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Are Women Undervalued? Board Gender Diversity and IPO Underpricing

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We find that IPOs experience significantly greater underpricing when the firm's board has at least one female director, relative to when no women sit on the board. The underpricing effect is not attributable to differences in profitability, growth opportunities, CSR profiles, or other firm characteristics. Instead, the presence of women on the board appears to create value because of a reduction in the cost of capital for these firms, driven by increased institutional investor demand for board gender diversity. We find evidence that underwriters with greater network centrality are better able to value board gender diversity, reducing the underpricing effect.

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1. Introduction

In recent years, investors, regulators, and practitioners worldwide have demanded an increase in female representation on corporate boards (Moody's, 2019; Gormley et al., 2020; Fried, 2021). However, identifying the effects of board gender diversity on corporate outcomes is extremely difficult. Reverse causality concerns limit researchers from making causal claims regarding the effect of increased board diversity on firm value. For instance, it is plausible that diverse boards improve corporate performance, possibly because diversity increases monitoring (Gul et al., 2011), curbs overconfidence (Chen et al., 2019), or reduces groupthink (Coles et al., 2020). It is also plausible that high-performing firms may have greater organizational slack (Myers et al., 1993), allowing them to diversify their boards. Furthermore, Eckbo et al. (2021) argue that studies that rely on quasi-exogenous changes in board gender composition via board gender quota mandates—e.g., Ahern and Dittmar (2012); Greene et al. (2020)—are limited in the inferences that they can make. In this paper, we provide an alternative approach to studying the effects of gender diversity on firm outcomes that is free from reverse causality concerns and that does not rely on board quota mandates. Specifically, we examine the impact of board gender diversity on the underpricing of initial public offerings (IPOs).

IPOs provide an effective venue to study the impact of gender diversity on corporate outcomes for at least two reasons. First, the book-building process of an IPO provides a unique opportunity for some investors to give feedback on the valuation range proposed by the investment bank. Investors who are invited to participate in the book-building process can show that they value stocks differently than the valuation proposed by the investment bank. For example, investors may be more optimistic about future cash flows, as they may believe that diversity increases profitability and that this is ignored by the bank. Alternatively, they also may use a lower discount rate when valuing gender-diverse board firms. As Fama and French (2007) argue, if investors have a strong preference for diversity, they are effectively using a lower discount rate for gender-diverse firms than someone who only cares about risk or other common factors. Both effects will generate ex-

cess demand at the high end of the IPO valuation range, leading to underpricing. Second, IPO underpricing is likely to be less subject to the endogeneity problems that plague studies examining the relation between gender diversity and stock market or operating performance. While it may not be obvious whether board diversity causes performance or vice versa, it is implausible that the potential for underpricing during the going public process *causes* firms to diversify their boards. Similarly, it is implausible that a female director would choose to join a board because she *expects* its IPO shares to be underpriced, as this would mean she is choosing to join a firm that leaves more money on the table.

Why might board gender diversity be related to IPO underpricing? The prior literature suggests two channels. In the first channel, underwriters deliberately underprice IPOs. Benveniste and Spindt (1989) posit that institutional investors have private information that they do not want to disclose in order to buy the shares cheaply. In order for these investors to truthfully reveal their opinions when they are optimistic, underwriters must reward them through a favorable share allocation and by only partially adjusting the offer price. Although the interpretation of Benveniste and Spindt (1989) is that the private information is about future cash flows, private information may also be about preferences for board gender diversity. Ince (2014) argues, however, that the book-building process is inefficient. He shows that offer prices only partially adjust to new information even when such information is public, and especially when it is favorable. So it is possible that the basic assumption of the model in Benveniste and Spindt (1989), that investment banks deliberately underprice, may not be realistic. In the second channel, underpricing may be due to investment banks ignoring board gender diversity in the valuation process, possibly because they assume that diversity is not correlated with future cash flows or they ignore the possibility that preferences for diversity may lower the cost of capital, as argued by Fama and French (2007). When they use multiples to price the IPO, they may use "comparable" companies that are not really comparable because they do not have the same levels of gender diversity. In either case, however, if investors' positive demand for board gender diversity is not fully incorporated into the offer price, gender-

diverse board IPOs will realize greater underpricing than non-diverse board IPOs. This is what we find in the data.

Specifically, in our sample of over 1,100 U.S. IPOs from 2000–2018, we find that board gender diversity is positively related to underpricing on the issue date. This effect is economically meaningful and statistically significant across the entire sample period. However, further analysis shows that this underpricing effect is almost entirely driven by IPOs in the most recent decade. From 2010–2018, gender-diverse board IPOs realized over 9 percentage points more underpricing than did non-diverse board IPOs. The size of the effect suggests that, by not considering the demand for diversity at the offering, gender-diverse board IPOs leave approximately $26 million more in IPO profits on the table. When we use a continuous measure of board gender diversity, rather than a binary indicator, we find that an IPO with an all-female board would realize over 33 percentage points more underpricing than an IPO with an all-male board. These results are robust to controlling for a host of possible confounding factors that may jointly affect board gender diversity and underpricing, like CEO gender, industry classification, firm age, VC involvement, and firm size. In addition, the underpricing effect is not attributable to differences in profitability, growth opportunities, CSR profiles, or financial characteristics like leverage and liquidity, which substantially assuages omitted variables bias concerns.

We next explore whether the effect is driven by the demand of institutional investors or non-institutional traders. Using TAQ data to differentiate between institutional and retail investor trading behavior on the day of the IPO, we find that the underpricing of gender-diverse board IPOs is largely caused by institutional investors. We also show that the institutional ownership of recently listed gender-diverse board firms has increased significantly in the recent decade. This effect is present even when considering the ownership of just the Big Three institutional investors—BlackRock, State Street, and Vanguard. This further suggests that institutional investor demand for board gender diversity has increased over time, contributing to the observed underpricing effect.

Why might institutional investors care about board gender diversity? First, institutional investors may believe that diverse firms are more profitable than non-diverse firms. So, the high demand for gender-diverse board IPOs from institutional investors could be due to their belief that these firms will outperform in the long-run. However, we find that after the stock is publicly traded, board gender diversity at the time of the IPO is uncorrelated with the subsequent operating performance of the firms, measured by industry-adjusted return on assets, as well as long-run buy-and-hold abnormal returns and cumulative excess returns using the IRATS methodology (Ibbotson, 1975). The alternative explanation is that institutional investors prefer gender-diverse board firms for reasons other than superior performance, which could lead them to require lower rates of return when investing in these firms. While these institutions appear to pay more for IPO shares than is justifiable based on the underwriters' valuations, this over-payment is may be justified by the fact that they "like" diversity. In line with this, Bauer et al. (2019) show that two-thirds of the surveyed members of a pension fund were willing to sacrifice yield if it expanded the fund's engagement with companies practicing sustainable development. Thus, our evidence is consistent with the hypothesis that gender diversity increases firm value by reducing the firm's cost of capital.

The fact that diversity is important for institutional investors should not be a surprise. Over the past decade, corporate social responsibility (CSR) ratings, such as the KLD rankings issued by MSCI, have become important considerations for some institutional investor portfolio holdings. These CSR ratings include firm rankings on gender diversity. If institutional investors explicitly include gender diversity criteria when forming their portfolio holdings, it is likely that institutional demand for firms with gender-diverse boards will increase. In support of this notion, in 2017–2018, BlackRock, State Street, and Vanguard launched campaigns to increase gender diversity on corporate boards, which included making director voting and portfolio holding decisions based on board gender diversity metrics (Gormley, Gupta, Matsa, Mortal, and Yang, 2020). In contrast, retail investors are not subject to similar pressures to invest in firms with positive diversity-related metrics. This likely explains why institutional investor trading, not retail trading, on the IPO date drives the underpricing effect.

A remaining question is whether underwriters eventually learn to incorporate this demand for board gender diversity into the offer price of IPOs. A key assumption in the model of Benveniste and Spindt (1989) is that underwriters' institutional clients have *private* information about their preferences for an issuing firm's shares. As this information is revealed across time over the course of subsequent underpriced IPOs, underwriters may learn its importance and be able to factor it into offer prices. In line with the information extraction hypothesis of Bajo et al. (2016), we hypothesize that underwriters that are more connected with other investment banks should be better suited to efficiently and accurately incorporate preferences for board gender diversity into IPO pricing. We test this hypothesis by estimating the effect of underwriter network centrality on the underpricing of gender-diverse board IPOs. We find evidence that well-connected underwriters appear better able to price the rising demand for gender-diverse board firms. In a similar vein, the average underpricing effect disappears after the Big Three institutional investors launched their diversity campaigns, which explicitly publicized their preferences for board gender diversity. Even after these campaigns, however, underwriter network centrality still impacts underpricing, as gender-diverse board IPOs with only *poorly* connected underwriters continue to realize significantly greater underpricing.

We consider several possible alternative explanations for the observed underpricing effect. For instance, we show that the women on gender-diverse boards are just as qualified and experienced as their male counterparts, so differences in qualifications do not drive the underpricing effect. We also find no evidence that board gender diversity is a form of window-dressing by the firm to appeal to external pressures, as both male and female directors typically have served on the board for over three years at the time of the IPO, and 90% of the gender-diverse board IPOs remain diverse two years after going public. Rejecting these alternative stories bolsters our conclusion that the gender diversity underpricing effect is driven by the relatively recent demands of institutional investors for gender-diverse board firms.

Our findings contribute to multiple strands of finance literature. First, we find robust evidence that gender-diverse board IPOs realize more underpricing than do non-diverse board IPOs. Other research has considered the relation between board diversity and IPO underpricing in international markets (Handa and Singh, 2015; Eriksen and Särnmo Åberg, 2019; Teti and Montefusco, 2021), but none document a significant effect. This suggests either that investors in these markets do not place a premium on gender diversity or, if they do, underwriters efficiently incorporate the premium into the IPO's offer price. Thng et al. (2016) consider board gender diversity in a sample of U.S. IPOs that subsequently conduct seasoned equity offerings, but they do not speak to the institutional demand effect that we address, potentially because their sample ends in 2013, only covering a small portion of the years in which demand for board gender diversity is especially high. Thus, a second contribution of our paper is our discussion of how institutional investors' private preferences for board gender diversity impact IPO underpricing and firm value. Whereas traditional models of IPO underpricing focus on private information about future cash flows (Benveniste and Spindt, 1989), our findings suggest that private preferences that are potentially unrelated to future profitability also impact underpricing.

While most of the literature has attempted to establish a link between board gender diversity and profitability, our results are consistent with an alternative source of value creation: diversity lowers the cost of capital. Proving that the cost of capital goes down when investors "prefer" a characteristic such as diversity is generally problematic as the cost of equity is the expected rate of return. In the absence of a long time series, Pastor, Stambaugh, and Taylor (2021) note that it is difficult to distinguish between expected and unexpected returns. They show that green assets have delivered high returns in recent years and argue that this performance reflects unexpectedly strong increases in environmental concerns, not high expected returns. Our IPO setting allows us to directly compare differences in valuation of stocks due to diversity. By showing that this difference is unrelated to profitability or other characteristics associated with cash flows, we can make a strong case for the argument that diversity lowers the cost of capital. In addition, we

build upon Bajo et al. (2016) by providing evidence that underwriter network centrality can help investment banks accurately and efficiently price investor preferences for board gender diversity.

Our findings also connect more broadly to the literature on the relation between board composition and firm value. Over the past decade, institutional investors and firms have placed increased emphasis on stakeholder value maximization, diversity, and other CSR-related topics. We show in this paper that one such factor, board gender diversity, matters in corporate financing because large institutional investors, and perhaps others, believe it is important. While it remains unclear as to whether gender-diverse boards are actually more effective at increasing firm cash flows, it is clear that the premium placed on diversity by some investors, especially institutional investors, has the potential to lower the cost of capital of gender-diverse board firms, leading to value creation.

This paper is organized as follows. In Section 2, we provide a brief overview of past research on the relation between diversity and shareholder value. Section 3 describes our data. In Section 4, we estimate the relation between gender diversity and IPO underpricing, and we discuss the role of institutional investor demand in driving the effect. In Section 5, we investigate the other possible explanations for the underpricing effect. Section 6 concludes.

2. Diversity and Shareholder Value: Literature Review

Over the past two decades, academic research has found mixed results regarding the relation between the gender composition of corporate boards and firm value. Adams and Ferreira (2009) show that, though female directors have better attendance records than male directors and that male directors have fewer attendance problems when boards are more gender-diverse, the average effect of gender diversity on firm performance is negative. Evgeniou and Vermaelen (2017) find that long-term excess returns following buybacks are significantly smaller when there is greater female representation on the board. Solal and Snellman (2019) argue that investors interpret gender-diverse boards as a preference for diversity over shareholder value and show that firms that increase gender diversity on their boards suffer a decrease in market value. Gender diversity has been found to lower business and financial risk (Bernile, Bhagwat, and Yonker, 2018), but this does not neces-

sarily imply larger shareholder value, as some business risks may be justified by higher expected returns, especially in young growth companies. In addition, if diversity reduces risk-taking, it may lead to a wealth transfer from shareholders to bondholders.[1]

It is important to note, however, that several recent academic papers have highlighted evidence consistent with the notion that gender diversity improves corporate outcomes. For instance, Kim and Starks (2016) show that female directors can contribute unique skills that their male counterparts might not possess, increasing board heterogeneity, and potentially improving firm value. Tate and Yang (2015) find evidence to suggest that female leadership leads to a more female-friendly culture within the firm. Giannetti and Wang (2020) show that greater public attention towards gender equality leads to an increased recruitment of highly qualified female directors. Finally, other work has used large-scale international patent data to show that board gender diversity is associated with greater corporate innovation (Griffin et al., 2021). In contrast to these papers, Van Peteghem et al. (2018) argue that increased diversity results in superior decision-making only when the board is free from conflicts and acts as a cohesive group. If, however, the board's diversity structure gives rise to the formation of subgroups along fault-lines, board effectiveness may be reduced.

One issue with the literature above is that it examines voluntary diversity initiatives. Hence, it is possible that these results are driven by endogeneity. However, the academic literature that has examined mandatory diversity regulations is also inconclusive on a relation between firm value and diversity. For example, Ahern and Dittmar (2012) find that the constraint imposed by the Norwegian quota mandating that 40% of Norwegian firms' directors be women caused a significant drop in the stock price at the announcement of the law and a large decline in Tobin's Q over the following years. The quota led to younger and less experienced boards, increases in leverage and acquisitions, and reductions in operating performance. Matsa and Miller (2013) find that affected

[1] In addition, Carter, D'Souza, Simkins, and Simpson (2010) do not find a significant association between gender diversity and firm value, and Farrell and Hersch (2005) show no evidence of significant announcement returns when a female director is added to the board. In contrast, Carter and Simpson (2003) find a positive relation between firm value and a broad measure of diversity that includes women, African-Americans, Asian-Americans, and Hispanics. Meta analyses, such as Post and Byron (2015), also find no significant relation between board gender diversity and firm performance, and similar conclusions are reached by Campbell and Mínguez-Vera (2008).

firms in Norway undertook fewer workforce reductions than comparison firms, increasing relative labor costs and employment levels and reducing short-term profits. However, Eckbo, Nygaard, and Thorburn (2021) argue that these quota studies are potentially flawed. Specifically, because quotas may be politically contentious, public debate about quotas may make it difficult to correctly identify news events that significantly change the market's prior probability of a quota law. Second, because legal and regulatory shocks affect all sample firms simultaneously in calendar time, economic factors driving stock returns tend to generate pervasive positive contemporaneous return correlations across securities, which necessitates correctly adjusting standard errors of abnormal stock returns for any contemporaneous cross-correlation of returns. Hence, Eckbo, Nygaard, and Thorburn (2021) argue that the valuation effect of Norway's mandatory quota law was insignificant. Similarly, while Greene, Intintoli, and Kahle (2020) document significant negative announcement returns to firms headquartered in California on the passage of California Senate Bill No. 826, which mandated that all publicly traded companies headquartered in California should have at least one woman on their boards, Gertsberg, Mollerstrom, and Pagel (2021), show that the negative stock market reactions to the mandate are only apparent among firms that retain their least favorable male directors, captured via shareholder proxy votes, when adding new female directors to the board.

In contrast to the mixed findings among academics, practitioners have increasingly argued that diversity among the board of directors has a positive economic impact on firms. In January 2020, the Nasdaq Stock Market filed a proposal with the Securities and Exchange Commission to adopt Rule 5605(f) (Diverse Board Representation), which would require Nasdaq-listed companies, subject to certain exceptions, to have (A) at least one director who self-identifies as a female and (B) at least one director who self-identifies as Black or African American, Hispanic or Latinx, Asian, Native American or Alaska Native, Native Hawaiian or Pacific Islander, two or more races or ethnicities, or as LGBTQ+, or (C) to explain why the company does not have at least two directors on its board who self-identify in the categories listed above. When arguing for mandatory diversity, Nasdaq justified its proposal by stating that: "Nasdaq reviewed dozens of empirical studies and

found that an extensive body of academic research demonstrates that diverse boards are positively associated with improved corporate governance and financial performance." Some critics of the proposed rule, however, attribute the proposal to "virtue signaling at the expense of someone else" (Wall Street Journal, 2020). At the same time, in January 2020, Goldman Sachs announced that it would no longer underwrite IPOs with all-male boards in some, but not all, markets. It justified this decision partially on the basis of economic reasons, claiming that diverse board IPOs had earned higher returns than non-diverse board IPOs, at least in recent years.

Nasdaq's claim that gender diversity has a positive economic impact on firm performance is mostly based on the findings of studies performed by consulting firms or asset managers (such as Wagner (2011); Credit Suisse (2014); Hunt (2015); Eastman (2016); Leadership (2019); Moody's (2019); FCLT (2019); Thomas and Starr (2020); McKinsey (2020)).[2] Though these studies report positive relations between diversity and various measures of financial performance, we note that the typical study simply measures the correlation between diversity in a given year and various measures of *past* performance. The methodology used in these studies has the potential for significant endogeneity issues either because both board gender diversity and profitability are determined by some omitted variable or because of reverse causality—e.g., good firms tend to put more women on the board.[3] These studies also suffer from survivorship bias—they examine firms existing at the end of the sample period, rather than firms existing at the beginning.

There are few academic studies that consider the relation between IPO performance and the gender composition of a firm's leadership team. Mohan and Chen (2004) find no significant relation between the gender of a firm's CEO and its level of underpricing at the time of the IPO. Several papers consider the relation between board diversity and IPO underpricing in different international markets: Handa and Singh (2015) analyse IPOs in India, Teti and Montefusco (2021)

[2]These studies are cited on page 3 in https://listingcenter.nasdaq.com/assets/RuleBook/Nasdaq/filings/SR-NASDAQ-2020-081.pdf. Also see Fried (2021), who summarizes the issues with these studies and with the Nasdaq proposal.

[3]For example, the 2015 McKinsey study (Hunt, 2015) uses data from 366 global companies. It measures performance by "EBIT margin relative to the industry median." It measures diversity in 2014 and relates it to EBIT margin during 2010–2013 and finds a positive correlation. But by relating past performance to future diversity, it illustrates reverse causality: firms with good performance in the past become more diverse later.

examine Italian initial public offerings; and Eriksen and Särnmo Åberg (2019) use Swedish data. None of these three studies document a significant association between board gender diversity and IPO underpricing, suggesting either that investors in these markets do not place a premium on gender diversity or, if they do, underwriters incorporate the premium into the IPO's offer price. The only other concurrent study that considers board diversity and IPO underpricing in the U.S. context is an unpublished working paper by Thng et al. (2016), who examine a sample of IPOs that subsequently conduct seasoned equity offerings (SEOs) within two years after going public, to examine if factors that are important in underpricing at the time of the IPO also matter during the subsequent SEO. However, their sample ends in 2013, which does not allow them to consider the differential effect gender diversity has had on IPO underpricing across the recent decades. As a result, they do not consider the potential premium placed on gender diversity by institutional investors, which has likely increased in recent years due to the increased attention given towards gender equality. In addition, because their sample conditions on ex post information that is not available at the IPO date (whether the firm will conduct a subsequent equity offering within two years of the IPO), their conclusions are not comparable to ours.

3. Data Construction

To analyze the effects of board gender composition on IPO performance, we use the Kenney-Patton Firm and Management Databases of Emerging Growth IPOs (Kenney and Patton, 2017). This database provides us with biographical information for the directors of each firm at the time of the IPO. In our analysis, we exclude the following types of firms and filings: mutual funds, real estate investment trusts (REITs), asset acquisition or blank check companies, foreign F-1 filers, and all spin-offs and other firms that are not true emerging growth firms. We merge the Kenney-Patton IPO sample with data from Thomson One, which allows us to identify the bookrunners involved in underwriting the IPO and other IPO characteristics. The overlap between these two datasets results in a sample of 1,552 unique IPOs with issue dates from January 1st, 2000 to December 31st, 2018.

We have non-missing Compustat financial data and IPO characteristic controls for 1,112 IPOs, which makes up our data sample.

We identify the gender composition of IPO firms' board of directors using the biographical information on each director provided in a firm's IPO prospectus. We search the biographies for gendered titles (e.g., Mr., Mrs., and Ms.) and for gendered pronouns (e.g., He and She), and we use these labels to classify individual directors as either male or female. In some instances, no gendered titles or pronouns are present in a biography, and in some cases both types of gendered words are present (e.g., when a biography mentions a director and their spouse). In these instances, we manually inspect the biographies and, in some cases, use Bloomberg, LinkedIn (which frequently has a photograph), or other search engines to fill in missing gender data. We also use first names to identify the gender of directors for whom we cannot find information elsewhere. When we compare our gender categorizations to those already in the Kenney-Patton database, we have agreement in 99.5% of the observations. We manually inspect the 0.5% of observations that are misaligned and use the methods described above to determine the final gender classification for each. For each IPO, we create a variable called *Diverse*, which equals one if there is at least one woman on the board, and zero otherwise.

Figure 1a shows the year-by-year trends in the number of IPOs in our sample. The year 2000 marked the high point, as this was at the height of the dot-com bubble, and we observe a dearth of IPOs in 2008 and 2009, at the trough of the Great Recession. Figure 1b shows that the fraction of gender-diverse IPOs was the smallest in 2008, and that it has steadily (almost monotonically) increased since then. Figure 1c shows that the institutional ownership of IPOs has increased drastically in the past decade.[4] Finally, Figure 1d shows that the average market capitalization of IPOs is much greater at the end of the sample period, relative to the beginning.

[4]We measure institutional ownership using Thomson Reuters 13-f data. For each IPO firm, we identify the first institutional ownership report filed after the time of the IPO. We then calculate the fraction of institutional ownership as the fraction of the firm's shares owned by institutional investors.

In addition to examining variation in IPO board gender diversity, we separate IPOs based on the year in which the deal takes place. Specifically, we compare the performance of firms going public from 2000 to 2009 to those going public from 2010 to 2018. We split the sample this way for several reasons. First, the lull in IPO activity during the Great Recession in 2008 and 2009—where only 7 and 13 IPOs occurred, respectively, compared to the yearly average of 59—provides a clear break-point in IPO activity. Furthermore, formal structural break tests estimate 2008 to be a break date in IPO board gender diversity. This finding aligns with the visual dip in female director representation in Figure 1b. Finally, in 2010, the SEC began requiring public companies to disclose the role diversity considerations play when they select directors. Several large pension funds, including CalPERS and CalSTRS, wrote letters in support of this regulation.[5] After this mandate went into effect, there were several prominent IPOs that did not initially include women on their board—specifically, Facebook (2012) and Twitter (2013)—creating a good deal of controversy for the firms.[6] Consistent with the split in time periods, the gender diversity of IPO boards changes drastically between the two decades. Figure 2 shows a dramatic shift in the level of gender diversity over these two periods. Fewer than 35% of all 2000–2009 IPOs had gender-diverse boards, whereas over 45% of 2010–2018 IPOs did. Importantly, all our results are robust to using 2008, 2009, 2010, or 2011 as the first year of the second sample period.[7]

Table 1 displays descriptive statistics for the IPOs in our sample. The leftmost columns report statistics for IPOs from 2000–2009, whereas the rightmost columns report statistics for IPOs from 2010–2018. Within each grouping of IPOs, we split the sample based on whether the boards of directors are gender-diverse or not. We display mean values of IPO and firm characteristics, as well as standard deviations (in parentheses). The columns of p-values report results from difference-in-means tests between diverse and non-diverse board IPOs. The difference in underpricing between gender-diverse and non-diverse board IPOs is not statistically significant in the 2000–2009 period.

[5] See footnote 116 in https://www.sec.gov/rules/final/2009/33-9089.pdf.

[6] See https://www.theguardian.com/commentisfree/2013/oct/11/twitter-ipo-women-board.

[7] In addition, our results are robust to excluding the small set of IPOs conducted in 2008 and 2009 and using 2000–2007 and 2010–2018 as the pre- and post-periods, respectively.

In the 2010–2018 period, however, gender-diverse board IPOs experience significantly greater underpricing than do non-diverse board IPOs. Specifically, the underpricing for diverse board IPOs is 39% greater that of non-diverse firms. In the 2000–2009 period, gender-diverse board IPOs have less institutional ownership than do non-diverse board IPOs, by 4 percentage points, but they are significantly more likely to be owned by institutions in the 2010–2018 period, by 9 percentage points. In both time periods, gender-diverse and non-diverse IPOs are similar in their share overhang levels and in their contemporaneous market conditions. Recent diverse board IPOs are more likely than non-diverse board IPOs to be taken to market by a top bookrunner.

In both time periods, gender-diverse and non-diverse board IPOs are similar in size, age, internet/tech classifications, leverage, and liquidity. Non-diverse board IPOs have greater sales and fewer growth opportunities in both time periods. Gender-diverse board IPOs have consistently greater CSR scores than non-diverse IPOs, and they have smaller profitability measures in the recent decade. From 2000–2009, on average, 16% of the directors of gender-diverse boards are women. This number increases to 18% in the 2010–2018 time period. Among gender-diverse board IPOs in the 2000–2009 period, the CEO of the firm is female in 12% of the sample. This percentage decreases slightly to 10% for IPOs in the 2010–2018 period. The 2010–2018 percentages are very similar to the percentages of female directors in 2017 and 2018 in a broader sample of Russell 3000 firms.[8] Taken together, these summary statistics show that gender-diverse and non-diverse board IPOs are similar in most respects. To assuage concerns about omitted variables bias, we show the robustness of our results when controlling for all these IPO and firm characteristics.

Panel B of Table 1 reports data on the relative experience levels of female versus male directors at the time their firms go public. We use three different potential proxies for accumulated experience: director age, the length of their prospectus biography, and their number of skills, which we identify by using the taxonomy of Adams, Akyol, and Verwijmeren (2018) and by searching the prospectus biographies for the strings listed therein. For each gender-diverse board IPO, we compute an *Age Ratio*, *Bio. Length Ratio*, and *Number Skills Ratio*, which equals the average age,

[8] See https://2020wob.com/educate2/2020-gender-diversity-index-key-findings/.

biography length, and number of skills of the female directors on the board divided by the average age, biography length, and number of skills, respectively, of the male directors. We report these ratios separately by time period in Panel B, and we report *p*-values from difference-in-means tests in the rightmost column to determine whether the relative experience levels of female versus male directors have changed over time. Across the two time periods, female directors realize a larger increase in experience than do male directors in terms of their ages and prospectus biography lengths, but a decrease based on their number of skills, though they continue to have more skills than their male counterparts. We further discuss these changes in Section 5, where we examine the possible explanations of our main IPO underpricing results.

4. Diversity and Economic Performance: Empirical Results

As detailed in Section 2, the true effect of board composition, and more specifically board gender composition, on firm value is unclear. Practitioner-developed studies that consider only cross-sectional relations conclude that gender diversity increases firm value. But academic studies, including those that use board gender quotas as exogenous shocks to board composition, find mixed effects on firm value. A related and unanswered question is, do investors reveal a preference for gender-diverse board IPOs that impacts the first day returns earned by these firms? We address this question by first estimating the effect of board gender diversity on IPO underpricing. We then examine the role of institutional investors in driving this effect and the impact of underwriter network centrality in attenuating the effect over time.

4.1. Underpricing

The focal IPO performance outcome that we examine is the underpricing on the issue date. We begin by regressing an IPO firm's issue date underpricing, the percentage change in the price of a share on the issue date of the IPO from offer to close, on an indicator variable, *Diverse*, that equals one if the firm's board has at least one woman on it, and zero otherwise. We control for the year of the IPO, λ_t, which helps to net out variation in IPO performance due to events such as the dot-com

bubble and the Great Recession. We also include industry fixed effects, γ_j, and a host of other control variables, represented by X_i, which have been used in previous IPO underpricing studies (Loughran and Ritter, 2004). Specifically, we control for the following: the natural log of the firm's assets; the natural log of the firm's sales; the natural log of one plus the firm's age, an indicator for top-tier underwriters; the firm's share overhang; a venture capital dummy; an indicator for internet companies; and an indicator for technology firms. All these variables are defined in Appendix A. We estimate the following model using ordinary least squares:

$$\text{Underpricing}_i = \alpha + \beta_1 \text{Diverse}_i + \beta X_i + \lambda_t + \gamma_j + \varepsilon_i. \tag{1}$$

The results are displayed in Panel A of Table 2, which reports the effects of board gender diversity on IPO underpricing across all years in Column (1), in the 2000–2009 period in Column (2), and in the 2010–2018 period in Column (3). Across all years, IPOs are underpriced by about 4.5 percentage points more when their boards are diverse, relative to when their boards are not diverse. Comparing Columns (2) and (3) shows that all this positive relation between board gender diversity and IPO underpricing is driven by IPOs in the most recent decade, where the returns on the issue date are 9.0 percentage points higher when at least one woman is on the board.

In Column (4), we include the interaction term (*Diverse* $\times$ *Post*), where *Post* equals one if the IPO occurred after 2009, and zero otherwise, to test whether the effect of gender diversity on underpricing is significantly greater in the 2010s than it is in the 2000s. The positive and significant coefficient on (*Diverse* $\times$ *Post*) suggests that gender-diverse boards have experienced greater underpricing in the most recent decade, relative to the decade prior. To further reduce the concern that omitted variables are biasing our results, we also control for the market return in the three-week period leading up to the IPO, *Prior Market Return*$_i$, which is standard in the literature (Loughran and Ritter, 2002; Cornelli and Goldreich, 2003),[9] the firm's market capitalization, and the change in the offer price before the issue date, *Offer Price Change*$_i$, which Hanley (1993) shows

[9] Loughran and Ritter (2002) and Ince (2014) show that the book-building process does not fully incorporate public information during the offering period, making it important to adjust for market movements when estimating the effect of board gender diversity on IPO pricing.

to be a strong predictor of underpricing. We also control for the gender of the CEO, as there is some evidence that women are superior negotiators when negotiating on behalf of others (Amanatullah and Morris, 2010; Bowles and Babcock, 2013), suggesting that a female CEO would leave less money on the table in the IPO process. Even after controlling for all of these possible confounding factors in Column (5), we continue to find that the positive effect of board gender diversity on the underpricing of IPO firms is significantly larger in the 2010–2018 period, relative to the decade before. This effect is not driven by outliers in our sample, as our results are very similar if we omit the IPOs in the top 5% of market capitalization. In addition, Table A.2 shows that our results are highly robust to including controls for CSR scores and those mentioned in Glushkov et al. (2018), which proxy for profitability, growth opportunities, leverage, and liquidity. The inclusion of these controls significantly reduces our sample size, but the robustness of the results bolsters our main findings and suggests that the underpricing effect is not driven by omitted variables.[10]

While the presence of at least one woman on the board at the time of the IPO appears to have a significant impact on IPO underpricing, one might wonder whether there is an additional effect of having even more women on the board. We examine this in Panel B of Table 2 by re-estimating the main regression models using, instead of the dummy *Diverse*, a variable that captures the fraction of the board that is represented by female directors, *Frac. Female*. Whereas the results with the dummy suggest that having a gender-diverse board is associated with increased underpricing of 9.0 percentage points, using the continuous *Frac. Female* variable suggests that going from a fully male board to a fully female board would lead to increased underpricing of over 33.6 percentage points (see Column (3) in Panel B).[11] In both sets of results, the coefficient on *Female CEO* is negative, which is consistent with the notion that female CEOs bargain well on behalf of

[10] Our results are also not sensitive to the inclusion of controls for the education levels of the directors on the board. In addition, the magnitude of the underpricing effect increases if we include state-industry-year fixed effects, rather than just industry and year fixed effects. This suggests that our results are robust when controlling for the supply of directors in a given place and industry in a particular year. Doing this, however, greatly reduces the sample due to there being many singleton observations within a given state-industry-year cluster. Due to this loss in sample size, the precision of the estimates decreases slightly, though they remain significant at conventional levels.

[11] All of our subsequent results are qualitatively similar if we use the *Frac. Female* measure, rather than the *Diverse* measure. The *Diverse* measure provides more tractable inference and it is more applicable to what we observe in real-world settings, which is why we prioritize it.

shareholders, leading to less underpricing. The estimate is marginally significant, which contrasts with the null results in Mohan and Chen (2004).[12]

4.1.1. How much money do gender-diverse board IPOs leave on the table?

Though IPO underpricing is a widely documented phenomenon, this paper is the first to document that gender-diverse board IPOs experience even *greater* underpricing. The significant increase in underpricing realized by diverse board IPOs relative to non-diverse board IPOs begs the question as to how much additional money these diverse board firms are leaving on the table. To estimate this, we follow Loughran and Ritter (2002) and calculate the amount of money left on the table, *Money Left*, as the price change from the offer price to the closing first-day market price, multiplied by the number of shares issued. We find that, across the entire 2000–2018 sample period, gender-diverse board IPOs leave approximately $36 million on the table due to underpricing, whereas non-diverse board IPOs leave only $27 million on the table on their issue date.

To determine whether the difference between these values is statistically significant when controlling for possible confounding factors, we regress *Money Left* on *Diverse* and the other control variables discussed previously. We display these results in Columns (1)–(3) of Table 3, showing the effect across different sample periods. The point estimate on *Diverse* in Column (1) implies that diverse board IPOs leave approximately $13.2 million more on the table, due to underpricing, than do non-diverse board IPOs. This effect is economically meaningful and statistically significant. Columns (2) and (3) show that this effect is entirely driven by IPOs in the 2010–2018 period, where the difference in realized profits is over $26 million. Column (4) includes the interaction (*Diverse* $\times$ *Post*) in the model and shows that gender-diverse board IPOs leave significantly more money on the table, relative to non-diverse board IPOs, in the 2010s than they did in the 2000s. Taken together, these results help highlight the economic significance of the observed underpricing

[12] In 26 of the 438 IPOs in our sample with gender-diverse boards, the only woman on the board is also the CEO. If we relabel these IPOs as non-diverse—capturing the fact that no non-CEO board members are women—our underpricing results are essentially the same.

effect, as gender diversity appears to have a major impact on the IPO proceeds earned by issuing firms.[13]

4.2. Is the underpricing effect driven by institutional investor demand?

In Section 3, we showed evidence of an increase in the institutional ownership of gender-diverse board IPOs versus non-diverse board IPOs across time periods. This suggests that institutional investors have significantly increased their demand for the shares of gender-diverse new issues, relative to non-diverse new issues, in the recent decade, which may be driving the gender diversity underpricing effect. To formally test this conjecture, we estimate the interactive effect on underpricing of board gender diversity and institutional investor trading behavior on the IPO issue date. We follow Krigman et al. (1999) and proxy for institutional investor trades by identifying block trades on the day of the IPO using TAQ data. We create a variable, *#Block Trades*, which equals the number of trades of 10,000 shares or more. We then include this variable and its interaction with *Diverse* into the same specification used to estimate our main underpricing effects in Table 2. Columns (1)–(3) in Panel A of Table 4 display the results. The coefficients on *Diverse* in each column mirror those displayed in Table 2 in both magnitude and significance, suggesting that gender-diverse board IPOs realize greater underpricing than do non-diverse board IPOs, and the effect is driven by IPOs in the 2010–2018 period. The important takeaway from Table 4, however, comes from the large, statistically significant point estimate on *Diverse* $\times$ *#Block Trades* in Column (3). This coefficient suggests that the underpricing of gender-diverse IPOs is positively related to the number of block trades—most likely made by institutional investors—that take place on the issue date. Column (4) presents the results of a fully saturated model that includes the triple interaction between *Diverse*, *#Block Trades*, and *Post*. The positive and significant estimate on *Diverse* $\times$ *#Block Trades* $\times$ *Post* is evidence that the interactive effect on underpricing is greater in the 2010–2018 period than in the 2000–2009 period, which aligns with our main findings.

[13]When considering the amounts of money that issuers leave on the table at the time of the IPO, it is important to remember that investment banks take each firm public only once, whereas they must interact repeatedly with their institutional investor clients. As such, the goal of the investment bank is not to maximize the value of the issuer, but instead to keep their pool of institutional investors satisfied and willing to continue to invest in future IPOs.

To show that this finding is not simply capturing a relation between underpricing and the number of trades made, regardless of trade size, we repeat these estimations using a variable, *#Small Trades*, which equals the number of trades of less than 1,000 shares. We tabulate these results in Panel B of Table 4. While the estimates on *Diverse* $\times$ *#Small Trades* in Columns (1) and (3) are statistically significant, the effect sizes are very small. That we do not find an economically meaningful effect in the 2010–2018 period suggests that the results in Panel A, which focus on institutional investor trading behavior, are not simply capturing a general effect of the number of trades of any size on underpricing.[14] The results tabulated in Table 4 provide strong, suggestive evidence that the underpricing effect is not driven by retail investors, who are much less likely to be concerned with board gender diversity.

We next provide evidence that this positive relation between IPO-day block trading behavior and underpricing is driven by institutional buy trades, not sell trades. Using another TAQ dataset that covers 787 of our 1,112 IPOs from 2003–2018, we separately control for institutional buy volume and institutional sell volume on the day of the IPO. We find that only institutional buy behavior significantly contributes to the gender diversity underpricing effect, as displayed in Table A.3. When we run a similar test using retail investor trading volume, we continue to find that retail investors do not meaningfully impact the observed gender diversity underpricing effect. Furthermore, it is unlikely that the observed gender diversity underpricing effect would be driven by institutional investors "flipping," i.e., immediately selling, their IPO shares. First off, flipping behavior would put downward pressure on the stock price, reducing the scope for underpricing. Secondly, flipping behavior has been "demonized" by the media and is discouraged by underwriters who may exclude flippers from future IPO offerings (Carter and Dark, 1993; Krigman et al., 1999). Taken together, the increased underpricing of gender-diverse IPOs in the recent decade appears to be driven by institutional investor demand.

[14]The results are similar if we consider the number of trades of less than 10,000 shares, which would capture both small and medium trades. We focus on small trades, however, as these are less likely to be made by large, passive institutional shareholders.

As an additional way of estimating institutional investor demand for the shares of gender-diverse firms at the time of the IPO, we regress *Percent Inst. Own*, which equals the fraction of a firm's shares owned by institutional investors according to the first report after the IPO, on (*Diverse* $\times$ *Post*), *Diverse*, and the previously mentioned control variables to estimate the differential effect that gender diversity has on the ownership decisions of institutional investors across the decades. We report these results in Table 5, in which the columns are analogous to those of Columns (4) and (5) of Table 2. The positive and significant estimates on (*Diverse* $\times$ *Post*) in Columns (1) and (2) suggest that the fraction of shares of gender-diverse board IPOs going to institutional investors has increased significantly in the 2010s, relative to the 2000s. Columns (3) and (4) consider the percent of shares going to the Big Three institutional investment firms—BlackRock, State Street, and Vanguard—and further highlight that these firms have increased their ownership of gender-diverse IPOs in the 2010s, relative to the 2000s. These results suggest that institutional investor demand for gender diverse IPOs is a significant factor in explaining the increased underpricing realized by gender-diverse board IPOs.[15]

We also find that institutional investors are less likely to divest their holdings of gender-diverse board firms one and two years after IPO than they are to divest their holdings of non-diverse board firms. Using Thomson Reuters 13-f filings data, we document each institutional shareholder that owns stock in one of our IPO companies in the first report within a month of issuance. We then track the holdings of these investors to see how many continue to own stock in the firms one and two years after IPO. We find that 66% of the institutional owners that owned shares of gender-diverse board IPOs continue to own shares one year later. In contrast, only 61% of the owners of non-gender-diverse board IPOs continue to own shares a year later, and the difference is significant at the 10% level. Two years following the IPO, we find that 47% of institutional owners continue to hold gender-diverse IPO shares, compared to only 40% continuing to hold non-diverse IPO shares. This difference is significant at the 5% level and suggests that institutional investors are less likely

[15] In addition, we find that the main underpricing effect is large and statistically significant among firms with above median post-IPO institutional holding values, whereas the effect is smaller and insignificant among firms with below median levels of institutional holding.

to divest their holdings in gender-diverse board firms than in non-diverse holdings. This supports the notion that institutional investors value board gender diversity.

Next we test whether our results are consistent with the prediction of the partial adjustment hypothesis proposed by Benveniste and Spindt (1989). Benveniste and Spindt (1989) predict that underpricing will be highest when the issue price is revised upwards above the high price in the initial offering range. We find that this is true among the IPOs in our sample. The average level of underpricing among IPOs with offer prices that are above the high price in the initial offering range (50.63%) is significantly greater than the level of underpricing among the other IPOs (15.65% for IPOs between the low and high prices and 6.73% for IPOs below the low price). This is consistent with a partial adjustment being made to the offer price, creating excess demand which is then reflected in high excess returns on the first day of trading, consistent with the findings of Hanley (1993) and Bradley and Jordan (2002). This finding, together with the fact that institutional trading is likely responsible for the observed underpricing effect, is consistent with the notion that, in the most recent decade, institutional investors have meaningfully increased their demand for gender diverse board firms. This demand has led banks to increase the issue price during the book-building process, but not enough to eliminate the excess demand.

4.3. Does underwriter network centrality mitigate the underpricing effect over time?

As discussed previously, IPO underwriters can contribute to underpricing in multiple ways. They may deliberately only partially adjust the offer price when they learn about investors' private demand for IPO shares (Benveniste and Spindt, 1989). Alternatively, they might not know how to accurately price certain demand factors, like preferences for increased board gender diversity. Underwriters with high degrees of network centrality among other investment banks are the most likely to learn from their peers how to price diversity-driven demand. We run several tests to determine whether underwriter network centrality impacts the gender diversity underpricing effect.

To do this, we build the *Degree* measure used in Bajo et al. (2016), which they refer to as the most intuitive and straightforward centrality measure. For each IPO, we consider each underwriter

of the deal. We then look back five years (including the year of the IPO) and identify how many unique IPO underwriters exist in the sample (N). We then note how many unique underwriters the focal underwriter was connected to by being part of the same syndicate of underwriters on IPOs in that five-year period. This value becomes n. For a given underwriter-year, the *Degree* measure equals n/N. Then for each IPO, we identify the largest value of *Degree* among its underwriters, and we ascribe this centrality measure to that particular IPO, *Max Degree*.[16] We then break our sample up into separate time periods, 2000–2009 and 2010–2018, and we split the IPOs into either above or below the median level of *Max Degree*, creating a binary *High Degree* indicator. We then run our main regression of underpricing on (*Diverse* $\times$ *Post*) and all the controls in the two subsamples. These results are reported in Panel A of Table 6. Column (1) is a replication of our main interaction effect from our results in Table 2 (Column (5)), which shows that the underpricing of gender-diverse board IPOs has increased significantly over the last decade. The Low Degree column (Column (2)), however, shows that this has only occurred for IPOs with poorly connected underwriters. Column (3) shows that well-connected underwriter IPOs have not contributed to this effect. Finally, Column (4) shows that the difference in effects is highly significant. This suggests that poorly connected underwriters are less able to learn about and accurately price the rising demand for gender-diverse board firms than are well-connected underwriters.

In Panel B of Table 6 we re-estimate the model in Column (4) of Panel A, but instead of using all post-2010 IPOs, we break up these IPOs into three three-year groups: 2010–2012, 2013–2015, and 2016–2018. This allows us to determine whether the differential underpricing effect between well-connected and poorly connected underwriters exists across the entire post-period, or in just part of the period. The significant coefficients on (*Diverse* $\times$ *Post*), (*Diverse* $\times$ (*2010–2012*)), (*Diverse* $\times$ (*2013–2015*)), and (*Diverse* $\times$ (*2016–2018*)) suggest that IPOs underwritten by poorly connected investment banks have a significantly greater gender diversity underpricing effect in the post-period than in the pre-period. The negative coefficients on (*Diverse* $\times$ *Post* $\times$

[16] Our results are similar if we use different IPO-level centrality measures like the *Degree* of the lead underwriter, the average value of *Degree* across all underwriters, and the median value of *Degree* across all underwriters.

High Degree) suggest that IPOs with well-connected underwriters have less of an underpricing effect. The magnitude of the coefficient increases each time period and is statistically significant in the latest time period, suggesting that in the 2016–2018 period, the well-connected underwriters are not contributing to the gender-diversity underpricing effect. This is suggestive evidence that well-connected underwriters learned how to price gender diversity, whereas the non-connected underwriters did not.[17]

4.4. Do gender diverse firms have superior operating performance?

One hypothesis as to why institutional investors value gender-diverse boards is that female directors add value above and beyond what their male counterparts contribute—that is, there are direct cash flow consequences to women being on boards. For example, gender-diverse boards could act as a substitute mechanism for corporate governance that would be otherwise weak (Gul, Srinidhi, and Ng, 2011). If women are less overconfident than men, then having more women on the board may reduce the negative consequences of overconfidence (Chen, Leung, Song, and Goergen, 2019), such as over-investment and excessive risk-taking. It may also be the case that gender-diverse boards are less susceptible to groupthink (Coles, Daniel, and Naveen, 2020), improving their ability and disposition to advise and monitor management. Furthermore, diverse leadership may send a positive signal about a firm's ability to attract and retain a diverse talent pool of employees (Athey, Avery, and Zemsky, 2000) or attract customers, especially if the media focuses attention on a firm's lack of gender diversity. In addition, employee responses to a firm's stance on diversity can meaningfully influence productivity and firm value (Mkrtchyan, Sandvik, and Zhu, 2020). Hence, this explanation would suggest that investment banks may not fully incorporate these possible cash flow benefits of gender diversity into the offer price.

[17]The timing of this learning behavior aligns with the timing of the diversity campaigns of the Big Three institutional investors. At the beginning of 2017, the three largest passive institutional investors—BlackRock, State Street, and Vanguard—wrote open letters to the companies they owned demanding an increase in board gender diversity. See https://www.morningstar.com/articles/825543/big-passive-voices-on-gender-diversity-and-climate-risk.

If there are cash flow benefits to firms from having gender-diverse boards, then gender-diverse board firms are likely to have superior operating performance. Assuming that the market is efficient, this expectation of superior performance will be captured in the initial underpricing of the firm. Hence, we examine the effect of board gender diversity on the long-run accounting performance of IPO firms. To measure accounting performance, we estimate each firm's industry- and size-adjusted return-on-assets (ROA) one, two, three, and four years after the IPO. We regress these ROA values on the same model used in Column (5) of Table 2, which includes year and industry fixed effects and the previously mentioned control variables. The results of these estimations are displayed in Table 7. We estimate small and statistically insignificant point estimates on (*Diverse* $\times$ *Post*) and *Diverse* in every time period, suggesting that board gender diversity at the time of the IPO is not related to future operating performance levels. We find similar results if we use a continuous measure of board gender diversity that captures the fraction of directors on the board who are female. In addition, we find no evidence of superior long-term performance when we use three-year buy-and-hold abnormal returns or cumulative excess returns using Ibbotson's RATS approach (Ibbotson, 1975).

An alternate channel through which women might add value is by preventing rare, value-destroying events such as class action lawsuits. This mitigation of potentially harmful events will not necessarily show up in operating performance, but it may still benefit firm value. To test this, we gather data from the Audit Analytics Legal Cases and Legal Parties database to identify instances of class action lawsuits filed against companies. For each IPO in our sample, we identify whether the firm was named as a defendant in a class action lawsuit in the year of the IPO or in any of the following five years.[18] We then regress these lawsuit indicators on *Diverse*, *Diverse* $\times$ *Post*, and all of the before mentioned control variables, just as we did in the ROA analysis in Table 7. Across all post-IPO time windows, we find no evidence that the gender composition of the board of directors at the time of the IPO is associated with a differential likelihood of future litigation

[18] In additional tests, we also consider instances of lawsuits in each of the five post-IPO years separately, and we also use discrete variables to capture instances in which more than one lawsuit is filed in a given year. The results are similar across all specifications.

events (results are available on request). Taken together, all our tests suggest that, while gender-diverse board IPOs realize significantly greater underpricing relative to non-diverse board IPOs, the effects of gender diversity at the time of the IPO do not translate into meaningful differences in long-run firm performance. This suggests that gender-diverse board firms are not likely to be superior at increasing operating performance. In other words, the higher value of diverse firms is likely the result of a lower discount rate, not great expected future cash flows.

5. Alternative Explanations

In Section 4, we found robust evidence that gender-diverse board IPOs realize significantly greater underpricing than do non-diverse board IPOs. We found evidence that this effect is driven by the demand of institutional investors for gender-diverse board firms. We also discussed evidence that suggests well-connected underwriters are better able to learn how to incorporate gender diversity into the offer price, reducing the underpricing effect among these IPOs. We showed that board gender diversity does not appear to impact future profitability, suggesting that gender-diverse board firms realize an increase in value due to a decrease in their cost of capital. In this section, we present evidence that the underpricing effect is not due to market inefficiencies, and we then present evidence against other possible alternative explanations for the effect.

5.1. Market efficiency

Here we examine whether the initial underpricing is followed by additional excess returns in the weeks following the IPO, a test of whether markets are efficient on the first day of trading. If markets overreacted on the first day of trading, the diversity effect may well disappear in the following weeks. In contrast, if institutional investors are superior investors because they have better information about future cash flows, excess returns should increase. To test this, we measure the buy-and-hold abnormal returns realized by investors who purchase the IPO firm's shares on the first trading date after the issue date and hold for 1–6 weeks. We use the value-weighted CRSP market index as the benchmark to measure abnormal returns. We then use these short-run return values as the dependent variables in regression specifications that mimic those used to populate

Table 7. We report the results in Table 8. The coefficients on *Diverse* and *(Diverse* $\times$ *Post)* are small and statistically insignificant in every column, suggesting that IPO board gender diversity does not affect short-run performance, nor is performance affected differently in the 2010s than in the 2000s. These null effects also suggest that there are no meaningful stock price reversals following the initial trade day underpricing. This indicates that investor demand for gender-diverse board shares is efficiently worked into the stock price on the first day of trading.

5.2. Are female directors less qualified to bargain with investment bankers?

A potential alternative explanation as to why gender diversity might be related to IPO underpricing is that, all else being equal, investment banks may prefer to underprice to cater to their institutional investor base. Inexperienced directors might be less able to bargain with investment bankers when setting the offer price. If less experience implies a lower ability to bargain for a higher offer price (and hence lower underpricing), we would expect a negative relation between the level of experience and underpricing in the IPO. Hence, we next examine the relative ages, accumulated experience, and skill sets of female versus male directors on the boards of gender-diverse IPOs. We focus this analysis on gender-diverse boards because we cannot measure the characteristics of female directors relative to male directors on boards with *no* female directors.

Using a sample of approximately 430 gender-diverse board IPOs, we estimate three separate models to determine whether temporal changes in average director age, experience, or skill contribute to the observed relation between gender diversity and IPO underpricing. In Section 3, we described the relative changes in age, experience, and skill between female and male directors across the decades. Relative to the male directors on the same board, female directors' ages and accumulated experience (proxied via their prospectus biography lengths) became significantly larger in the 2010–2018 period. In both decades, female directors had relatively more skills than

their male counterparts. These results suggest that the supply of highly qualified female directors increased significantly in the 2010s, relative to the 2000s.[19]

To test whether differential trends in director characteristics contribute to the observed changes in IPO underpricing, we regress the firm's underpricing on an indicator for the year of the IPO being in 2010 or later, *Post*, a control for a specific female-to-male characteristic ratio, and the interaction between this control and *Post*. For instance, the variable *Age Women to Men* equals the relative age of female directors to male directors on a particular board. Similarly, *Bio. Length Women to Men* (*Num. Skills Women to Men*) equals the relative biography lengths (number of skills) of female directors to male directors on a particular board. These regressions include all previously mentioned control variables. In addition, we also control for board size to capture a firm's sensitivity to the supply of directors in the labor pool.

The results in Table A.4 show that the relative ages, biography lengths, and skill sets of female directors compared to male directors are not significantly related to IPO underpricing in the 2000–2009 period. In addition, the difference in effect across time periods is not statistically significant. While the descriptive statistics in Panel B of Table 1 do suggest that the experience levels of female directors, relative to male directors, increased across the decades, this change does not appear to drive the observed IPO underpricing effect. As such, the underpricing effect is likely driven by something else, such as an increase in institutional investor demand for female directors.

5.3. Is the gender composition on boards changed to attract institutional investors?

A final consideration is whether firms use board gender diversity opportunistically at the time of the IPO to attract attention from institutional investors. First, we consider whether firms add female directors to the board in anticipation of an IPO. We use directors' biographies provided in the IPO prospectuses to identify when directors were first appointed to the board. We find that the average male director has served on the board of directors for 3.75 years while the average female director

[19] Figure A.1 shows that the number of unique female directors increases across the time periods, whereas the number of unique male directors decreases. This suggests that the relative supply of female directors increases over time, likely to accommodate the increased demand for gender diversity.

has served on the board of directors for 3.36 years at the time of the IPO. The difference between these averages is not statistically significant. This suggests that firms with gender-diverse boards at the time of the IPO are unlikely to be placing women on the boards of directors immediately before their initial public offering.

We then examine if firms adjust board composition to be less diverse in the years that follow the IPO. To do so, we use data from BoardEx to identify the gender composition of our IPO firms as reported in their first and second post-IPO proxy statements. If firms are opportunistically boosting their boards' gender diversity at the time of the IPO to appeal to the demands of particular investors and then replacing female directors with male directors post-IPO, we would expect to see an overall reduction in the fraction of gender-diverse boards in the years following the IPO. We do not find meaningful evidence of this behavior.

Among firms with a woman on the board at the time of the IPO, 93.4% continue to have at least one woman on the board in their first post-IPO proxy statement, and 90% have at least one woman on the board according to their second post-IPO proxy statement. In contrast, only 80% of firms with no women on the board at the time of the IPO continue to have no women on the board according to their second post-IPO proxy statement. So while a small percentage of gender-diverse IPO boards become non-diverse in the subsequent years, a greater percentage of non-diverse boards at the time of the IPO become diverse in the two years following the IPO. Taken together, it does not appear to be the case that gender diversity at the time of the IPO is simply window-dressing meant to attract attention from institutional investors.

6. Conclusion

In this paper, we document a gender diversity effect in the levels of underpricing for U.S. IPOs over the past decade. IPOs with at least one woman on the board are significantly more underpriced than IPOs with all-male boards. The effect appears to be driven by excess institutional investor demand, as the greatest underpricing occurs when the issue price is above the initial price range. Hence, the valuation models used by investment banks to set the initial price range do not fully incorporate the

demands for diversity. Ceteris paribus, institutional investors appear willing to pay higher prices for diverse board firms, even though diversity does not appear to be associated with higher levels of profitability, at least over the observation periods in our sample. The benefits from diversity, therefore, appear to arise from lowering the firms' costs of capital. Simply put, investors require lower rates of return on diverse board firms because they have strong preferences for diversity.

The results are consistent with research in asset pricing that shows that "values" affect returns. However, as Pastor, Stambaugh, and Taylor (2021) note, these tests assume that the realized return is equal to the expected return, so that the return is the cost of equity. This is unlikely if returns are measured over a relatively short time horizon. The advantage of our IPO setting is that we directly observe the difference in firm value related to diversity. We then show that this difference is unrelated to profitability or other firm characteristics, allowing us to make a stronger case for the argument that diversity lowers the cost of capital.

The results are economically significant: over the last decade, firms with gender-diverse boards experience a 9.0 percentage point larger level of underpricing, and they leave, on average, $26 million more on the table. These results are robust when we control for possible confounding factors that may jointly affect board gender diversity and underpricing, like CEO gender, industry classification, firm age, VC involvement, firm size, growth opportunities, CSR profiles, and other financial characteristics, which substantially reduces omitted variables bias concerns. Some investment banks do eventually learn about the gender diversity effect. We show that underpricing largely disappears for well-connected underwriters over the course of the decade while remaining significant for poorly connected underwriters over the same period.

We do not find evidence consistent with a number of alternative hypotheses. For example, over the years subsequent to the IPO, we do not find that the industry-adjusted return-on-assets is higher for gender-diverse board firms than for non-diverse board firms. So the results do not seem to be driven by valuation models underestimating the expected profitability from gender diversity, a claim often made in research conducted by practitioners. The fact that profitability is unrelated to

board gender diversity lowers concerns about endogeneity, an argument made in diversity studies that highly profitable firms hire more women. We also find no evidence that firms opportunistically change the gender composition of their boards to attract attention from institutional investors.

This demand for gender diversity may be fueled by political reasons, to wit, the push by large asset managers to put women on the board (Gormley, Gupta, Matsa, Mortal, and Yang, 2020). This motivation is a relatively recent phenomenon, which may explain why the effect does not show up in the early 2000s. Another possible explanation for the demand shift could be that investors have become more comfortable with diversity following the increase in qualifications and experience of female board members in recent years. However, we do not find any evidence that changes in the relative experience levels of female versus male directors drive the effects on IPO underpricing, suggesting that increased investor demand is unrelated to the improved qualifications of female directors.

A final takeaway from the paper is that, over the past decade, institutional investors and firms have placed increased emphasis on stakeholder value maximization, diversity, and other CSR-related topics. One such factor, board gender diversity, appears to matter in corporate financing because large institutional investors, and perhaps others, believe it is important. Because intermediaries such as Goldman Sachs and exchanges such as Nasdaq cater to these investors, it is likely to become necessary for firms, especially small growth firms and those considering an IPO, to be proactive in addressing these societal concerns, lest they be unable to receive the external financing necessary for future growth.

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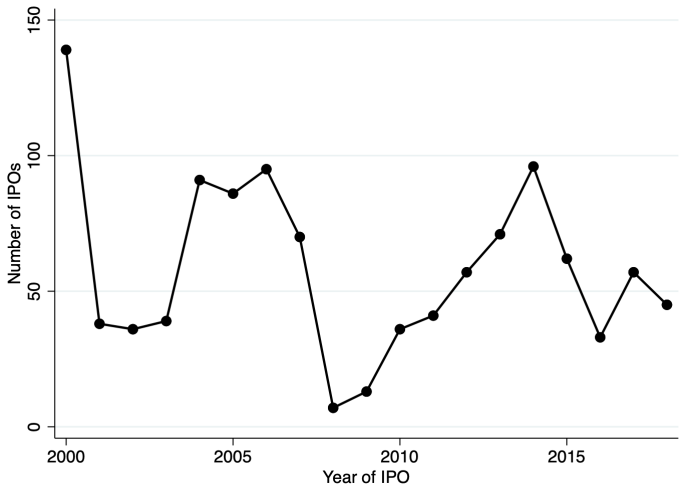
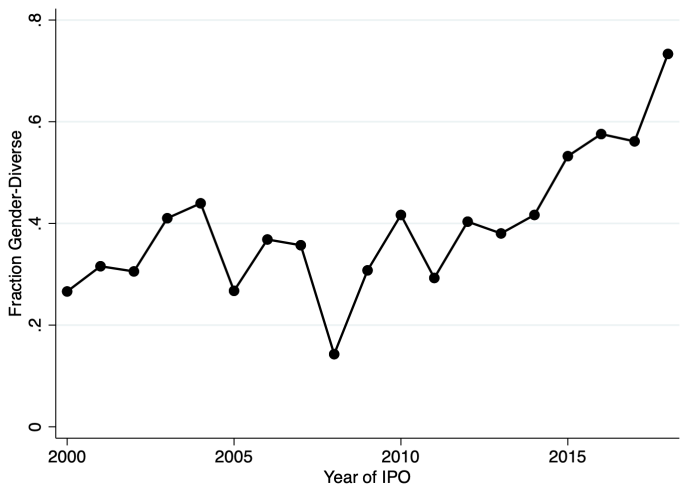
Figure 1: IPO Trends Over Time

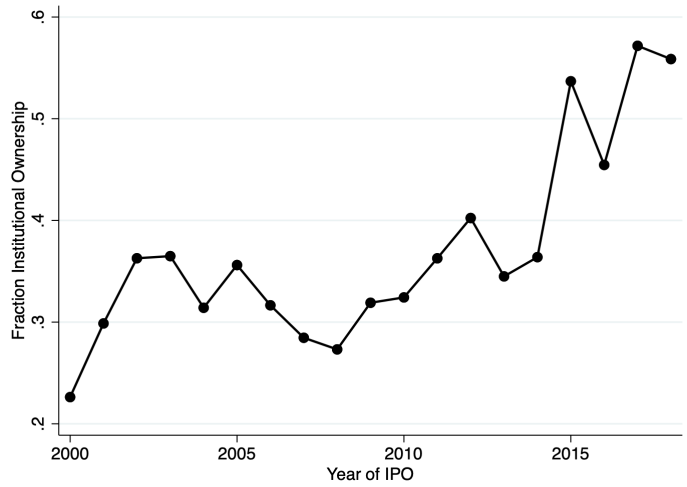
(a) Number of IPOs



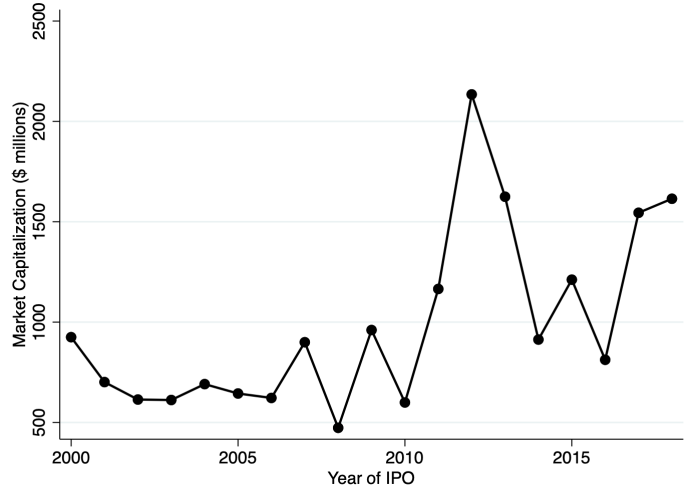
(b) Gender Diversity of IPOs



(c) Institutional Ownership of IPOs

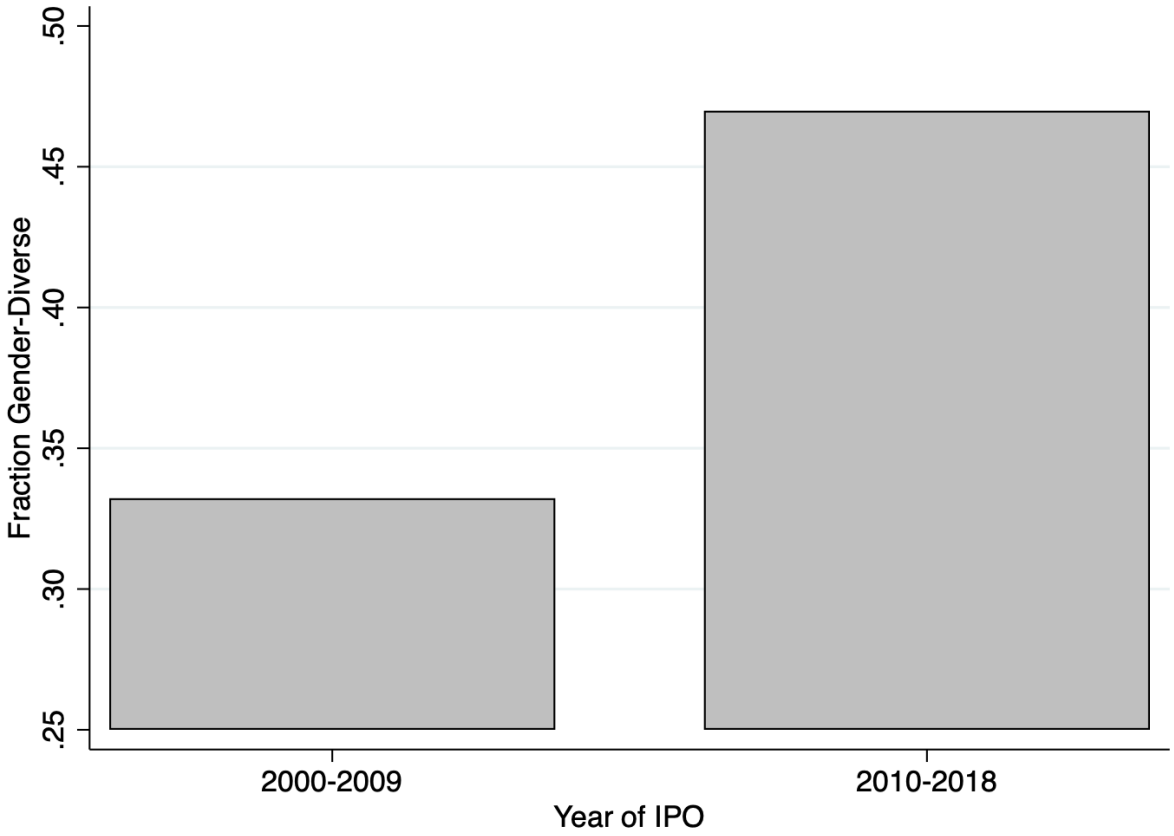


(d) Size of IPOs



Notes: These figures display trends in the number, gender diversity, institutional ownership, and size of IPOs in our sample each year. IPOs are defined as having a gender-diverse board if at least one women serves on the board at the time of the IPO.

Figure 2: Board Gender Diversity at the Time of the IPO



Notes: This chart displays the fraction of IPOs that have gender-diverse boards split by time period. IPOs are defined as having a gender-diverse board if at least one women serves on the board at the time of the IPO.

Table 1
Descriptive Statistics

Panel A: IPO and Firm Characteristics

	2000–2009			2010–2018		
	Diverse	Non-Diverse	p-value	Diverse	Non-Diverse	p-value
Number of IPOs	204	410		234	264	
IPO Characteristics						
Underpricing	0.21	0.25	0.310	0.25	0.18	0.003
	(0.32)	(0.48)		(0.32)	(0.25)	
Inst. Own Post-IPO	0.28	0.32	0.064	0.48	0.39	0.003
	(0.19)	(0.22)		(0.37)	(0.29)	
Top Bookrunner	0.27	0.25	0.580	0.55	0.44	0.021
	(0.45)	(0.44)		(0.50)	(0.50)	
Share Overhang	2.97	2.89	0.654	2.74	2.97	0.214
	(1.79)	(2.07)		(2.02)	(2.03)	
Prior Market Return	0.01	0.01	0.697	0.01	0.01	0.155
	(0.05)	(0.04)		(0.03)	(0.03)	
Offer Price Change	-0.03	0.01	0.047	-0.02	-0.03	0.621
	(0.22)	(0.24)		(0.21)	(0.20)	
Firm Characteristics						
Market Capitalization	647.38	793.50	0.203	1192.85	1430.07	0.484
	(953.35)	(1493.93)		(2135.51)	(4779.86)	
ln(Assets)	5.14	5.29	0.155	5.56	5.63	0.529
	(1.24)	(1.25)		(1.18)	(1.34)	
ln(Sales)	4.21	4.48	0.075	4.32	4.73	0.025
	(1.79)	(1.84)		(2.03)	(2.00)	
ln(Firm Age)	2.44	2.45	0.853	2.48	2.53	0.395
	(0.80)	(0.85)		(0.65)	(0.68)	
VC Dummy	0.60	0.54	0.184	0.73	0.65	0.057
	(0.49)	(0.50)		(0.44)	(0.48)	
Internet Dummy	0.21	0.18	0.364	0.18	0.15	0.405
	(0.41)	(0.38)		(0.38)	(0.36)	
Tech Dummy	0.35	0.40	0.235	0.31	0.34	0.381
	(0.48)	(0.49)		(0.46)	(0.48)	
Female CEO	0.12			0.10		
	(0.32)			(0.30)		
Fraction Women	0.16			0.18		
	(0.07)			(0.09)		

Panel A: IPO and Firm Characteristics (continued)

	2000–2009			2010–2018		
	Diverse	Non-Diverse	p-value	Diverse	Non-Diverse	p-value
Profitability						
Operating CF / CAPEX	-10.54	-36.02	0.437	-116.85	351.13	0.240
	(113.28)	(459.28)		(977.5)	(6010.57)	
Operating ROA	-0.36	-0.39	0.881	-0.62	-0.21	0.005
	(1.86)	(1.90)		(2.18)	(0.88)	
Growth Opp.						
R&D / Assets	0.11	0.07	0.009	0.13	0.10	0.008
	(0.23)	(0.11)		(0.13)	(0.13)	
PPE / Assets	0.12	0.16	0.024	0.10	0.13	0.048
	(0.16)	(0.21)		(0.14)	(0.20)	
Leverage						
Debt / EBITDA	0.84	1.02	0.652	-0.53	0.63	0.110
	(4.94)	(4.84)		(9.30)	(6.58)	
Debt / NWC	-0.56	-12.29	0.476	0.52	0.32	0.756
	(18.77)	(225.24)		(1.68)	(9.10)	
Liquidity						
Current Ratio	5.31	5.03	0.553	5.20	4.63	0.283
	(5.28)	(5.21)		(5.52)	(5.79)	
Quick Ratio	5.09	4.69	0.389	4.97	4.36	0.255
	(5.29)	(5.21)		(5.58)	(5.75)	
Cash Ratio	4.27	3.81	0.318	4.45	3.65	0.132
	(5.17)	(5.14)		(5.55)	(5.72)	
Corporate Social Resp.						
CSR Score	11.04	9.97	0.001	10.98	10.72	0.001
	(1.20)	(1.34)		(0.66)	(0.79)	

Panel B: Director Characteristics

	2000–2009	2010–2018	*p*-value
Age Ratio	0.93	0.99	0.001
Bio. Length Ratio	1.01	1.07	0.078
Number Skills Ratio	1.39	1.15	0.011

Notes: Panel A displays descriptive statistics for the IPOs in our sample. The leftmost columns consider IPOs from 2000–2009, whereas the rightmost columns consider IPOs from 2010–2018. Within each grouping of IPOs, we split the sample based on whether the boards of directors are gender-diverse or not. We report means and standard deviations in parentheses. The columns of *p*-values report results from difference-in-means tests between gender-diverse board IPOs and non-diverse board IPOs. Panel B considers only gender-diverse board IPOs and displays average values of director characteristics. For each firm, we calculate the average age, biography lengths, and number of skills of the female directors on the board, and we divide this by the average age, biography lengths, and number of skills, respectively, of the male directors. In the far right column, we report results from difference-in-means tests between 2000–2009 and 2010–2018 IPOs. We report the number of IPOs by industry in Table A.1. All variables are defined in Appendix A.

Table 2
Underpricing

Panel A: Diverse

	All	2000–2009	2010–2018	All Years	
	(1)	(2)	(3)	(4)	(5)
Diverse × Post				8.923**	6.438**
				(2.483)	(2.159)
Diverse	4.476**	0.095	9.030***	0.343	2.403
	(2.071)	(0.040)	(3.038)	(0.143)	(1.456)
ln(Assets)	4.056**	4.988	2.964*	3.956*	0.533
	(1.989)	(1.319)	(1.923)	(1.942)	(0.420)
ln(Sales)	0.153	0.131	0.694	0.174	0.079
	(0.175)	(0.108)	(0.691)	(0.199)	(0.105)
ln(Firm Age)	-3.470**	-3.726*	-3.125	-3.318**	-0.980
	(-2.291)	(-1.857)	(-1.326)	(-2.199)	(-0.734)
Top Bookrunner	6.494**	10.145**	5.438**	6.309**	-0.298
	(2.528)	(2.302)	(2.015)	(2.523)	(-0.178)
Overhang	1.171*	1.639	0.232	1.254*	0.879
	(1.789)	(1.445)	(0.274)	(1.905)	(1.520)
VC Dummy	7.345***	8.223	7.798***	7.301***	4.127*
	(2.669)	(1.627)	(2.748)	(2.707)	(1.960)
Internet Dummy	6.251*	11.329**	-0.768	6.287*	4.609*
	(1.719)	(2.197)	(-0.211)	(1.731)	(1.701)
Tech Dummy	2.266	4.379	-2.184	2.144	1.166
	(0.664)	(0.827)	(-0.541)	(0.625)	(0.509)
Prior Market Return					77.444***
					(3.184)
Market Capitalization					0.649
					(0.700)
Offer Price Change					84.938***
					(4.858)
Female CEO					-5.557*
					(-1.654)
Year FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Adj. R-Square	0.176	0.176	0.202	0.178	0.412
Observations	1,112	614	498	1,112	1,112

Notes: Panel A reports estimations of the effect of board gender diversity on IPO underpricing. The dependent variable in all specifications is an IPO's underpricing on the issue date. Columns (1)–(3) report the level effects of board gender diversity on underpricing. Columns (4)–(5) consider the differential effect of board gender diversity on underpricing across time periods, and Column (5) includes additional controls to account for potential omitted variables bias. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Panel B: Frac. Female

	All	2000–2009	2010–2018	All Years	
	(1)	(2)	(3)	(4)	(5)
Frac. Female × Post				35.524**	34.996***
				(1.991)	(2.712)
Frac. Female	20.713**	-0.409	33.670***	0.594	9.245
	(2.041)	(-0.029)	(2.749)	(0.043)	(1.059)
ln(Assets)	4.134**	4.977	3.097**	4.023**	0.602
	(2.048)	(1.326)	(2.091)	(2.000)	(0.469)
ln(Sales)	0.048	0.135	0.563	0.093	-0.037
	(0.056)	(0.113)	(0.579)	(0.110)	(-0.048)
ln(Firm Age)	-3.442**	-3.716*	-2.979	-3.241**	-0.865
	(-2.278)	(-1.853)	(-1.270)	(-2.154)	(-0.652)
Top Bookrunner	6.564**	10.156**	5.895**	6.510***	-0.166
	(2.580)	(2.298)	(2.110)	(2.596)	(-0.100)
Overhang	1.180*	1.641	0.131	1.221*	0.876
	(1.794)	(1.439)	(0.155)	(1.857)	(1.511)
VC Dummy	7.374***	8.232	8.032***	7.378***	4.132**
	(2.683)	(1.623)	(2.803)	(2.730)	(1.974)
Internet Dummy	6.220*	11.344**	-0.495	6.389*	4.602*
	(1.714)	(2.198)	(-0.139)	(1.761)	(1.736)
Tech Dummy	2.339	4.379	-1.779	2.371	1.339
	(0.691)	(0.824)	(-0.447)	(0.700)	(0.591)
Prior Market Return					77.877***
					(3.237)
Market Capitalization					0.655
					(0.698)
Offer Price Change					85.255***
					(4.905)
Female CEO					-7.024**
					(-1.979)
Year FE	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓
Adj. R-Square	0.175	0.176	0.194	0.176	0.412
Observations	1,112	614	498	1,112	1,112

Notes: Panel B is analogous to Panel A, but it reports estimations of the effect of board gender diversity, as measured by the fraction of directors on the board who are female (*Frac. Female*), on IPO issue date underpricing.

Table 3
Money Left on the Table

	All	2000–2009	2010–2018	All
	(1)	(2)	(3)	(4)
Diverse × Post				20.901*
				(1.828)
Diverse	13.233**	0.003	26.026**	3.485
	(2.101)	(0.001)	(2.028)	(0.873)
ln(Assets)	15.135	-7.674***	27.369	14.880
	(1.233)	(-3.045)	(1.607)	(1.216)
ln(Sales)	0.607	2.493**	-3.672	0.662
	(0.420)	(2.261)	(-1.266)	(0.453)
ln(Firm Age)	-5.131*	-4.683*	-11.934*	-4.793*
	(-1.867)	(-1.810)	(-1.659)	(-1.761)
Top Bookrunner	9.401**	9.948**	2.775	9.011**
	(2.215)	(2.005)	(0.431)	(2.138)
Overhang	0.984	-2.725	-0.394	1.183
	(0.352)	(-1.284)	(-0.152)	(0.422)
VC Dummy	7.413	-0.000	15.298*	7.319
	(1.553)	(-0.000)	(1.706)	(1.541)
Internet Dummy	5.728	-4.401	19.875	5.780
	(0.672)	(-0.546)	(0.925)	(0.674)
Tech Dummy	-18.780**	-13.929**	-22.630	-19.006**
	(-1.982)	(-2.221)	(-1.348)	(-1.988)
Prior Market Return	126.931**	32.525	422.086**	130.942**
	(2.043)	(0.765)	(2.136)	(2.063)
Market Capitalization	-0.770	29.161***	-4.751	-0.709
	(-0.041)	(5.913)	(-0.244)	(-0.038)
Offer Price Change	75.785***	35.788*	96.158**	74.673***
	(2.739)	(1.670)	(2.289)	(2.710)
Female CEO	-12.599*	1.715	-17.716*	-11.836*
	(-1.742)	(0.256)	(-1.681)	(-1.669)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.061	0.524	0.001	0.062
Observations	1,112	614	498	1,112

Notes: This table reports estimations of the effect of board gender diversity on the amount of money firms leave on the table on their IPO issue date. The dependent variable in all specifications is, *Money Left*, the price change from the offer price to the closing first-day market price, multiplied by the number of shares issued (in $ millions). All models include all previously mentioned control variables. Column (4) considers the differential effect of board gender diversity on *Money Left* across time periods. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table 4
Effect of Institutional Trading on Underpricing

Panel A: Block Trades

	All	2000–2009	2010–2018	All
	(1)	(2)	(3)	(4)
Diverse × #Block Trades	-12.350	-24.361	41.059***	-44.651*
	(-0.546)	(-0.922)	(3.099)	(-1.691)
Diverse	5.645***	4.494	7.694***	6.264**
	(2.679)	(1.597)	(2.675)	(2.519)
#Block Trades	-103.079***	-97.009**	-115.421***	-55.075**
	(-3.000)	(-2.435)	(-3.077)	(-2.528)
Diverse × #Block Trades × Post				83.287***
				(2.662)
All Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.425	0.518	0.370	0.438
Observations	1,101	604	497	1,101

Panel B: Small Trades

	All	2000–2009	2010–2018	All
	(1)	(2)	(3)	(4)
Diverse × #Small Trades	0.146**	0.077	0.091*	-0.070
	(2.574)	(0.233)	(1.674)	(-0.192)
Diverse	2.707	1.764	6.528**	3.318
	(1.477)	(0.627)	(2.369)	(1.231)
#Small Trades	-0.207*	0.285	-0.065	0.491*
	(-1.784)	(1.069)	(-0.813)	(1.699)
Diverse × #Small Trades × Post				0.225
				(0.596)
All Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.410	0.496	0.337	0.423
Observations	1,101	604	497	1,101

Notes: This table reports estimates of the interactive effect on underpricing of board gender diversity and institutional investor trading behavior on the IPO issue date. The dependent variable in all specifications is an IPO's underpricing on the issue date. To proxy for institutional trading activity, in Panel A we use the number of block trades made on the issue date, with *#Block Trades* equal to the number of trades of 10,000 shares or more. In contrast to this measure, in Panel B we consider the number of small trades made on the issue date, with *#Small Trades* equal to the number of trades of less than 1,000 shares. The models include all previously mentioned control variables and fixed effects. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table 5
Post-IPO Institutional Investor Holdings

	Percent Inst. Own		Percent Big Three	
	(1)	(2)	(3)	(4)
Diverse × Post	0.076**	0.074**	0.007**	0.006**
	(2.536)	(2.487)	(2.115)	(2.004)
Diverse	-0.023	-0.030*	0.001	0.001
	(-1.380)	(-1.741)	(0.810)	(0.579)
ln(Assets)	0.061***	0.061***	0.005***	0.004***
	(6.355)	(6.127)	(3.957)	(3.381)
ln(Sales)	0.004	0.003	-0.000	-0.000
	(0.798)	(0.514)	(-0.197)	(-0.328)
ln(Firm Age)	-0.009	-0.008	-0.003*	-0.002
	(-0.687)	(-0.606)	(-1.719)	(-1.559)
Top Bookrunner	0.055***	0.050***	0.003*	0.002
	(3.078)	(2.847)	(1.804)	(1.356)
Overhang	-0.059***	-0.059***	-0.005***	-0.005***
	(-9.824)	(-9.658)	(-5.082)	(-5.071)
VC Dummy	0.014	0.013	0.002	0.001
	(0.754)	(0.682)	(1.188)	(0.905)
Internet Dummy	0.014	0.019	0.000	0.001
	(0.547)	(0.742)	(0.143)	(0.184)
Tech Dummy	-0.012	-0.011	0.004	0.004
	(-0.367)	(-0.337)	(1.046)	(1.140)
Prior Market Return		-0.226		-0.023
		(-1.193)		(-1.498)
Market Capitalization		-0.001		0.000
		(-0.515)		(1.049)
Offer Price Change		0.060		0.011
		(1.443)		(1.646)
Female CEO		0.071**		0.003
		(1.981)		(0.917)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.341	0.343	0.259	0.261
Observations	1,046	1,046	1,046	1,046

Notes: This table reports estimations of the effect of board gender diversity on the institutional ownership of the firm's shares. The dependent variable in Columns (1) and (2) is, *Percent Inst. Own*, the fraction of shares owned by institutional investors in the first filing after the IPO. The dependent variable in Columns (3) and (4) is, *Percent Big Three*, the fraction of shares owned by either BlackRock, State Street, or Vanguard in the first filing after the IPO. Each specification considers the differential effect of board gender diversity on institutional ownership across time periods. The models in Columns (1) and (3) include the same control variables used in Column (4) of Table 2, and the models in Columns (2) and (4) include all previously mentioned control variables. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table 6
Effect of Underwriter Network Centrality on Underpricing

Panel A: Broad Decade Comparison

	All	Low Degree	High Degree	All
	(1)	(2)	(3)	(4)
Diverse × Post × High Degree				-16.971***
				(-2.895)
Diverse × Post	6.438**	12.174**	-0.965	15.570***
	(2.159)	(2.510)	(-0.242)	(3.502)
Diverse	2.403	0.812	5.329**	-0.808
	(1.456)	(0.310)	(2.317)	(-0.340)
All Controls & FEs	✓	✓	✓	✓
Adj. R-Square	0.412	0.517	0.302	0.413
Observations	1,112	528	584	1,112

Panel B: Granular Decade Comparison

	All	All	All	All
	(1)	(2)	(3)	(4)
Diverse × Post × High Degree	-16.971***			
	(-2.895)			
Diverse × Post	15.570***			
	(3.502)			
Diverse × (2010–2012) × High Degree		-5.796		
		(-0.590)		
Diverse × (2010–2012)		14.471**		
		(2.077)		
Diverse × (2013–2015) × High Degree			-13.002	
			(-1.490)	
Diverse × (2013–2015)			13.188*	
			(1.928)	
Diverse × (2016–2018) × High Degree				-38.967***
				(-3.498)
Diverse × (2016–2018)				29.966***
				(3.531)
Diverse	-0.808	-1.848	-0.286	-1.293
	(-0.340)	(-0.714)	(-0.113)	(-0.501)
All Controls & FEs	✓	✓	✓	✓
Adj. R-Square	0.413	0.440	0.456	0.488
Observations	1,112	748	843	749

Notes: This table reports estimates of the interactive effect on underpricing of board gender diversity and underwriter network centrality. The dependent variable in all specifications is an IPO's underpricing on the issue date. *High Degree* equals one for IPOs whose underwriters have an above median level of network centrality, and zero otherwise. The models include all previously mentioned control variables and fixed effects. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table 7
Long-Run Accounting Performance

	ROA_{t+1}	ROA_{t+2}	ROA_{t+3}	ROA_{t+4}
	(1)	(2)	(3)	(4)
Diverse × Post	0.002	-0.056	-0.114	0.025
	(0.036)	(-1.123)	(-0.645)	(0.433)
Diverse	-0.042	0.037	0.165	0.004
	(-0.938)	(1.139)	(0.924)	(0.094)
ln(Assets)	0.016	-0.020	0.047	-0.025
	(0.488)	(-1.284)	(0.668)	(-1.027)
ln(Sales)	0.051***	0.101***	0.264	0.050***
	(3.819)	(3.083)	(1.199)	(2.855)
ln(Firm Age)	0.047**	0.009	-0.027	0.017
	(2.193)	(0.505)	(-0.429)	(0.783)
Top Bookrunner	-0.008	-0.004	-0.056	-0.002
	(-0.497)	(-0.197)	(-0.872)	(-0.097)
Overhang	-0.012**	-0.009	0.014	-0.018
	(-2.517)	(-0.928)	(1.219)	(-0.821)
VC Dummy	0.012	-0.009	0.245	-0.030
	(0.479)	(-0.197)	(0.813)	(-0.692)
Internet Dummy	-0.031	0.041	0.225	0.054
	(-0.934)	(1.313)	(0.978)	(1.060)
Tech Dummy	-0.032	0.010	0.429	0.055
	(-1.266)	(0.172)	(1.055)	(1.303)
Prior Market Return	-0.623*	-0.330	-1.041	0.200
	(-1.778)	(-1.250)	(-1.062)	(0.523)
Market Capitalization	-0.006	-0.006	-0.026	0.003
	(-1.492)	(-1.141)	(-0.934)	(0.882)
Offer Price Change	0.076**	-0.006	-0.156	-0.054
	(2.013)	(-0.129)	(-0.728)	(-0.743)
Female CEO	0.043	0.019	0.011	0.041
	(1.082)	(0.573)	(0.109)	(0.881)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.221	0.171	-0.029	0.110
Observations	1,030	883	742	641

Notes: This table reports estimations of the differential effect of board gender diversity on long-run accounting performance across different time periods. The dependent variable in all specifications is a firm's industry- and size-adjusted return-on-assets at different time windows after IPO. All models include all previously mentioned control variables. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table 8
Market Efficiency

	Buy-and-Hold Abnormal Returns					
	1-Week	2-Week	3-Week	4-Week	5-Week	6-Week
	(1)	(2)	(3)	(4)	(5)	(6)
Diverse × Post	-0.385	-0.193	1.372	0.992	0.442	2.755
	(-0.248)	(-0.105)	(0.758)	(0.448)	(0.179)	(0.887)
Diverse	-0.591	-0.188	-0.184	-0.625	-0.610	-1.217
	(-0.519)	(-0.135)	(-0.145)	(-0.400)	(-0.381)	(-0.623)
ln(Assets)	0.215	0.102	1.019	1.238	1.131	1.161
	(0.455)	(0.163)	(1.333)	(1.615)	(1.385)	(1.433)
ln(Sales)	0.731**	1.365***	1.524***	1.445***	1.837***	2.335***
	(2.170)	(2.964)	(3.243)	(2.876)	(3.164)	(3.844)
ln(Firm Age)	-0.010	-0.746	-1.745*	-1.270	-1.262	-1.723
	(-0.015)	(-1.083)	(-1.941)	(-1.286)	(-1.212)	(-1.560)
Top Bookrunner	-0.317	-1.209	-0.545	-1.225	-1.208	-0.547
	(-0.474)	(-1.288)	(-0.530)	(-1.089)	(-0.734)	(-0.320)
Overhang	-0.178	-0.102	0.228	0.170	-0.265	-0.365
	(-0.595)	(-0.338)	(0.548)	(0.334)	(-0.647)	(-0.938)
VC Dummy	-0.767	-0.698	0.297	2.937*	3.022	2.831
	(-0.887)	(-0.662)	(0.188)	(1.669)	(1.619)	(1.416)
Internet Dummy	-1.877	-1.865	-2.274	-3.794**	-4.713**	-4.936**
	(-1.616)	(-1.195)	(-1.375)	(-1.996)	(-2.064)	(-2.246)
Tech Dummy	0.343	0.491	1.450	1.385	3.943*	2.140
	(0.309)	(0.328)	(0.896)	(0.707)	(1.849)	(1.143)
Prior Market Return	-2.754	-2.764	-23.047	-56.344**	-71.865***	-76.234***
	(-0.233)	(-0.175)	(-1.317)	(-2.476)	(-2.807)	(-2.976)
Market Capitalization	-0.227**	-0.515***	-0.553***	-0.523***	-0.520***	-0.641***
	(-2.375)	(-4.201)	(-5.383)	(-4.588)	(-4.892)	(-6.920)
Offer Price Change	-0.488	-1.500	-7.274**	-6.653*	-9.945**	-14.734***
	(-0.231)	(-0.474)	(-2.559)	(-1.939)	(-1.968)	(-3.365)
Female CEO	0.574	0.441	2.747	4.789	7.417	8.194*
	(0.252)	(0.155)	(0.848)	(1.160)	(1.610)	(1.955)
Year FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
Adj. R-Square	-0.019	-0.002	0.029	0.034	0.037	0.051
Observations	1,112	1,112	1,112	1,112	1,112	1,112

Notes: This table reports estimations of the differential effect of board gender diversity on short-run buy-and-hold abnormal returns across different time periods. The dependent variable in all specifications is a firm's short-run buy-and-hold abnormal return at different time windows after IPO. All models include all previously mentioned control variables. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

A. Appendix

Variable Definitions

Variable	Definition	Source
IPO Characteristics		
Gender Diverse	For each IPO, this equals one if there is at least one woman on the board, and zero otherwise.	Thomson One
Post	Equal to one if the IPO issue date is on or after January 1st, 2010, and zero otherwise.	Thomson One
Outcome Variables		
Underpricing	The percentage change in the price of a share of stock on the issue date of the IPO from offer to close.	Thomson One
n-Week BHAR	Buy-and-hold daily returns over n weeks (i.e., the product of one plus the daily return) less the return on the value-weighted CRSP market index over the same time period.	CRSP
n-Week Volume	Abnormal daily trading volume is estimated as the residuals of a regression of daily firm trading volume on the trading volume of the corresponding market. Cumulative abnormal trading volume across different time horizons is then estimated by summing up a firm's abnormal daily trading volume.	CRSP
n-Month BHAR	Buy-and-hold monthly returns over n months (i.e., the product of one plus the monthly return) less the return on the value-weighted CRSP market index over the same time period.	CRSP
IRATS	We regress a firm's returns on market index returns and the Fama-French five factors cross-sectionally for each month in event time. The intercepts from these regressions represent the abnormal return for the month. We then add these together across different time horizons to estimate IRATS CARs.	Eventus
Return-on-Assets	Equal to income before extraordinary items divided by total assets at the start of the year.	Compustat
Percent Inst. Own	Equal to the fraction of a firm's shares owned by institutional investors in the first filing after the firm's IPO.	Thomson Reuters
Percent Big Three	Equal to the fraction of a firm's shares owned by either BlackRock, State Street, or Vanguard in the first filing after the firm's IPO.	Thomson Reuters

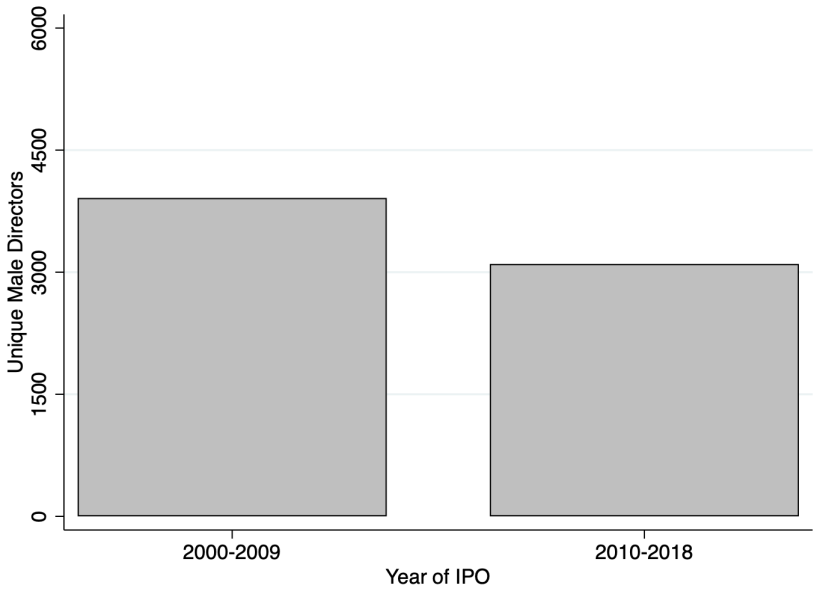
Money Left	The price change from the offer price to the closing first-day market price, multiplied by the number of shares issued (in $ millions).	Thomson One
CSR Score	We compile firm-year CSR scores using the Kinder, Lydenberg, and Domini Research & Analytics (KLD) data and the same aggregation process described in Cronqvist and Yu (2017). To capture a firm's average level of corporate social responsibility post-IPO, we take the average of the firm's CSR score in the year of its IPO and the two subsequent years.	KLD
Director Characteristics		
Director Age	The age of a director in years.	Kenney-Patton
Biography Length	The number of characters, including spaces, in the director's biography, which is made public in the IPO prospectus.	Kenney-Patton
Number of Skills	We identify director skill sets using the taxonomy of Adams, Akyol, and Verwijmeren (2018) and by searching the prospectus biographies for the strings listed therein. The authors identify twenty different skills commonly held by directors, so our number of skills variable takes on discrete values from zero to twenty.	Kenney-Patton
Control Variables		
Female CEO	Equal to one if a woman is the CEO of the firm, and zero otherwise.	Kenney-Patton
Top-Tier Bookrunner	Equal to one if the lead bookrunner is either Goldman Sachs, Morgan Stanley, or JP Morgan, and zero otherwise. This designation is motivated by materials on Jay Ritter's website.	Thomson One
Share Overhang	Our overhang variable is the same as that in Bradley and Jordan (2002), which equals the ratio of retained shares to the public float (i.e., retained shares to issued shares).	Thomson One
Offer Price Change	We follow Hanley (1993) and measure the change in the offer price as the percent difference between the expected offer price and the actual offer price, where the expected offer price is equal to the average of the highest and lowest prices in the original file price range. Missing values are replaced with zeros.	Thomson One

Prior Market Return	Buy-and-hold return of the equal-weighted CRSP market index in the three weeks leading up to the IPO date using daily data. Our results are very similar if we instead use the value-weighted CRSP market index.	CRSP
ln(Firm Age)	Equal to the natural log of one plus the age of the firm in years (i.e., the number of years between the issue date and the founding date).	Jay Ritter's Website
VC Dummy	Equal to one if the firm has venture capital funding, and zero otherwise. From Jay Ritter's November 16th, 2020 IPO database.	Jay Ritter's Website
Internet Dummy	Equal to one if the firm is an internet-based company, and zero otherwise. From Jay Ritter's November 16th, 2020 IPO database.	Jay Ritter's Website
Tech Dummy	Following Loughran and Ritter (2004), equal to one if the firm's SIC code is one of the following: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371, 7372, 7373, 7374, 7375, 7378, 7379, and zero otherwise.	CRSP
Market Capitalization	Equal to the firm's first closing share price multiplied by the number of shares of stock outstanding. For firms with dual-class shares, we use data on the number of shares outstanding in Thomson One.	CRSP/Thomson One
ln(Assets)	Equal to the natural logarithm of the firm's assets.	Compustat
ln(Sales)	Equal to the natural logarithm of the firm's sales.	Compustat
Industry	Based on two-digit SIC code classifications.	Compustat
Board Size	Equal to the number of unique directors on the board.	Kenney-Patton
Frac. Female	Equal to the number of female directors on the board divided by the board size.	Kenney-Patton
#Block Trades	Equal to the number of trades of 10,000 shares or more, made on the IPO date.	TAQ
#Small Trades	Equal to the number of trades of less than 1,000 shares, made on the IPO date.	TAQ
Buy Volume	Total volume of institutional investor buy trades, made on the IPO date.	TAQ
Sell Volume	Total volume of institutional investor sell trades, made on the IPO date.	TAQ
High Degree	Equal to one if the network centrality degree measure of the most well-connected underwriter of an IPO is above the median degree measure among all underwriters in a given year, and zero otherwise.	Thomson One

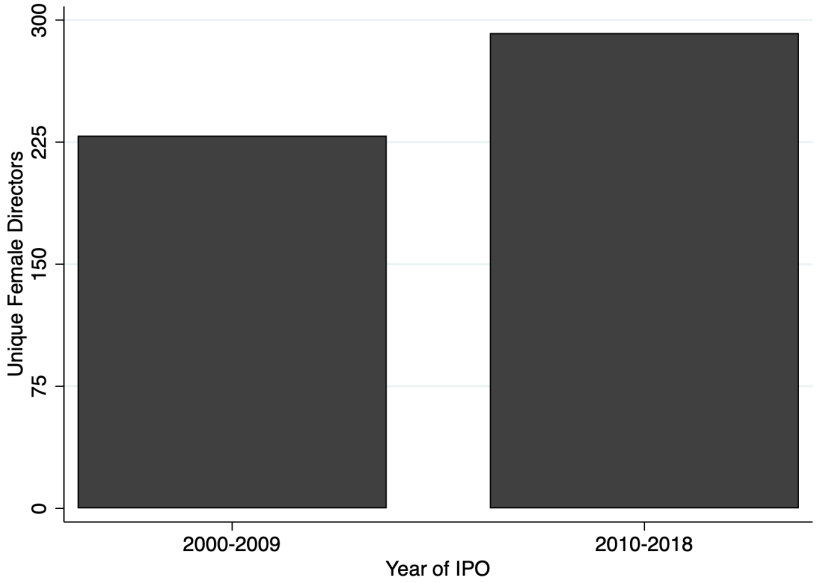
Operating CF / CAPEX	Cash flow income before extraordinary items divided by capital expenditures.	Compustat
Operating ROA	Operating income after depreciation divided by lagged assets.	Compustat
R&D / Assets	Research and development expenditures divided by assets.	Compustat
PPE / Assets	Total net property, plant, and equipment divided by assets.	Compustat
Debt / EBITDA	Long-term debt divided by assets.	Compustat
Debt / NWC	Long-term debt divided by the difference between current assets and current liabilities.	Compustat
Current Ratio	Current assets divided by current liabilities.	Compustat
Quick Ratio	Current assets minus inventories, divided by current liabilities.	Compustat
Cash Ratio	Cash and short-term investments divided by current liabilities.	Compustat

Figure A.1: Trends in Director Labor Supply

(a) Supply of Male Directors



(b) Supply of Female Directors



Notes: These charts display the number of unique male and female directors on the boards of IPO firms in our sample, split by time period. Figure (a) captures the unique number of men, whereas Figure (b) captures the unique number of women.

Table A.1
IPOs by Industry

	2000–2009		2010–2018	
	Diverse	Non-Diverse	Diverse	Non-Diverse
Number of IPOs	204	410	234	264
Consumer Non-Durables	2	11	5	4
Consumer Durables	3	4	1	4
Manufacturing	2	23	6	6
Oil, Gas, and Coal	2	18	1	13
Chemicals	5	4	3	1
Computers & Software	55	138	75	89
Telephone & TV	11	16	0	3
Utilities	0	1	0	2
Wholesale & Retail	17	27	17	24
Healthcare & Medical	46	64	75	59
Finance	26	37	26	26
Other	35	67	25	33

Notes: This table displays the industry breakdown of IPOs. We use the 12 Fama-French industry classifications. The two leftmost columns consider IPOs from 2000–2009, whereas the third and fourth columns consider IPOs from 2010–2018. Within each grouping of IPOs, we consider the number of gender-diverse board IPOs and non-diverse board IPOs separately. All variables are defined in Appendix A.

Table A.2
Underpricing

Panel A: Diverse

	All	2000–2009	2010–2018	All Years
	(1)	(2)	(3)	(4)
Diverse × Post				8.883**
				(2.014)
Diverse	6.311**	1.061	10.761***	1.576
	(2.562)	(0.366)	(2.794)	(0.530)
ln(Assets)	-1.805	-9.593***	3.154	-1.747
	(-0.865)	(-2.700)	(0.864)	(-0.835)
ln(Sales)	0.313	1.547	-0.094	0.262
	(0.232)	(0.895)	(-0.039)	(0.191)
ln(Firm Age)	-2.799	-1.898	-5.481	-2.657
	(-1.539)	(-0.917)	(-1.587)	(-1.484)
Top Bookrunner	1.665	3.056	-1.359	1.558
	(0.810)	(1.111)	(-0.362)	(0.762)
Overhang	0.480	-0.180	-0.184	0.571
	(0.674)	(-0.168)	(-0.186)	(0.804)
VC Dummy	4.389*	-0.486	7.929*	4.259*
	(1.713)	(-0.127)	(1.667)	(1.661)
Internet Dummy	-0.073	3.668	-4.055	-0.075
	(-0.028)	(1.013)	(-1.081)	(-0.029)
Tech Dummy	-3.895	-3.986	-3.024	-3.949
	(-1.201)	(-0.926)	(-0.722)	(-1.208)
Prior Market Return	88.137**	79.734*	134.696**	88.272**
	(2.482)	(1.830)	(2.384)	(2.509)
Market Capitalization	0.257	7.571**	-0.613	0.276
	(0.368)	(2.346)	(-1.515)	(0.397)
Offer Price Change	51.700***	42.768***	54.862***	51.102***
	(6.547)	(5.921)	(3.465)	(6.440)
Female CEO	-1.068	10.499	-7.874	-0.773
	(-0.203)	(1.500)	(-1.121)	(-0.142)
Operating CF / CAPEX	-0.004***	-0.003	-0.005***	-0.003***
	(-3.849)	(-0.617)	(-4.653)	(-3.631)
Operating ROA	1.515	-5.415	2.580***	1.616
	(1.467)	(-1.466)	(2.897)	(1.539)
R&D / Assets	-1.551	-16.951	5.725	-1.369
	(-0.101)	(-0.794)	(0.246)	(-0.088)
PPE / Assets	-0.810	4.679	-9.558	-1.553
	(-0.107)	(0.456)	(-0.735)	(-0.210)
Debt / EBITDA	-0.099	0.106	-0.127	-0.087
	(-0.320)	(0.195)	(-0.424)	(-0.301)
Debt / NWC	0.008***	0.005***	0.198	0.009***
	(3.016)	(2.794)	(1.035)	(3.236)
Current Ratio	4.278**	1.706	5.107	4.164**
	(1.999)	(0.489)	(1.545)	(1.982)
Quick Ratio	-4.904	-1.401	-2.637	-4.909
	(-1.332)	(-0.273)	(-0.420)	(-1.342)
Cash Ratio	0.824	0.111	-2.112	0.954
	(0.330)	(0.035)	(-0.487)	(0.380)
CSR Score	0.380	0.652	3.391	0.833
	(0.342)	(0.580)	(0.974)	(0.721)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.332	0.378	0.358	0.336
Observations	640	333	307	640

Panel B: Frac Female

	All	2000–2009	2010–2018	All Years
	(1)	(2)	(3)	(4)
Frac. Female × Post				45.639**
				(2.128)
Frac. Female	29.843**	0.131	54.462***	2.089
	(2.383)	(0.009)	(3.274)	(0.127)
ln(Assets)	-1.714	-9.562***	3.228	-1.649
	(-0.824)	(-2.693)	(0.893)	(-0.793)
ln(Sales)	0.116	1.523	-0.440	0.087
	(0.085)	(0.880)	(-0.181)	(0.063)
ln(Firm Age)	-2.687	-1.882	-4.926	-2.388
	(-1.468)	(-0.912)	(-1.385)	(-1.326)
Top Bookrunner	1.779	3.123	-0.612	1.782
	(0.868)	(1.129)	(-0.165)	(0.874)
Overhang	0.511	-0.177	-0.141	0.564
	(0.705)	(-0.164)	(-0.134)	(0.780)
VC Dummy	4.541*	-0.470	8.169*	4.567*
	(1.766)	(-0.123)	(1.691)	(1.775)
Internet Dummy	-0.321	3.732	-4.385	-0.154
	(-0.123)	(1.013)	(-1.264)	(-0.060)
Tech Dummy	-4.079	-3.963	-3.512	-4.039
	(-1.257)	(-0.930)	(-0.849)	(-1.240)
Prior Market Return	88.715**	78.632*	134.487**	89.067**
	(2.504)	(1.829)	(2.418)	(2.535)
Market Capitalization	0.253	7.550**	-0.617	0.252
	(0.361)	(2.332)	(-1.512)	(0.362)
Offer Price Change	51.621***	42.770***	55.496***	51.491***
	(6.472)	(5.914)	(3.445)	(6.438)
Female CEO	-2.163	10.897	-11.852*	-1.845
	(-0.394)	(1.490)	(-1.682)	(-0.328)
Operating CF / CAPEX	-0.003***	-0.003	-0.004***	-0.003***
	(-3.622)	(-0.635)	(-4.245)	(-2.867)
Operating ROA	1.484	-5.429	2.475***	1.553
	(1.460)	(-1.468)	(2.881)	(1.526)
R&D / Assets	-1.540	-17.021	6.061	-0.899
	(-0.100)	(-0.805)	(0.255)	(-0.058)
PPE / Assets	-0.313	4.535	-7.202	-0.236
	(-0.041)	(0.434)	(-0.536)	(-0.031)
Debt / EBITDA	-0.075	0.108	-0.093	-0.061
	(-0.251)	(0.198)	(-0.325)	(-0.216)
Debt / NWC	0.008***	0.005***	0.193	0.009***
	(2.997)	(2.869)	(1.023)	(3.174)
Current Ratio	4.223*	1.605	4.804	4.081*
	(1.942)	(0.464)	(1.409)	(1.909)
Quick Ratio	-4.984	-1.310	-2.323	-4.886
	(-1.351)	(-0.257)	(-0.367)	(-1.338)
Cash Ratio	0.940	0.124	-2.186	0.997
	(0.377)	(0.039)	(-0.508)	(0.399)
CSR Score	0.466	0.767	3.397	0.971
	(0.417)	(0.684)	(0.959)	(0.841)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.330	0.378	0.359	0.334
Observations	640	333	307	640

Notes: The specifications in this table are analogous to those in Panels A and B, respectively, of Table 2, but the models include additional controls as motivated by Glushkov et al. (2018).

Table A.3
Effect of Institutional Trading on Underpricing

Panel A: Buy Volume

	All	2000–2009	2010–2018	All
	(1)	(2)	(3)	(4)
Diverse × Buy Volume	0.013***	0.008	0.014***	0.007
	(2.909)	(0.424)	(3.975)	(0.309)
Diverse	4.460**	2.072	6.380**	2.809
	(2.353)	(0.816)	(2.124)	(1.125)
Buy Volume	-0.025***	0.002	-0.039**	-0.012*
	(-2.898)	(0.179)	(-2.564)	(-1.853)
Diverse × Buy Volume × Post				0.008
				(0.394)
All Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.308	0.380	0.324	0.313
Observations	787	371	416	787

Panel B: Sell Volume

	All	2000–2009	2010–2018	All
	(1)	(2)	(3)	(4)
Diverse × Sell Volume	-0.006	0.002	-0.014	0.007
	(-0.934)	(0.145)	(-1.533)	(0.547)
Diverse	6.613***	2.758	8.923***	2.497
	(3.401)	(1.071)	(2.971)	(1.072)
Sell Volume	-0.018***	-0.002	-0.023***	-0.016**
	(-3.683)	(-0.174)	(-3.126)	(-2.126)
Diverse × Sell Volume × Post				-0.016
				(-0.995)
All Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Adj. R-Square	0.327	0.379	0.346	0.327
Observations	787	371	416	787

Notes: This table reports estimates of the interactive effect on underpricing of board gender diversity and institutional investor trading behavior on the IPO issue date. The dependent variable in all specifications is an IPO's underpricing on the issue date. To proxy for institutional trading activity, in Panel A we use the volume of institutional investor buy block trades. In contrast to this measure, in Panel B we use the volume of institutional investor sell block trades. The models include all previously mentioned control variables and fixed effects. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

Table A.4
Age, Experience, and Skills

	(1)	(2)	(3)
Age Women to Men × Post	22.305		
	(0.981)		
Age Women to Men	-1.413		
	(-0.067)		
Bio. Length Women to Men × Post		6.969	
		(0.528)	
Bio. Length Women to Men		-1.079	
		(-0.087)	
Num. Skills Women to Men × Post			-1.862
			(-0.455)
Num. Skills Women to Men			-0.287
			(-0.110)
All Controls	✓	✓	✓
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
Adj. R-Square	0.341	0.331	0.329
Observations	425	437	437

Notes: This table reports results of mechanism tests to determine what may have caused the changes in underpricing across time periods. We restrict the sample to IPOs with gender-diverse boards of directors. To test whether differential trends in director characteristics contribute to the observed changes in IPO underpricing, we regress a firm's issue date underpricing on an indicator for the year of the IPO being in 2010 or later, *Post*, a control for a specific female-to-male characteristic ratio, and the interaction between this control and *Post*. For instance, the variable *Age Women to Men* equals the average across boards of the relative age of female directors to male directors on a particular board. Similarly, *Bio. Length Women to Men* (*Num. Skills Women to Men*) equals the average across boards of the relative biography length (number of skills) of female directors to male directors on a particular board. All models include all previously mentioned control variables, and we also control for board size to capture a firm's sensitivity to the supply of directors in the labor pool. Standard errors are adjusted for heteroskedasticity and are clustered by industry-year, using two-digit SIC code industry classifications. *t*-statistics are reported in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.