-building process. CSR activities of IPOs seem to be a part of large and institutional investors' decision making as they particularly consider environment information and screen out IPO firms that potentially misbehave in terms of environment. This explanation is likely one reason for the increase in underpricing realized by environment information. We relate these results to limited attention hypothesis. There is consistent evidence suggesting that underpricing is related to investor attention. The environment information in business descriptions of IPOs seems to increase the attention based trading activity.

However, large investors and institutional investors do not seem to believe that IPOs with more positive (overall) CSR activities are more profitable than other IPOs. Rather, investors seem to receive non-monetary benefits from owning ethical IPO stocks. Such non-pecuniary activities are unlikely to influence firm profitability at the time the firm goes public. This also means that using positive CSR information strategically at the time of IPO is unlikely to attract attention from institutional investors. Thus, IPO firms cannot use positive CSR information at the time of going public as window-dressing to garner the attention of institutional investors.

Underpricing is known as primary cost of going public. Underwriters by considering, particularly, the environment information in business descriptions can lower IPO costs and improve access to capital markets for private firms. Overall, limited attention has a significant

impact on first day returns of IPOs and liquidity in financial markets. Policy makers could feasibly consider IPOs' environment initiatives that increase information in business prospectuses. This has benefits not only for investors' trades but also for underpricing of IPOs.

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### **Table 1. Descriptive statistics**

Data cover total 779 IPOs (average of 56 IPOs per year) with full first day return information. The table shows descriptive statistics for all the variables that are used both in the underpricing regressions and investors' holdings regressions. For the dependent variable of underpricing of IPOs, we use first day return and market adjusted return (MAR), which is defined as the first day return in excess of market return on day  $t$ . The main variable of interest in the regressions is the CSR score, more specifically the net environment score, which is defined as the number of positive words that are related to environment minus the number of negative words that are related to environment in the business descriptions in IPO prospectuses. As a robustness we also use the environment TF-IDF scores (term frequency-inverse document frequency), which is a statistical measure that evaluates how relevant a word is to a

document (business description of an IPO) in a collection of documents (all the business descriptions of IPOs in the data).

Variable	Obs	Mean	Std. dev.	Min	Max
First day return	779	0.111	0.638	-0.819	3.500
MAR	777	0.111	0.639	-0.835	3.512
Nasdaq OMX return	777	0.000	0.011	-0.084	0.040
Environment score	779	0.512	0.838	-2.000	4.000
Environment TF-IDF score	779	0.118	0.202	-0.800	0.849
CSR score	779	1.315	2.407	-6.000	14.000
CSR TF-IDF score	779	0.164	0.265	-0.800	1.271
Foreign IPO	779	0.077	0.267	0.000	1.000
VC backed	779	0.189	0.392	0.000	1.000
Initial listing	779	0.720	0.449	0.000	1.000
HHI	779	0.254	0.289	0.000	1.000
GICR	779	0.228	0.226	0.005	0.750
Urban	779	0.619	0.486	0.000	1.000
Popular advisor	779	0.090	0.286	0.000	1.000
Net sales (TSEK)	697	19.085	58.224	0.000	426.400
Profit loss (TSEK)	689	1.884	48.613	-91.236	383.043
Intangible assets	694	0.175	0.273	0.000	0.997
Debt/Equity	678	1.918	5.410	0.000	44.996
Profit margin	779	-13.047	46.818	-440.222	39.641
ROA	694	-0.166	0.369	-1.650	0.560
Nr. IPOs	779	80.368	38.823	18.000	138.000
Good economic times	779	0.496	0.500	0.000	1.000
Additional variables used in holding regressions					
Weight	1,430,066	0.017	0.074	0.000	0.621
Cum. market return	1,430,066	0.017	0.111	-1.296	0.284
Gender	1,282,403	0.750	0.433	0.000	1.000
Local municipality	1,346,232	0.111	0.314	0.000	1.000
Age	1,282,403	51.915	17.412	16.000	87.000
Mean income in TSEK	1,274,726	332.784	122.750	10.100	1267.000
Nr. post-grad. Edu. in cohort (in 100)	1,151,687	0.318	0.545	0.000	2.330
Swedish individuals	1,430,066	0.897	0.304	0.000	1.000
Large portfolio	1,148,152	0.506	0.500	0.000	1.000
Swedish institutions	1,430,066	0.062	0.241	0.000	1.000
Foreign institutions	1,430,066	0.041	0.197	0.000	1.000
Foreign individuals	1,430,066	0.001	0.030	0.000	1.000



**Table 2. Descriptive statistics and bivariate analysis for pre-market value and first day return of IPOs**

Panel A presents statistics on pre-market value and first day returns over time. Panel B divides the sample by the stock market list. Panel C shows statistics on the first time IPOs vs. change of stock market list. About 72% of the IPOs in the data is the first time introduction and the remaining 28% is a change of stock market list. Panel D splits the sample by IPOs headquartered in urban vs. rural areas. Urban and Rural areas are determined according to definitions of Statistics Sweden (see Lista Kommungruppsind 2017 - SCB<https://www.scb.se>). Panel E shows statistics on IPOs in high-tech industries vs. other industries. Firms in Telecommunication, computer/IT, medicine, healthcare, and media industries are assigned as high tech industry. Panel F presents statistics on IPOs with high pre-market ownership concentration vs. IPOs with low pre-market ownership. Pre-market high ownership concentration IPO is determined as if the pre-market Herfindahl index (HHI) of an IPO is greater than the median HHI in the data. Finally, Panel G shows descriptive statistics on hot period IPOs vs. cold period IPOs. Hot IPO period is determined as if the number of IPOs in a given year is greater than the average number of IPOs in the data.

Panel A. Number of IPOs, average proceeds, and average first day returns over time

IPO year	n	Pre-market value (MSEK)		First day return	
		mean	std	Mean	std
2006	19	1308	4055	0.085	0.622
2007	33	272	613	0.182	0.890
2008	21	124	219	-0.063	0.505
2009	18	194	483	0.202	0.906
2010	33	248	574	-0.011	0.371
2011	32	953	3134	0.310	0.806
2012	27	666	2692	0.139	0.885
2013	33	523	1178	0.377	0.882
2014	85	1071	3086	-0.028	0.439
2015	100	1385	3286	0.129	0.672
2016	104	730	2112	0.048	0.497
2017	138	670	1954	0.109	0.563
2018	76	480	1037	0.096	0.676
2019	60	721	2404	0.215	0.634
All	779	759	2331	0.111***	0.638
<i>t</i> -value				4.850	

Panel B. Number of IPOs, average proceeds, and average first day returns by stock market listing

Stock market list	n	Pre-market value (MSEK)		First day return	
		mean	std	mean	std
First North	335	322	633	0.129	0.678
NGM	75	310	2025	0.036	0.754
Nasdaq Stockholm	137	3070	4327	0.198	0.585
Spotlight	232	171	1237	0.058	0.560

Panel C. IPOs: Average proceeds, and average first day returns by first time IPO.

	N	Mean	Std Dev	t-value
Pre-market value (MSEK)				
Change of list (1)	218	853.80	2616.60	
First time IPO (2)	561	722.30	2211.90	
Diff (2-1)		-131.50	2332.00	-0.66
First day return				
Change of list (1)	218	0.364	0.888	
First time IPO (2)	561	0.013	0.475	
Diff (2-1)		<b>-0.352</b>	<b>0.619</b>	<b>-5.54</b>

Panel D. IPOs: Average proceeds, and average first day returns by geography

	N	Mean	Std Dev	t-value
Pre-market value (MSEK)				
Rural (1)	297	697.30	2364.90	
Urban (2)	482	797.20	2311.90	
Diff (2-1)		99.86	2332.30	0.58
First day return				
Rural (1)	297	0.109	0.606	
Urban (2)	482	0.112	0.658	
Diff (2-1)		0.003	0.639	0.07

Panel E. IPOs: Average proceeds, and average first day returns by high tech industry

	N	Mean	Std Dev	t-value
Pre-market value (MSEK)				
Others (1)	397	1157.00	2973.90	
High tech (2)	382	345.60	1252.70	
Diff (2-1)		<b>-811.40</b>	<b>2297.10</b>	<b>-4.99</b>
First day return				
Others (1)	397	0.123	0.643	
High tech (2)	382	0.099	0.634	
Diff (2-1)		-0.024	0.638	-0.52

Panel F. IPOs: Average proceeds, and average first day returns by high pre-market ownership concentration (Herfindahl index).

	N	Mean	Std Dev	t-value
Pre-market value (MSEK)				
Low HHI (1)	390	726.80	2310.60	
High HHI (2)	389	791.50	2354.40	
Diff (2-1)		64.65	2332.50	0.39
First day return				
Low HHI (1)	390	0.157	0.681	
High HHI (2)	389	0.065	0.590	
Diff (2-1)		<b>-0.092</b>	<b>0.637</b>	<b>-2.01</b>

Panel G. IPOs: Average proceeds, and average first day returns by hot/cold IPO periods

	N	Mean	Std Dev	t-value
Pre-market value (MSEK)				
Cold IPO period (1)	352	549.70	1933.90	
Hot IPO period (2)	427	931.70	2603.40	
Diff (2-1)		<b>382.00</b>	<b>2325.00</b>	<b>2.35</b>
First day return				
Cold IPO period (1)	352	0.159	0.724	
Hot IPO period (2)	427	0.072	0.555	
Diff (2-1)		<b>-0.087</b>	<b>0.637</b>	<b>-1.90</b>

**Table 3. Validation of CSR scores**

The table shows the results from the regressions that relate our main measure of environment score (Panel A) and environment TF-IDF score (Panel B) calculated using business descriptions in IPO prospectuses to firms' CSR news that cover any news about firms' CSR activities after the IPOs. The CSR news information in the data covers those IPO firms that entered data between the first quarter of 2006 and the third quarter of 2019 and survived during the period. Thus, CSR news in the dataset reflects IPO firms' future CSR engagement.

Panel A. Validation of the net environment score

VARIABLES	(1) CSR news	(2) CSR news	(3) CSR news	(4) Positive CSR news	(5) Positive CSR news	(6) Positive CSR news	(7) ESG dummy
Environment score	0.0049** (3.007)	0.0053** (2.651)	0.0058** (2.609)	0.0010** (2.772)	0.0015** (3.036)	0.0014* (1.978)	0.0215 (0.252)
Advisor FE	NO	YES	YES	NO	YES	YES	NO
Industry FE	NO	YES	YES	NO	YES	YES	NO
List FE	NO	YES	YES	NO	YES	YES	NO
Year FE	NO	YES	YES	NO	YES	YES	NO
Control Variables	NO	NO	YES	NO	NO	YES	NO
Constant	0.0063*** (3.497)	0.0059*** (8.250)	2.2355*** (6.039)	0.0856*** (155.932)	0.0852*** (149.582)	0.0857*** (32.994)	0.2312*** (3.547)
Observations	779	751	659	305	295	284	38
Adjusted R-squared	0.021	0.120	0.142	0.005	0.111	0.179	0.009
F-value	9.040	7.027		7.682	9.218		0.064

Panel B. Validation of the net environment TF-IDF score

VARIABLES	(1) CSR news	(2) CSR news	(3) CSR news	(4) Positive CSR news	(5) Positive CSR news	(6) Positive CSR news	(7) ESG dummy
Environment TF-IDF score	0.0227** (2.883)	0.0242** (2.652)	0.0266** (2.657)	0.0042* (2.070)	0.0059** (2.415)	0.0055 (1.730)	0.0244 (0.231)
Advisor FE	NO	YES	YES	NO	YES	YES	NO
Industry FE	NO	YES	YES	NO	YES	YES	NO
List FE	NO	YES	YES	NO	YES	YES	NO
Year FE	NO	YES	YES	NO	YES	YES	NO
Control Variables	NO	NO	YES	NO	NO	YES	NO
Constant	0.0061*** (3.265)	0.0058*** (6.489)	2.1946*** (6.397)	0.0856*** (146.084)	0.0853*** (144.428)	0.0859*** (33.691)	0.2397** (3.139)
Observations	779	751	659	305	295	284	38
Adjusted R-squared	0.026	0.125	0.149	0.004	0.108	0.176	0.009
F-value	8.315	7.034		4.285	5.833		0.053

**Table 4. CSR and Underpricing of IPOs**

The table examines the relation between CSR information in business descriptions and the dependent variable of underpricing of first time IPOs. We use first day return and market adjusted return (MAR), which is defined as the first day return in excess of market return on day  $t$ . Panel A of the table relates the net environment score, measured by using business descriptions, to the first day return and MAR that represent the underpricing of IPOs. Panel B shows the results from term frequency-inverse document frequency (TF-IDF) of net environment score. In all the panels three regression models are run for each dependent variable. The first column regresses the first day return on the environment score variables alone. Column 2 includes industry, stock market list, and IPO year fixed effects in the model. The final column includes also all the control variables in the model. Robust (White) standard errors are used and  $t$ -statistics are presented within the parentheses. Significance of the coefficients is marked with asterisks at 1 percent (\*\*\*), 5 percent (\*\*), and at 10 percent (\*) significance levels.

Panel A. The net environment score and underpricing

VARIABLES	(1) First day return	(2) First day return	(3) First day return	(4) AR	(5) AR	(6) AR
Environment score	0.0679*** (3.636)	0.0562*** (4.274)	0.0365** (2.105)	0.0685*** (3.732)	0.0561*** (4.526)	0.0370** (2.291)
Foreign IPO			-0.2535** (-2.696)			-0.2526** (-2.652)
VC backed			-0.0545 (-0.715)			-0.0571 (-0.740)
Initial listing			-0.3430*** (-3.425)			-0.3462*** (-3.447)
HHI			-0.1284 (-1.117)			-0.1268 (-1.122)
GICR			0.2786 (1.106)			0.2821 (1.125)
Urban			-0.0931 (-1.438)			-0.0933 (-1.423)
Popular advisor			0.2007 (1.697)			0.2003 (1.703)
Net sales (TSEK)			-0.0005** (-2.310)			-0.0005** (-2.305)
Profit loss (TSEK)			0.0009* (2.072)			0.0009* (2.132)
Intangible assets			0.0139 (0.150)			0.0129 (0.137)
Debt/Equity			0.0109 (1.134)			0.0109 (1.128)
Profit margin			0.0010*** (3.094)			0.0010*** (3.099)
ROA			0.0511 (0.897)			0.0470 (0.854)
Nr. IPOs			-0.9295*** (-7.368)			-0.9376*** (-7.408)
Good economic times			0.0264			0.0246

			(0.370)			(0.336)
Advisor FE	NO	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	NO	YES	YES
List FE	NO	YES	YES	NO	YES	YES
Year FE	NO	YES	YES	NO	YES	YES
Constant	0.0762***	0.0838***	73.9788***	0.0760***	0.0840***	74.7701** *
	(3.159)	(6.003)	(7.424)	(3.201)	(6.157)	(7.463)
Observations	779	751	659	777	749	657
Adjusted R-squared	0.007	0.041	0.096	0.007	0.041	0.096
F-value	13.219	18.264		13.929	20.480	

Panel B. The net environment TF-IDF score and underpricing

VARIABLES	(1) First day return	(2) First day return	(3) First day return	(4) AR	(5) AR	(6) AR
Environment TF-IDF score	0.2595** (2.496)	0.2193*** (3.688)	0.1583** (2.140)	0.2597** (2.492)	0.2170*** (3.638)	0.1569** (2.131)
Control variables	NO	NO	YES	NO	NO	YES
Advisor FE	NO	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	NO	YES	YES
List FE	NO	YES	YES	NO	YES	YES
Year FE	NO	YES	YES	NO	YES	YES
Constant	0.0804*** (3.096)	0.0868*** (5.608)	73.6554*** (7.484)	0.0804*** (3.128)	0.0871*** (5.722)	74.4155*** (7.503)
Observations	779	751	659	777	749	657
Adjusted R-squared	0.005	0.041	0.096	0.005	0.040	0.096
F-value	6.232	13.599		6.208	13.235	

**Table 5. Investors' holdings of IPOs**

The table presents results from investors' holdings in IPO firms. The dependent variable is the capital weight placed on IPO firms by the investors. It is calculated as the number of shares held in IPO at the end of the quarter times the closing price of the IPO stock on the holding day, normalized by the total market value of IPO purchases on the holding day. The main variables of interest the net Environment score and the net TF-IDF environment score calculated by using the IPO business descriptions. Panel A of the table shows results from all investors' holdings in the data. Panel B shows results from Swedish individual investors. The sample of individuals also split by their portfolio value. Those with large portfolios are determined as if the market value of the portfolio is greater than the median portfolio value in the data. Panel C presents results from Swedish institutions, Foreign institutions alone and Foreign institutions including foreign individuals (which cover only 0.1% of the data). In each regression standard errors are clustered on investor id and IPO date. The *t*-statistics are presented within the parentheses and the significance of the coefficients is marked with asterisks at 1 percent (\*\*\*), 5 percent (\*\*), and at 10 percent (\*) significance levels.

Panel A. Holdings and environment score

VARIABLES	(1) Weight	(2) Weight
Environment score	0.0012** (2.214)	
Environment TF-IDF score		0.0073*** (2.804)
VC backed	-0.0031* (-1.897)	-0.0031* (-1.860)
HHI	-0.0099*** (-5.010)	-0.0099*** (-5.091)
GICR	0.0109** (2.592)	0.0106** (2.474)
Popular advisor	-0.0086*** (-2.701)	-0.0092*** (-2.695)
Initial listing	0.0081*** (3.558)	0.0080*** (3.462)
Net sales (TSEK)	-0.00001*** (-4.651)	-0.00001*** (-4.662)
Profit loss (TSEK)	0.00001** (2.291)	0.00001** (2.298)
Intangible assets	0.0117*** (4.828)	0.0118*** (4.917)
Debt/Equity	-0.0000 (-0.126)	-0.0000 (-0.118)
Profit margin	0.0000 (0.952)	0.0000 (0.968)
ROA	-0.0009 (-0.285)	-0.0008 (-0.256)
First day return	-0.0008 (-0.615)	-0.0008 (-0.615)

Cum. market return	0.0064 (1.546)	0.0067* (1.700)
Good economic times	0.0013 (1.136)	0.0014 (1.270)
Gender	0.0014*** (2.800)	0.0014*** (2.814)
Local municipality	0.0058*** (4.283)	0.0058*** (4.279)
Age	0.00001** (2.036)	0.00001** (2.030)
Mean income in TSEK	0.00001*** (10.247)	0.00001*** (10.231)
Nr. post-grad. Edu. (in 100)	0.0007* (1.881)	0.0006* (1.865)
Advisor FE	YES	YES
Industry FE	YES	YES
Municipality FE	YES	YES
Time FE	YES	YES
Constant	-0.0061*** (-3.303)	-0.0061*** (-3.391)
Observations	1,085,900	1,085,900
Adjusted R-squared	0.067	0.067
F-value	140.921	130.896

Panel B. Domestic individual investors' holdings of IPOs

VARIABLES	(1) Individuals Weight	(2) Individuals Weight	(3) Large ind. Weight	(4) Large ind. Weight	(5) Small ind. Weight	(6) Small ind. invs. Weight
Environment score	0.0012** (2.214)		0.0027** (2.550)		-0.0003 (-1.149)	
Environment TF-IDF score		0.0073*** (2.804)		0.0117*** (3.353)		-0.0009 (-0.862)
Control variables	YES	YES	YES	YES	YES	YES
Advisor FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Constant	-0.0061*** (-3.303)	-0.0061*** (-3.391)	-0.0099*** (-2.791)	-0.0101*** (-2.916)	0.0025** (2.356)	0.0025** (2.335)
Observations	1,085,900	1,085,900	419,425	419,425	462,562	462,562
Adjusted R-squared	0.067	0.067	0.119	0.119	0.130	0.130
F-value	140.921	130.896	104.828	101.406	36.637	35.651

Panel C. Institutional investors' holdings of IPOs

VARIABLES	(1) Swedish inst. Weight	(2) Swedish inst. Weight	(3) Foreign inst. Weight	(4) Foreign inst. Weight	(5) Foreign ints. and ind. Weight	(6) Foreign ints and ind. Weight
Environment score	0.0168*** (4.026)		-0.0019 (-0.321)		0.0005 (0.078)	
Environment TF-IDF score		0.0732*** (4.621)		-0.0043 (-0.213)		0.0107 (0.466)
Control variables	YES	YES	YES	YES	YES	YES
Advisor FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Municipality FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Constant	0.0541*** (4.324)	0.0535*** (4.258)	0.0431** (2.517)	0.0435** (2.546)	0.0429** (2.533)	0.0436** (2.552)
Observations	82,473	82,473	3,115	3,115	3,186	3,186
Adjusted R-squared	0.216	0.217	0.202	0.202	0.205	0.205
F-value	108.887	443.102				

## Appendix

Appendix A presents the percentage of CSR words in the business descriptions of IPOs that are presented in IPO prospectuses. For the CSR words/bigrams, we use a previously developed word list of Pencle and Malaescu (2016), which is available online (<https://provalisresearch.com/Download/CSR.zip>). Appendix B presents scores of TF-IDF (term frequency-inverse document frequency), which is a statistical measure that evaluates how relevant a word is to a document (business description of an IPO) in a collection of documents (all the business descriptions of IPOs in the data). Appendix C presents results from our validation tests using overall CSR score and Appendix D revises these analyses for the net CSR TIIDF score. Appendix E relates the overall CSR score to underpricing and Appendix F relates the net CSR TIIDF score to underpricing. Finally, Appendix G shows results from regressions relating overall CSR score and the CSR score and the net TIIDF CSR score to investors' IPO holdings.

Appendix A. The number and percentage of CSR words in business descriptions by category and tone

Categories/Tone	Variable	N	Mean	Std Dev	Min	Max
	Total words in a document	779	16.82	10.09	1.00	75.00
All CSR words	CSR all pct	779	0.24	0.16	0.00	1.00
<i>Tone within CSR words</i>	CSR all pos pct	726	0.23	0.27	0.00	1.00
	CSR all neg pct	726	0.03	0.11	0.00	1.00
Employee words	CSR employee pct	779	0.12	0.11	0.00	0.67
<i>Tone within category</i>	CSR employee pos pct	608	0.22	0.32	0.00	1.00
	CSR employee neg pct	608	0.04	0.13	0.00	1.00
Environment words	CSR environment pct	779	0.12	0.11	0.00	1.00
<i>Tone within category</i>	CSR environment pos pct	605	0.30	0.36	0.00	1.00
	CSR environment neg pct	605	0.02	0.11	0.00	1.00
Human rights words	CSR human rights pct	779	0.08	0.09	0.00	0.50
<i>Tone within category</i>	CSR human rights pos pct	501	0.20	0.33	0.00	1.00
	CSR human rights neg pct	501	0.06	0.20	0.00	1.00
Social and community words	CSR soc com pct	779	0.12	0.11	0.00	0.60
<i>Tone within category</i>	CSR soc com pos pct	610	0.15	0.27	0.00	1.00
	CSR soc com neg pct	610	0.04	0.14	0.00	1.00

Appendix B. CSR TF-IDF scores of words in business descriptions by category and tone

Categories/Tone	Variable	N	Mean	Std Dev	Min	Max
	TF-IDF score	779	7.06	1.73	2.00	12.68
CSR TF-IDF score	CSR TF-IDF score	779	1.66	1.00	0.00	4.91
<i>Tone within CSR words</i>	CSR pos TF-IDF score	779	0.20	0.24	0.00	1.27
	CSR neg TF-IDF score	779	0.04	0.12	0.00	1.03
Employee TF-IDF score	CSR employee TF-IDF score	779	0.43	0.36	0.00	1.84
<i>Tone within category</i>	CSR employee pos TF-IDF score	779	0.11	0.19	0.00	1.27
	CSR employee neg TF-IDF score	779	0.02	0.09	0.00	0.67
Environment TF-IDF score	CSR environ TF-IDF score	779	0.45	0.38	0.00	2.23
<i>Tone within category</i>	CSR environ pos TF-IDF score	779	0.13	0.19	0.00	0.85
	CSR environ neg TF-IDF score	779	0.01	0.08	0.00	1.03
Human rights TF-IDF score	CSR human rights TF-IDF score	779	0.29	0.30	0.00	1.54
<i>Tone within category</i>	CSR human rights pos TF-IDF score	779	0.07	0.15	0.00	0.81
	CSR human rights neg TF-IDF score	779	0.02	0.08	0.00	0.67

Social and community TF-IDF score	CSR soccom TF-IDF score	779	0.43	0.35	0.00	2.03
<i>Tone within category</i>	CSR soccom pos TF-IDF score	779	0.07	0.14	0.00	1.08
	CSR soccom neg TF-IDF score	779	0.02	0.08	0.00	0.67

Appendix C. Validation of the net CSR score

VARIABLES	(1) CSR news	(2) CSR news	(3) CSR news	(4) Positive CSR news	(5) Positive CSR news	(6) Positive CSR news	(7) ESG dummy
CSR score	0.0018** (2.506)	0.0018* (2.097)	0.0017** (2.271)	0.0003* (2.152)	0.0003* (1.846)	0.0002 (1.173)	0.0073 (0.212)
Advisor FE	NO	YES	YES	NO	YES	YES	NO
Industry FE	NO	YES	YES	NO	YES	YES	NO
List FE	NO	YES	YES	NO	YES	YES	NO
Year FE	NO	YES	YES	NO	YES	YES	NO
Control Var.	NO	NO	YES	NO	NO	YES	NO
Constant	0.0064*** (3.505)	0.0063*** (5.748)	1.8677*** (7.290)	0.0856*** (122.153)	0.0856*** (139.824)	0.0864*** (35.216)	0.2328*** (3.269)
Observations	779	751	659	305	295	284	38
Adjusted R2	0.023	0.117	0.133	0.004	0.100	0.169	-0.027
F-value	6.278	4.399		4.632	3.406		0.045

Appendix D. Validation of the net CSR TIIDF score

VARIABLES	(1) CSR news	(2) CSR news	(3) CSR news	(4) Positive CSR news	(5) Positive CSR news	(6) Positive CSR news	(7) ESG dummy
CSR TIIDF score	0.0218*** (3.302)	0.0212** (2.868)	0.0211** (2.773)	0.0013 (0.438)	0.0011 (0.366)	0.0020 (0.633)	-0.1373 (-0.907)
Advisor FE	NO	YES	YES	NO	YES	YES	NO
Industry FE	NO	YES	YES	NO	YES	YES	NO
List FE	NO	YES	YES	NO	YES	YES	NO
Year FE	NO	YES	YES	NO	YES	YES	NO
Control Var.	NO	NO	YES	NO	NO	YES	NO
Constant	0.0052*** (3.189)	0.0052*** (5.379)	1.9197*** (7.459)	0.0859*** (116.980)	0.0858*** (105.692)	0.0865*** (35.505)	0.2477** (2.954)
Observations	779	751	659	305	295	284	38
Adjusted R2	0.043	0.136	0.153	-0.002	0.097	0.168	-0.018
F-value	10.902	8.225		0.192	0.134		0.823

Appendix E. Net CSR score and underpricing

VARIABLES	(1) First day return	(2) First day return	(3) First day return	(4) AR	(5) AR	(6) AR
CSR score	0.0143* (2.109)	0.0045 (0.376)	0.0004 (0.034)	0.0142* (2.061)	0.0042 (0.353)	0.0001 (0.011)
Control Var.	NO	NO	YES	NO	NO	YES
Advisor FE	NO	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	NO	YES	YES
List FE	NO	YES	YES	NO	YES	YES
Year FE	NO	YES	YES	NO	YES	YES
Constant	0.0922*** (3.195)	0.1070*** (4.449)	72.6463*** (7.253)	0.0924*** (3.219)	0.1073*** (4.482)	73.4319*** (7.264)
Observations	779	751	659	777	749	657
Adjusted R-squared	0.002	0.036	0.093	0.002	0.036	0.094
F-value	4.448	0.141		4.249	0.125	

Appendix F. Net CSR TF-IDF score and underpricing

VARIABLES	(1) First day return	(2) First day return	(3) First day return	(4) AR	(5) AR	(6) AR
CSR TF-IDF score	0.1314** (2.269)	0.0543 (0.939)	0.0037 (0.042)	0.1318** (2.265)	0.0529 (0.924)	0.0021 (0.024)
Control Var.	NO	NO	YES	NO	NO	YES
Advisor FE	NO	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	NO	YES	YES
List FE	NO	YES	YES	NO	YES	YES
Year FE	NO	YES	YES	NO	YES	YES
Constant	0.0894*** (3.717)	0.1040*** (5.858)	72.6671*** (7.676)	0.0893*** (3.770)	0.1042*** (5.983)	73.4333*** (7.682)
Observations	779	751	659	777	749	657
Adjusted R-squared	0.002	0.036	0.093	0.002	0.036	0.094
F-value	5.146	0.882		5.128	0.853	

Appendix G. CSR scores and investors' IPO holdings

VARIABLES	(1) Weight	(2) Weight
CSR score	0.0001 (0.322)	
CSR TF-IDF score		0.0048* (1.713)
Control Var.	YES	YES
Advisor FE	YES	YES
Industry FE	YES	YES
Municipality FE	YES	YES
Time FE	YES	YES
Constant	-0.0063*** (-3.679)	-0.0065*** (-3.753)
Observations	1,085,900	1,085,900
Adjusted R-squared	0.067	0.067
F-value	139.148	130.205