HUMAN CAPITAL, SEARCH FRICTIONS, AND ALL-MALE CORPORATE BOARDROOMS

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Abstract

This study examines the role of search frictions and gendered differences in human capital in contributing to the frequency of all-male corporate boardrooms. I use California's SB826, enacted in 2018 and requiring at least one female director on the corporate boards of listed companies by 2019, as a policy shock. Using a difference-in-differences design comparing listed California-based firms to listed non-California based firms, I find the quota increased the female share of boards by 11 percentage points while increasing the share of out-of-network and first-time female directors by 3 percentage points. Other measures of human capital and board quality remained stable. The traditional shift-share instrumental variables approach used in related research dramatically overstates point-estimates, as pre-reform diversity is correlated with firm-size and growth trajectories. I interpret these results with a model of statistical discrimination where the signal variance is an endogenous function of connections to incumbents. Viewed through this lens, my results indicate that search frictions, rather than a lack of qualified candidates, previously contributed to the frequency of all-male boards.

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1 Introduction

Does referral-based hiring reduce informational frictions and bring in the most qualified candidates for the job, or does it systematically exclude qualified candidates outside those networks? Within the context of corporate boardrooms, referral based hiring is common – often referred to as the "Old Boys' Club" – and all-male boards represented 30% of all listed companies in 2017. Several theories have been proposed for limited female representation in corporate leadership, including gendered differences in human capital and access to relevant professional networks (Cullen and Perez-Truglia 2023; Michelman, Price, and Zimmerman 2022; Essen and Smith 2022). Gender quotas on corporate boards have been an increasingly popular policy response aimed at increasing female representation in corporate leadership over the last 20 years (e.g., Ahern and Dittmar 2012; Bertrand et al. 2019; Allen and Wahid 2024; Greene, Intintoli, and Kahle 2020; Ferrari et al. 2022). Using novel data on professional networks, I ask whether gender quotas introduce directors with board-specific human capital who were previously excluded due to search frictions, or whether all-male boardrooms are common because women lack traditional human capital measures such as relevant schooling and experience.

Theoretically, in the flavor of Phelps (1972) and Coate and Loury (1993), I show all-male boards can remain an equilibrium even when the distribution of human capital is similar across male and female candidates. When professional networks are gender-segregated, signals from majority-group candidates are more precise, lowering the standards required for majority-group candidates to obtain a position. This incentivizes firms to hire majority-group applicants, which in turn, increases the signal-precision of future majority group applicants, creating a feedback-loop where all-male boards can be a stable equilibrium even when group level mean abilities are identical.

Introducing a quota lowers the effective hiring threshold for female candidates, increasing the probability of female appointments and potentially raising or lowering boardroom human capital depending on the supply of qualified female candidates. By placing women on boards, quotas increase signal precision for future female candidates, but whether female hiring persists once quotas are relaxed depends on the distribution of female human capital. In a "harmonious" equilibrium, quota appointees leverage female-dense professional networks and facilitate the hiring of qualified women previously excluded due to high signal variance, generating persistent effects of temporary affirmative action policies (e.g., Miller 2017). In contrast, when gender ability gaps are large, quotas mainly operate by lowering hiring standards; in this "patronizing" equilibrium, average boardroom human capital declines (e.g., Ahern and Dittmar 2012), and female hiring collapses once quotas are removed, producing a backlash (e.g., Bian, Li, and Li 2023). The model also delivers a tight upper bound on shareholder costs of gender quotas: firm losses are bounded by the minimum of the non-compliance fine and the cost of evasion.

Empirically, I study how California's SB826, the first gender-based quota for corporate boards in the United States, affected boardroom gender composition, human capital, and professional networks. Passed in late 2018, SB826 mandates that listed companies headquartered in California (CA) have at least one female director by the end of 2019, with additional requirements for larger boards by 2021. Companies failing to comply face annual fines ranging from \$100,000 to \$300,000. I examine corporate responses during the three years following enactment, until the law was ruled unconstitutional in 2022.[2]

My baseline model is a difference-in-differences specification comparing listed CA-based companies with all-male boards in 2017 ("treated") to listed non-CA based companies with all-male boards in 2017 ("control"). Treated firms faced the greatest pressure to comply, as they had no female directors prior to SB826. They are also of independent interest, as this paper asks why they are common. Conceptually, treated firms represent an "intent-to-treat" sample, analogous to firms that were ASA in 2003 in Bertrand et al. (2019). Prior literature typically uses a shift-share instrument, which relies on the cross-sectional exogeneity of the female share prior to the regulation with respect to trends in potential outcomes (Ahern and Dittmar 2012;

[2]The implementation of NASDAQ's rule requiring mandatory disclosure of board diversity in August 2021 complicates interpretation of point estimates past this date, so I end my sample in December 2021 (Fried 2021).

Bertrand et al. 2019). As a methodlogical contribution, I show board gender diversity exhibits mean reversion (Figure I) and firms with limited diversity prior to the regulation are on faster financial growth trajectories, violating the identifying assumptions of shift-share instruments formalized in Goldsmith-Pinkham, Sorkin, and Swift (2020).[3]

I find that the share of all-male boards declines by 24 percentage points and the female share increases by 11 percentage points within three years. The first-stage effects using the standard shift-share instrument are upward biased by 14 percentage points due to mean reversion, representing more than a 50% overstatement. My empirical design reveals that compliance is driven by board expansion rather than male-replacement, as the quota increased the rate of board expansion by 14 percentage points in 2019. Board expansion rates are higher for firms in male-dominated industries. There is no evidence that CA firms engaged in evasive actions such as delisting or changing headquarters location to avoid compliance.[4]

Next, I turn to the primary question of how the quota shifted professional networks and human capital measures. In the full sample, I observe that 61 percent of incoming male directors have a prior employment connection to the board, compared to 39 percent of incoming female directors. The baseline specification indicates that the quota reduced the share of directors with prior professional networks to the board by 3 percentage points. Point estimates are larger if I consider alternative measures of connectivity, such as whether two directors previously served on a board together or have a same-gender connection. The quota increased

[3]This concern may apply to other contexts as well. Ahern and Dittmar (2012) acknowledge their first-stage point estimates may be due to reversion to the mean, Bertrand et al. (2019) find that growth trajectories for the share of women with kids and share women working part-time was smaller for firms that started with high female shares, and Eckbo, Nygaard, and Thorburn (2022) show firms with lower baseline female diversity are smaller firms that were particularly negatively affected by the 2008 financial crisis. As formalized in Goldsmith-Pinkham, Sorkin, and Swift (2020), these examples are all violations of the identifying assumption required of shift-share instruments, which is cross-sectional exogeneity of baseline shares with respect to trends in potential outcomes.

[4]By 2021, multiple lawsuits challenged the constitutionality of CA's Senate Bill 826 and there was substantial non-compliance with the stricter requirements that, depending on board size, mandated up to 50% female board representation. Consistent with this reasoning, the effect of the gender quota on the female board share drops from 0.08 in the baseline specification to 0.04 in the difference-in-differences specification with all listed firms. The estimated effects of the quota on boardroom characteristics and financial outcomes are also typically smaller in this specification. As a further robustness check, I reassuringly observe similar trends in board diversity among private firms based inside and outside CA.

the share of first-time directors by 3 percentage points, though estimated effects are smaller for firms in male-dominated industries. By requiring gender diversity, the quota therefore created incentives for firms to search for candidates outside the traditional “Old Boys’ Club.”

Outside of professional networks and top-level experience, new women directors generally resemble men in terms of other observable qualification measures. The quota had no discernible impacts on the average age of the boardroom, the share of directors with an MBA or Ivy-League degree, the share of directors with prior sector experience, and a board-specific human capital measure. I find no detectable effects on board-influenced actions such as CEO turnover. Treated firms hired distinct female directors to fill the quota’s requirement and the ratio of female directorships to treated firms in 2017 exceeds twenty. These facts indicate that the labor supply of potentially qualified female director candidates prior to the quota was sufficient to meet the additional demand.

If concerns about a limited supply of qualified candidates to meet the quota’s requirements are well-founded, I may potentially observe negative effects on financial performance measures, as in Ahern and Dittmar (2012). Instead, I see positive point estimates of 4.5 percentage points on return on assets and cash flows. Other firm value measures, such as Tobin’s Q and the market-to-book ratio also show positive point estimates but statistically insignificant effects. However, I continue to observe positive point estimates of comparable magnitudes when expanding the treatment and control groups to all listed CA and non-CA companies respectively, suggesting these changes may not be due to the law. The most noteworthy result from looking at financial outcomes is that the reduced-form estimates using the traditional shift-share instrument yield implausibly large positive effects on ROA and negative effects on Tobin’s Q. These patterns are reconciled by my finding that firms with all-male boards are typically younger and on faster growth trajectories.[5] Interpreted conservatively, my results imply that the quota did not

[5]It is important to acknowledge that financial and corporate governance outcomes may respond to reasons tangentially related to the introduction of women onto boards, such as increases in board size, how male directors act in the boardroom, or differential responses to the Covid-19 pandemic. Therefore, I interpret this medium-run evidence as supplementary to the main analysis of boardroom characteristics to corroborate that search frictions

deteriorate measures of boardroom human capital or quality within three years.

Relationship to the Literature: The primary contribution of this paper is to show that gender diversity mandates can break reliance on incumbent connections without reducing measures of board quality, highlighting that search frictions, not a lack of qualified women, are a barrier to women's representation in corporate leadership. Although networks are a central feature of board recruitment, they have received limited attention in the literature on gender diversity mandates. Prior research highlights the importance of connections in shaping access to corporate leadership roles. For example, Gormley et al. (2023) show that institutional investor pressure to increase board diversity led firms to identify candidates beyond managers' existing networks and to place less emphasis on executive experience. Using administrative data on Danish firms, Essen and Smith (2022) offer evidence that professional networks are a key determinant of board appointments, finding that connections are strongly correlated with becoming a first-time director.[6]

Outside the CA context, a large literature examines the effects of gender diversity mandates in Europe.[7] Early research on Norway's 2003 quota, which required 40% female board representation, found substantial non-compliance, less experienced boards, and declines in firm value within five years (Ahern and Dittmar 2012). In a follow-up paper, Bertrand et al. (2019) find that women appointed to corporate boards post-reform were observably more qualified than their female predecessors along many dimensions, but that the reform did not benefit the larger set of women employed in the companies subject to the quota. Similarly, Eckbo, Nygaard, and Thorburn (2022) find that the valuation effect of Norway's quota law was statistically insignificant, while Ferrari et al. (2022) find no significant effects of Italy's gender quota mandate on

contributed to the frequency of all-male boards.

[6]See also Michelman, Price, and Zimmerman (2022) and Cullen and Perez-Truglia (2023), who discuss the importance of professional networks in shaping career outcomes outside the corporate board context. Hallock (1997) shows that CEOs embedded in interlocking boards, where CEOs sit on each other's boards, earn significantly higher compensation, underscoring the importance of professional networks for executives.

[7]The U.S. context offers additional insight, as U.S. corporate governance emphasizes shareholder primacy and flexible board structures, whereas many European markets operate under stakeholder-oriented frameworks and more centralized governance systems (Greene, Intintoli, and Kahle 2020; Jäger, Schoefer, and Heining 2021).

firm performance or share prices. Taken together, my findings show that the quota did not have substantial impacts besides its direct effect of placing out-of-network, first-time female directors onto corporate boards, consistent with the main conclusions in Bertrand et al. (2019). Secondarily, I show the traditional shift-share instrument used in related research is not appropriate (at least in the US context), as firms with all-male boards are on different trajectories, violating the identifying assumption that cross-sectional female shares are exogenous to trends in potential outcomes (Goldsmith-Pinkham, Sorkin, and Swift 2020).

Existing research on SB826 in particular has emphasized short-term share price reactions to milestones associated with the law's passage or repeal, with mixed findings: some studies document negative announcement returns of 1–2% (e.g., Greene, Intintoli, and Kahle 2020; Hwang, Shivdasani, and Simintzi 2018; Klick 2025; Von Meyerinck et al. 2018), while others find non-negative or positive reactions (e.g., Allen and Wahid 2024). The most related paper in this context is Allen and Wahid (2024), who find similar first-stage point estimates but null effects on total network size. I show SB826 introduced women with less powerful connections, in support of the theory that recruitment has traditionally operated within the "Old Boys' Club."

Finally, building on canonical models of statistical discrimination with threshold hiring (e.g., Coate and Loury 1993), I endogenize signal precision as a function of group representation, motivated by gender-segregated professional networks in elite labor markets. Unlike existing models in which discrimination arises from differences in priors, self-fulfilling beliefs, endogenous investment, or taste-based preferences, as reviewed by Fang and Moro (2011), discriminatory outcomes in this framework emerge solely from informational asymmetries generated by network structure. When boards are historically male-dominated, signals for male candidates are more precise, allowing them to meet hiring thresholds with lower realizations than equally qualified female candidates, creating a self-reinforcing feedback loop that sustains all-male boards in equilibrium. This framework formalizes how referral-based hiring can be privately optimal yet socially inefficient, clarifying that the "Old Boys' Club" need not maximize boardroom human capital. The model therefore provides conditions under which quotas can improve equity and economic efficiency.

The remainder of this paper is structured as follows. Section 2 outlines the quota's requirements. Section 3 discusses the theoretical framework. Section 4 describes the data and characteristics of companies with all-male boards. Section 5 examines firms' compliance with the legislation. In Section 6, I show the effects of the quota on human capital measures and professional connections. Section 7 analyzes the quota's impact on other measures of board quality. Finally, Section 8 concludes.

2 Legal Context

CA Governor Jerry Brown signed into law Senate Bill (SB) 826 on September 30, 2018, which requires publicly held corporations with a principal executive office in CA to have at least one female director on the Board of Directors by December 31, 2019.[8] By the end of 2021, companies with five directors are mandated to have at least two female directors, and companies with six or more directors are required to have at least three. I analyze responses to the gender quota from 2019 through 2021, covering the period before legal challenges invalidated the law and NASDAQ's implemented its mandatory diversity disclosure rule (Fried 2021). A potential limitation of this analysis window is that I may fail to detect longer-run effects.

The legislation applies to companies headquartered in CA with shares listed on the New York Stock Exchange, NASDAQ, or NYSE American, but does not cover private companies or listed companies based outside CA. Companies that fail to comply with the quota are subject to fines: each director seat required to be held by a female that is not filled for any portion of

[8] According to the CA Secretary of State, "A female is an individual who self-identifies her gender as a woman, without regard to the individual's designated sex at birth." Publicly held companies have shares listed on the New York Stock Exchange, NASDAQ, or NYSE American. Between 2015 and 2021, no other U.S. state passed a corporate board gender quota that enforces fines on non-compliant companies. On May 13, 2022, Los Angeles Superior Court Judge Maureen Duffy-Lewis found that SB826 violates the equal protection clause of CA's constitution, halting enforcement of the gender quota: https://corpgov.law.harvard.edu/2022/06/12/california-gender-board-diversity-law-is-held-unconstitutional/

the calendar year counts as a violation. A fine of \$100,000 is imposed for the first violation and \$300,000 for each subsequent violation.[9] CA-based firms affected by SB826 had several options to avoid fines. First, they could add a female board member by the end of 2019, either by replacing an existing male director or expanding the board. Second, firms could avoid the law's reach by going private or moving their headquarters out of CA. While the state agency responsible for enforcement never issued fines, companies swiftly added female directors, as I document in Section 5.[10]

The response to SB826 offers unique insight into how diversity mandates affect corporate boards in the U.S., where such policies had not previously been implemented. Although my study period overlaps with other diversity initiatives in the U.S., such as pressure from institutional investors to increase board gender diversity (Gormley et al. 2023), SB826 was the only mandate that required companies to appoint female directors. It thus provides a rare opportunity to study the effects of a gender quota in the U.S., where legal, regulatory, and cultural environments differ from European countries that have adopted similar quotas.

3 Theoretical Framework

A firm must fill a single open board seat in each period. Candidates belong to groups $g \in \{M, F\}$ with current board representation shares λ_{gt}, where $\lambda_{Mt} + \lambda_{Ft} = 1$. Individual productivity is distributed

$$\theta_{ig} \sim \mathcal{N}(\mu_g, \sigma_g^2),$$

[9] For example, a CA-based listed company that has no female board members between January 1, 2019, and December 31, 2020, would owe \$400,000. Failure to file timely board gender information with CA's Secretary of State also incurs a \$100,000 fine.

[10] It is interesting to observe that 37% of CA-based companies were in non-compliance with the stricter requirements as of 2021 (Table A1), but there was near universal compliance with the more lenient 2019 requirement. Several theories may explain this behavior. The first legal challenge filed in state court was on August 6, 2019, so firms may have previously operated under the presumption the law would be enforced and shifted expectations thereafter (Allen and Wahid 2024). Second, the median monetary cost of adding a non-executive director is approximately \$100,000, which typically represents less than 0.2% of a company's market value (Greene, Intintoli, and Kahle 2020). Third, there may be costs from market participants such as institutional investors from maintaining all-male boards (Gormley et al. 2023).

where μ_g is the group-specific mean ability and σ_g^2 captures talent dispersion.

As in Phelps (1972), the firm observes a noisy signal of productivity

$$s_{igt} = \theta_{ig} + \varepsilon_{igt}, \qquad \varepsilon_{igt} \sim \mathcal{N}\left(0, \frac{\sigma_0^2}{\lambda_{gt}}\right).$$

The key assumption is that signal noise decreases in group representation, reflecting gender-segregated professional networks and superior information flow when a group is well represented on the board. Given ability and the signal are jointly normally distributed, Bayesian updating yields the following posterior mean (DeGroot 2004; Fang and Moro 2011):

$$\hat{\theta}_{igt} = (1 - \gamma_{gt})\mu_g + \gamma_{gt} s_{igt}, \qquad \gamma_{gt} = \frac{\sigma_g^2}{\sigma_g^2 + \sigma_0^2/\lambda_{gt}}.$$

The distribution of posterior means across candidates of group g is

$$\hat{\theta}_{igt} \sim \mathcal{N}\left(\mu_g, \gamma_{gt}\sigma_g^2\right).$$

When the noisy signal of productivity is highly imprecise, the posterior distribution collapses to the group mean. As a result, firms view all candidates of the same gender as identical. In contrast, as the signal becomes more precise, the variance of the posterior distribution increases, allowing some candidates to clear the hiring threshold. This logic is present in many models of statistical discrimination (see Fang and Moro (2011) for a recent review), though the novelty from this model is that signal variance is inversely proportional to the group's initial share – reflecting gender-segregated professional networks. Board gender composition evolves according to the following law of motion:

$$\lambda_{F(t+1)} = (1 - \alpha)\lambda_{Ft} + \alpha \cdot p_F(\lambda_{Ft}, \tau),$$

where $\alpha \in (0, 1)$ is exogenous and denotes the fraction of board seats that turn over each period and $p_F(\lambda_F, \tau)$ is the probability of appointing a female candidate.[11] Absent regulation, the firm appoints a female candidate if and only if $\hat{\theta}_{iFt} \geq \bar{\theta}$, where $\bar{\theta}$ denotes the firm's outside option and can be interpreted as the expected productivity of the marginal male alternative.

Proposition 1 (All-Male Boards as an Equilibrium)**.** *If $\mu_F < \bar{\theta}$, then $\lambda_F = 0$ is a locally stable equilibrium of the representation dynamics absent a quota.*

Proof. As $\lambda_F \to 0$, signal noise $\sigma_0^2/\lambda_F \to \infty$ and $\gamma_F(\lambda_F) \to 0$. Consequently, $\hat{\theta}_{iF} \to \mu_F$ almost surely. If $\mu_F < \bar{\theta}$, the probability of female appointment absent a quota,

$$p_F(\lambda_F, 0) = \Pr(\hat{\theta}_{iF} \geq \bar{\theta}) = 1 - \Phi\left(\frac{\bar{\theta} - \mu_F}{\sqrt{\gamma_F(\lambda_F)\sigma_F^2}}\right),$$

converges to zero as $\lambda_F \to 0$.

The law of motion

$$\lambda_{F(t+1)} = (1 - \alpha)\lambda_{Ft} + \alpha\, p_F(\lambda_{Ft}, 0)$$

therefore maps small values of λ_F back toward zero. Low representation reduces signal precision, suppresses female hiring, and completes a self-confirming feedback loop. □

Now suppose a gender quota requires the firm to appoint a female director. Non-compliance incurs a fine c, which I interpret as the present discounted value of hiring a male director and paying quota-fines in future periods. Evasion (e.g. delisting or legal restructuring) incurs a one-time cost d. Let

$$\tau = \min\{c, d\}.$$

Proposition 2 (Quota Compliance, Female Appointment Probability, and Upper-Bound Quota Cost)**.** *Under a quota with policy wedge τ, the firm follows the decision rule:*

[11] When $\alpha = 0$, board gender diversity exhibits complete persistence, while when $\alpha = 1$, the entire board turns over each period. Mean-reversion in board-gender diversity and the fact that approximately 80% of boards with all-male boards maintain all-male boards the following year suggests α lies strictly between the two extremes.

1. *Appoint a female candidate if* $\hat{\theta}_{iFt} \geq \bar{\theta} - \tau$.

2. *Otherwise, appoint a male candidate and incur cost* τ.

The resulting probability of female appointment is

$$p_F(\lambda_F, \tau) = \Pr(\hat{\theta}_{iF} \geq \bar{\theta} - \tau) = 1 - \Phi\left(\frac{\bar{\theta} - \tau - \mu_F}{\sqrt{\gamma_F(\lambda_F)\sigma_F^2}}\right).$$

The parameter τ *constitutes an upper bound on the shareholder cost of the quota.*

Proof. Appointing a male candidate yields expected payoff $\bar{\theta} - \tau$, reflecting the best male alternative net of the least costly method of non-compliance or evasion. Appointing a female candidate yields expected payoff $\hat{\theta}_{iFt}$ with no penalty. The firm appoints a female candidate if and only if expected productivity exceeds the threshold $\bar{\theta} - \tau$. The probability of female appointment follows immediately from the distribution of $\hat{\theta}_{iF}$. Because the firm can always choose the least costly option among compliance, fine payment, or evasion, total losses relative to the unconstrained optimum are bounded above by τ. □

Proposition 3 (Harmonious and Patronizing Equilibria Absent Quota Pressures)**.** *Let* λ_F^τ *denote a stable fixed point of the representation dynamics under quota* $\tau > 0$*. Define the no-quota appointment probability*

$$p_F(\lambda_F, 0) = 1 - \Phi\left(\frac{\bar{\theta} - \mu_F}{\sqrt{\gamma_F(\lambda_F)\sigma_F^2}}\right).$$

Two regimes may arise:

1. ***Harmonious equilibrium.*** *If* $p_F(\lambda_F^\tau, 0) > 0$*, female hiring persists after the quota is removed.*

2. ***Patronizing equilibrium.*** *If* $p_F(\lambda_F^\tau, 0) = 0$*, female hiring ceases once the quota is removed and representation converges back to* $\lambda_F = 0$.

Proof. Under the quota, representation converges to λ_F^τ, satisfying $p_F(\lambda_F^\tau, \tau) = \lambda_F^\tau$. The quota raises representation and therefore signal precision $\gamma_F(\lambda_F)$. After quota removal, dynamics follow

$$\lambda_{F(t+1)} - \lambda_{F,t} = \alpha\big(p_F(\lambda_{Ft}, 0) - \lambda_{Ft}\big).$$

If $p_F(\lambda_F^\tau, 0) > 0$, then at the quota-induced precision level,

$$p_F(\lambda_F^\tau, 0) = 1 - \Phi\left(\frac{\bar{\theta} - \mu_F}{\sqrt{\gamma_F(\lambda_F^\tau)\sigma_F^2}}\right) > 0,$$

so merit-based female appointments occur with positive probability even when $\tau = 0$. Hence female representation does not collapse after policy removal. If instead $p_F(\lambda_F^\tau, 0) = 0$, then no female candidate meets the merit threshold $\bar{\theta}$ at λ_F^τ. Removal of the quota yields $\lambda_{F(t+1)} = (1-\alpha)\lambda_{Ft}$, implying $\lambda_{Ft} \to 0$. Thus representation is sustained only through the policy wedge, generating a patronizing equilibrium. □

3.1 Discussion

In the absence of a quota, signals for minority candidates are less precise as they have less initial representation in the firm. Low initial representation, analogous to low initial beliefs on ability in Phelps (1972) and Coate and Loury (1993), creates higher standards for minority candidates and incentivizes firms to hire male-candidates. This dynamic creates a feedback loop where signals from future male-candidates become even more precise, allowing all-male boards to remain an equilibrium even if group level ability are similar between male and female candidates.

Introducing a quota lowers the effective hiring threshold for female candidates, increasing the probability of a female appointment. The quota can increase or decrease boardroom human capital, depending on whether there is a large supply of qualified female candidates. A key result is that by introducing women onto boards, the quota increases signal precision for future female candidates. However, whether firms continue hiring female candidates absent quota pressures depends on the human capital distribution of female candidates. In the "harmonious" equilibrium, quota-appointees leverage their female-dense professional networks to hire qualified female candidates who were previously excluded because of high signal variance (see also the discussion in Bertrand et al. (2019)). This mechanism is closely related to the findings in Miller (2017), which emphasizes how affirmative action policies can create incentives to hire from underrepresented groups that persist after formal constraints are relaxed. In contrast, when underlying ability gaps between male and female candidates are large, quotas operate primarily by lowering hiring standards for female applicants. In this "patronizing" equilibrium, average boardroom human capital will decline as firms select less qualified candidates (e.g., Ahern and Dittmar 2012). Once the quota is removed, there will be a "backlash" (e.g., Bian, Li, and Li 2023), female hiring ceases and the system reverts to all-male boards.

The model also provides a tight upper bound on shareholder costs from the quota and a framework to understand compliance and evasion incentives. The firm's loss from regulation is bounded above by $\tau = \min\{c, d\}$, the minimum of the fine for non-compliance and the cost of evasion (e.g., delisting or legal restructuring). Because firms can satisfy a quota by appointing a female director, paying a fine, or evading regulation altogether, observed compliance depends on the relative magnitudes of c and d. Near-universal compliance, such as that observed following SB826's 2019 requirements, is consistent with high evasion costs and credible credible enforcement of fines. In contrast, strategic exit, as observed in response to Norway's quota, arises naturally when evasion is relatively inexpensive.

4 Data Sources and Sample Description

4.1 Data Sources

I link data from BoardEx, Compustat, and CRSP to study how CA's SB826 affected professional networks, human capital measures, corporate governance, and firm performance.[12] To assess how firms complied with SB826, I use BoardEx, which provides annual data on board gender composition for approximately 4,000 domestic and publicly listed firms from 2010 to 2021, covering nearly the universe of U.S. listed companies (Table I). These data allow me to construct compliance measures, including (i) the share of women on the board, (ii) an indicator for all-male boards, (iii) whether firms expanded board size to comply, and (iv) whether a male director was replaced to add a female director.[13]

To understand how SB826 affected professional networks, I analyze connections between new directors and existing board members or senior management using BoardEx's employment connection dataset. For each incoming director, I observe whether they previously worked with any member of the incumbent board or C-suite (which includes the CEO, CFO, and other top executives). The dataset also identifies the type of connection – whether two individuals previously served together on a board, as senior executives at the same firm, in other leadership roles, or have a same-gender connection. Data limitations include the fact that I only observe connection patterns for individuals who were directors at least once over the sample period, and that my access to data precludes me from analyzing connection patterns beyond Dec 31, 2020.

From BoardEx, I gather data on age, education, and prior board, executive, and sector experience at the time of onboarding to evaluate observable director qualifications. Experience

[12] I use the crosswalk provided by WRDS and employ a conservative approach that requires matched companies to have identical SEC identifiers (CIKs) and security-level identifiers (CUSIPs) across BoardEx, Compustat, and CRSP.

[13] The annual characteristics of the board are measured as of the company's annual report date. If there are multiple annual reports in a single calendar year, I select the last annual report. BoardEx does not impute gender. Instead, gender is based on self-identification or pronouns used in official reports. For the robustness check in Figure A1, I use a non-random sample of private companies available in BoardEx.

variables are over all positions (which may exceed 52 weeks in a calendar year), so I focus on indicator variables rather than the level. I also analyze whether new directors were non-executive members, a proxy for director independence (Adams, Hermalin, and Weisbach 2010). In the flavor of Bertrand et al. (2019), I construct a board-specific human capital index as a function of the variables described above. In the first step, I regress director compensation on the age, schooling, and experience variables. For each director, the human capital index is the predicted compensation using the fitted values from the first-step, where the independent variables are measured upon onboarding. Unlike Bertrand et al. (2019), I avoid using the predicted probability of board membership, as my dataset conditions on board members.

From BoardEx, I also examine whether newly appointed female directors joined monitoring-intensive committees, including the audit, compensation, and nominating committees. I complement these governance outcomes with data from the Stanford Securities Class Action Clearinghouse, which tracks securities class action filings in federal courts. The director level BoardEx data allows me to construct variables for CEO turnover and whether the CEO is chairman of the board. From CRSP, I analyze firm-level outcomes typically influenced by the board, including delistings, mergers and acquisitions (M&A), dividend issuance, share repurchases, and changes in shares outstanding. Firms are coded as delisted if none of their securities remain listed in the following year. M&A, dividends, and repurchases are coded as occurring if any security was involved in such transactions during the calendar year. I further use daily CRSP share prices to calculate abnormal returns on October 1, 2018. I obtain headquarters location from Compustat Snapshot, cross-verifying missing cases with WRDS SEC Analytics Suite and BoardEx's Company Profile files, to examine whether firms avoided the quota by changing headquarters location.

To examine the effects of SB826 on financial performance, I link BoardEx to Compustat. From Compustat, I construct standard measures of operating performance such as return on assets (ROA) and cash flows. I consider, but do not focus, on firm value measures such as Tobin's

Q because of the limitations discussed in Bartlett and Partnoy (2020). ROA is calculated as net income before extraordinary items divided by book assets. Cash flows are income before extraordinary items plus depreciation and amortization divided by total assets. Tobin's Q is computed as the ratio of the firm's market value to book value of assets, where market value equals book assets plus market equity minus book equity. Observations with non-positive total or book assets are excluded. I also construct a composite z-score index of financial outcomes combining seven indicators: ROA, return on equity, Log(Tobin's Q), Log(market-to-book), cash flows, Log(employment), and capital intensity.[14] After merging BoardEx, Compustat, and CRSP, approximately 4,000 U.S.-based, publicly listed companies remain in my sample annually between 2015 and 2021, covering nearly the full universe of listed firms (Table A2). CA-based firms account for 16 to 20 percent of the sample each year, and in the three years prior to SB826's passage, 31 to 39 percent of CA firms had all-male boards (Table I).

4.2 Sample Description

Several interesting facts about firms with all-male boards are notable. First, I observe that 88% of companies with all-male boards maintain all-male boards the following year (Figure A2). It is rare for firms with gender-diverse boards to transition to all-male boards. Descriptively, firms with all-male boards are typically younger, smaller, and less profitable than firms with gender-diverse boards (Table A3), consistent with the observations in Eckbo, Nygaard, and Thorburn (2022).[15] More formally, I find that companies that transition from all-male boards to gender-diverse boards are on faster growth trajectories. Using the difference-in-differences estimator of Sun and Abraham (2021) suitable for staggered treatment adoption, I see that in the

[14]The z-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation, ensuring that each variable has mean 0 and a standard deviation 1 within the control group. Aggregating multiple outcome variables within a given domain can improve statistical precision by lowering standard errors (Kling, Liebman, and Katz 2007; Hoynes, Schanzenbach, and Almond 2016).

[15]These descriptive differences contribute to our understanding of how gender-diverse boards differ from all-male boards. See also Griffin, Li, and Xu (2021), who show that firms with gender diverse boards have more patents and higher innovative efficiency.

pre-quota period, firms with all-male boards are on faster asset growth and employment growth trajectories relative to companies that maintained gender-diverse boards (Table A4). These patterns caution against the traditional shift-share instruments used to evaluate the longer-term effects of gender quotas, which relies on the exogeneity of the pre-quota female share with respect to trends in potential outcomes (Goldsmith-Pinkham, Sorkin, and Swift 2020).[16]

There are notable cross-sectional differences between the 204 treated firms and 942 control firms, as reported in Table II. In 2017, treated firms have smaller boards, are younger, and employ fewer workers than control firms. They also have higher Tobin's Q and are less likely to pay dividends, suggesting that CA-based firms subject to the quota are more likely to be growth-oriented companies. Despite these differences, many boardroom human capital and professional network measures – the focus of this paper – are similar between treated and control firms. Directors in both groups have comparable ages and similar rates of prior connections to board members and C-suite executives. Directors joining treated firms are somewhat more likely to hold MBAs and have prior board and C-suite experience. Committee participation is also broadly similar, though treated firms have a slightly higher share of directors on nominating committees. These cross-sectional differences do not pose a concern for my identification strategy, which relies on the parallel trends assumption rather than identical baseline characteristics.

5 Compliance

Unlike evidence from other countries, I find no indication that firms systematically evaded CA's SB826 quota through delisting or changing headquarters. For example, studies of Norway's

[16]The IV specification in Ahern and Dittmar (2012) and Bertrand et al. (2019) is a special case of the shift-share instrument described by Goldsmith-Pinkham, Sorkin, and Swift (2020). While a general Bartik instrument for firm f is defined as $B_f = \sum_{k=1}^{K} z_{fk} g_k$ for K shocks, the standard approach used in the quota literature represents the case where $K = 1$. In this setting, the instrument collapses to $B_f = z_f \cdot g$, where z_f is the pre-quota female share (the "share") and g is the post-quota indicator (the "shift"). As Goldsmith-Pinkham, Sorkin, and Swift (2020) demonstrate, the identifying variation in this $K = 1$ case is derived entirely from the cross-sectional exogeneity of the initial shares z_f.

2003 gender quota document substantial evasion: only one-third of treated companies ("ASA" companies in Norway) remained listed within five years of the quota's announcement (Bertrand et al. 2019). By contrast, SB826 imposed relatively mild penalties compared to the threat of forced dissolution in Norway. CA firms faced monetary fines that were comparable to the typical annual compensation of a non-executive director — around \$100,000 per year, similar to SB826's \$100,000 to \$300,000 fines for non-compliance. Given these moderate penalties, adding a female director represented a far less costly adjustment than delisting or relocating. Consistent with this reasoning, the rates of delisting and headquarter relocation following SB826's passage were similar between treated and control firms, suggesting little evidence of evasion (Tables A5, A6).[17]

I next examine how CA firms adjusted board composition in response to SB826. Among CA companies with all-male boards in 2017, fewer than a dozen remained all-male by 2021 — a sharp decline from 204 to just 12 companies. However, gender diversity on corporate boards was rising across the U.S. during this period (Figure II), suggesting that part of the shift toward more gender-diverse boards reflects broader national trends in attitudes about women in leadership. Formally, I estimate the parameters of the following event-study model using ordinary least squares:

$$Y_{fti} = \gamma_0 + \sum_{t \neq 2017} \beta^t \Big(1[Year = t] \times CA\ HQ_{2017} \Big) + \delta_f + \delta_{ti} + \epsilon_{fti}, \tag{1}$$

where Y_{fti} is a board composition outcome for firm f in year t and industry i, δ_f are firm fixed effects, δ_{ti} are industry-by-year fixed effects, and γ_0 is a constant. All regressions use an unbalanced panel of firms from 2015 to 2021, with standard errors clustered at the firm level. Firm fixed effects account for time-invariant firm characteristics. Industry-by-year fixed effects control for shocks common to all firms within an industry in a given year, allowing

[17] Since I do not observe differential attrition between treatment and control groups, I am not motivated to further condition treatment and control groups based on realized 2021 status or modify the treatment group to be CA-based firms in a given year, analogous to Bertrand et al. (2019) Table 4, Panel A.

for different time trends across industries. Accounting for industry-specific trends is important because treated and control firms differ in industry composition, and relying alone on year fixed effects would require the stronger assumption of common trends across industries – one that may not hold in this setting. For example, using the 11 SIC divisions, I observe treated firms are concentrated in manufacturing and services (Table II); using the more granular 43 FTSE industry classification, I see treated firms are more heavily represented in biotechnology and software (Table A7). For the parameter estimates to identify the causal effect of SB826, it is necessary that outcomes would have followed parallel trends between treated and control firms within industry, absent the law. If the parallel trends assumption holds, estimates of β^t for $t < 2019$ should be close to zero. In line with this assumption, I find that pre-treatment trends are flat and statistically indistinguishable from zero across a range of board composition outcomes, supporting the credibility of the identification strategy.

Table III presents the event-study estimates. SB826 substantially increased the representation of women on boards and reduced the frequency of all-male boards. The male share of directors fell by 6 percentage points within a year of the law's passage, and the share of all-male boards fell by 30 percentage points, aligning with point estimates in Allen and Wahid (2024).[18] These changes occurred primarily through board expansion rather than replacement of existing male directors: the probability that a firm expanded its board rose by 14 percentage points (relative to a baseline of 23 percent) in 2019, while the likelihood of dropping a male director did not significantly change. Board size increased by about 0.22 seats on average in 2019, consistent with firms meeting the quota by adding women rather than displacing men. This pattern of board expansion is consistent with Greene, Intintoli, and Kahle (2020) but differs from findings in Hwang, Shivdasani, and Simintzi (2018), who focus on a sample of Russell 3000 firms. To contextualize these effects, the 11 percentage point increase in female board share induced by SB826 between 2019 and 2021 is greater than the entire gain in female board representation

[18]The coefficient on the indicator for all-male board is not equal to one, despite near universal compliance with SB826's 2019 requirements, because the control group is also becoming more gender-diverse.

among all listed companies between 2010 and 2017. Moreover, this effect is comparable in magnitude to the impact of a one standard deviation increase in "Big 3" institutional ownership — BlackRock, Vanguard, and State Street — as estimated by Gormley et al. (2023).

5.1 Robustness Checks

To address the concern that broader social changes particular to CA may explain the baseline results, I examine whether firms that already had gender-diverse boards prior to SB826 also increased female representation, as would be expected if shifts in attitudes or business culture were driving the baseline results. As a first test of this "social change" theory, I expand the treatment group to include all CA-based firms and the control group to include all non-CA-based firms. If shifting social norms rather than SB826 drove the increase in board diversity, this comparison should reveal similar gains among all CA firms. When I estimate this specification, the coefficient on the male share drops by half from 8 percentage points to 4 percentage points (Figure III, Panel A). When looking at the coefficient on the indicator for an all-male board, the point estimate falls by two-thirds — from a 30 percentage point reduction to just 9 percentage points, consistent with minimal changes among already gender-diverse firms (Figure III, Panel B).

To further assess whether shifts in attitudes unique to CA contribute to the baseline estimates, I implement a triple-difference specification using the same full sample of listed CA and non-CA firms. If broader cultural shifts rather than the quota were driving the baseline results, the triple-difference estimate should be significantly smaller than the baseline estimates, as firms already in compliance would have experienced similar changes. The specification is as follows:

$$Y_{fti} = \gamma_0 + \theta_f + \delta_{CA,t} + \psi_{AMB,t} + \beta\Big(1[Year \geq 2019] \times CA\ AMB_{2017}\Big) + \epsilon_{fti} \qquad (2)$$

where Y_{fti} measures board gender composition, θ_f are firm fixed effects, $\delta_{CA,t}$ are CA-specific time effects, and $\psi_{AMB,t}$ are time effects for firms with all-male boards in 2017. The coefficient β captures the estimated effect of SB826 under this specification. The triple-difference estimate of the quota on board gender diversity is similar to the baseline result, suggesting that the observed effects in the baseline specification are driven by firm responses to the quota rather than by shifting attitudes about diversity particular to CA (Figure III). I obtain similar point estimates on the male share and indicator for all-male board if I restrict the within-state control group to be companies compliant with the more restrictive 2021 requirements as of 2017 (Table A9).

To address the concern that firms outside CA may have increased board diversity in response to SB826 — biasing the estimated effect downward — I restrict the control group to firms headquartered in Democratic-leaning states. If spillovers occurred, they would likely be concentrated in these states, which share similar political and social attitudes. If so, using this control group should reduce the estimated effect of SB826, as firms headquartered in these states may have increased board gender diversity in response to CA's quota. However, when I re-estimate the baseline specification with firms headquartered in Democratic states as the control group, the point estimates do not substantially change (Figure III).

5.2 Shift-Share Instrument Yields Biased Estimates

Due to mean reversion in board gender diversity, I find that the standard shift-share instrument used by Ahern and Dittmar (2012) and Bertrand et al. (2019) would over-state the first-stage point estimate on female share by 14 percentage points (Table IV). The estimated effect on female share for CA-AMB companies is .38 - .62 = -.24, representing a combination of the treatment effect and mean reversion effect. The estimated effect on female share for non-CA-AMB companies is .23 - .37 = -.14, representing purely a mean reversion effect. The baseline point estimate is approximately -.10 = -.24 + .14, which nets out the mean reversion effect for CA-AMB companies. As previously discussed, firms with all-male boards are on faster asset growth trajectories and Figure A3 further supports the idea that CA-based companies with varying levels of diversity prior to the quota are not on parallel trends: CA companies with all-male boards in 2017 are becoming less diverse prior to the regulation, while CA companies with gender-diverse boards in 2017 are becoming more diverse prior to the regulation.

To investigate whether the baseline effects are due to differential-mean reversion as opposed to the quota's effects, I run the baseline specification but using all-male board cohorts prior to 2017 as a falsification test (Figure A4).[19] Point estimates for earlier cohorts are typically indistinguishable from zero, indicating that CA-based companies with all-male boards are not inherently more likely to transition to gender-diverse boards. I also run the baseline specification but restrict the treatment and control to companies that maintained all-male boards from 2015 through 2017 – companies that may be more likely to maintain all-male boards in future years (Table A8). I again find similar point estimates, suggesting that treatment effects from the baseline specification are due to the quota and not mean reversion. The descriptive survival probabilities shown in Figure A2 also show similar mean reversion rates between CA and non-CA companies from 2010-2017, suggesting treated companies do not have higher tendencies to switch to gender-diverse boards absent quota pressures. Overall, although all-male boards are persistent, the presence of mean reversion indicates that the standard shift-share instrument will over-state the quota's effects on board composition and bias instrumental variables estimates down, all else equal.

6 Human Capital Versus Search Frictions

To distinguish between the search frictions and human capital hypotheses, I analyze how the quota shifted the characteristics of the boardroom, focusing on relevant educational qualifica-

[19] As an additional falsification test, I repeat the baseline analysis among the subset of private companies available in BoardEx. Reassuringly, Figure A1 shows similar trends in the male share among CA and non-CA based private companies.

tions, experience, and professional networks. I again estimate the parameters from Equation 1, using the characteristics of the entire boardroom at the firm and year level as the dependent variable. Examining the entire boardroom is important because, in theory, the quota could have changed the characteristics of the men in the boardroom, so this analysis captures those effects. There are also limitations to solely comparing the qualifications of incoming women in treated and control firms, as in the baseline specification, both sets of companies had no women on boards in the year prior to the quota by construction.

Table V presents the event-study results. As in the first-stage analysis, treated and control firms follow similar trends before the quota, supporting the validity of the identification strategy. Within two years, SB826 reduced the share of the board with top-level experience, consistent with firm reactions to other corporate board gender quotas. Specifically, the quota lowered the share of the board with prior board and C-suite experience by three percentage points (Table V, Cols 4-5). Most interestingly, I find a 3 percentage point reduction in the proportion of directors with a prior employment connection to the board. Alternative measures of connectivity to the incumbent board yield, such as whether two directors previously served on a board together or had a same-gender employment connection, yield larger point estimates. Although the quota did not reduce the total number of connections (Allen and Wahid 2024), it did increase the share of the board not previously connected to corporate leadership.

To assess the impact of having at least one female director on boardroom characteristics (as opposed to the reduced form effects of the quota), I estimate two-stage least squares (2SLS) effects, which scale the reduced-form estimates by the first-stage effect.[20] The 2SLS estimates indicate that firms shifting to a gender-diverse board experience approximately three times the impact seen in the reduced-form results, which is not surprising given the first-stage estimate

[20]The first and second stage equations are as follows:

$$1(\text{GenderDiverseBoard}_{fti}) = \gamma_0 + \sum_{t \neq 2017} \beta^t \left(1[\text{Year} = t] \times \text{CA HQ}_{2017}\right) + \delta_f + \delta_{ti} + \epsilon_{fti},$$

$$Y_{fti} = \lambda_0 + \lambda_1 \, 1\left(\widehat{\text{GenderDiverseBoard}}_{fti}\right) + \delta_f + \delta_{ti} + \nu_{fti} \, .$$

of approximately 0.30. Notably, I observe a statistically significant decline of 8, 10, and 16 percentage points in the share of prior connections, prior connections from a previous directorship, and prior same-gender connection respectively. SB826 did not change the average age of the board or the share of directors with prior same-sector experience, in contrast to findings in other contexts (i.e., Ferrari et al. 2022). It also did not affect the share of the board with an MBA degree, a certification held by 38% of directors among all listed companies over the sample period, or the share of non-executive directors. Reassuringly, point estimates decrease when estimating the baseline specification but expanding the treatment and control groups to be all-CA and non-CA firms respectively (Figure IV).

These patterns hint that the quota did not deteriorate the observable characteristics of the board, but the negative effects on prior board experience prompts me to further investigate this claim. If top-level experience weights heavily in contributing to board members' wage profiles, then we should see declines in predicted compensation upon onboarding, my measure of board-specific human capital. But when using this index as the outcome variable, I also find null effects. As in Gormley et al. (2023), I interpret these results to indicate firms responded to the quota by placing less emphasis on executive experience, and broadening their search to consider out-of-network female candidates who had relevant sector and educational qualifications.

6.1 Mechanisms

To understand mechanisms behind boardroom-level changes, I look at the characteristics of incoming, outgoing, and retained directors by gender in the treatment and control groups (Table VI). Several notable facts stand out. First, 214 female directorships were filled by 210 distinct female directors in treated firms, indicating the same women were not filling multiple positions (e.g., Seierstad and Opsahl 2011) and suggesting a large supply of qualified candidates to meet the quota's requirement. This statement is further supported by the fact that the ratio of treated firms to female directorships prior to the quota exceeds twenty (Table A10). Second, incoming women to treated firms generally resemble incoming women to control firms, as none of the differences are significant at the 5% level. Nevertheless, in both treatment and control groups, incoming women have fewer connections, less prior board experience, less sector experience, sit on fewer committees, and are more likely to be non-executive directors than incoming male directors. Therefore, the overall effects of the quota on boardroom characteristics is driven by treated firms recruiting a greater share of incoming directors from the female versus male candidate pool. This claim is further supported by the fact that there are more companies in treated firms recruiting female directors than male directors (147 to 105), while in the control group more firms recruit male than female directors (502 to 443). This pattern hints at the theory that the quota caused treated firms to substitute incoming female for incoming male directors, but future research could investigate this point further. Third, 93% of incoming female directors to treated firms are non-executive directors. That the quota did not raise the overall independence of the boardroom is because baseline rates of independence are high to begin with – approximately 80% in 2017. Fourth, retained male directors appear to hold more important responsibilities on the board, as evidence by participation on a greater number of committees and the audit committee.

The changes in boardroom characteristics introduced by the quota generally align with differences in individual characteristics between male and female directors, measured at the time of onboarding (Table VII). Across all US listed companies from 2015-2020, women directors have similar educational backgrounds to their male counterparts but are, on average, one year younger (Table VII). More pronounced disparities appear in prior board experience and ties to company leadership. The share of male directors with prior board experience is 83%, compared to 72% for female directors, a difference of 11 percentage points. A gap of 21 percentage points exists for prior employment connections to a sitting member on the board, and a 22 percentage point difference for prior connections to the C-suite.

7 Effects on Measures of Board Quality

In theory, first-time female directors from outside established networks may be tougher monitors (e.g., Adams and Ferreira 2009). I probe this hypothesis by examining the quota's effects on CEO turnover, whether CEO is chairman of the board, board-influenced outcomes such as delistings, dividend issuance, M&A activity, share repurchases, and assignments to monitoring-intensive committees. These committees include the audit, compensation, and nominating committees, where board members contribute to ensuring the integrity of financial statements, setting executive compensation, and recruiting directors. I also consider how the quota affected the share of non-executive directors, a proxy for board independence (Adams, Hermalin, and Weisbach 2010). I generally find null effects on monitoring capacity, though I observe a precisely estimated negative effect of 2.4 percentage points on audit committee participation in the size-control and triple-difference specifications. Interestingly, in male-dominated industries, there is a more sizable 3.5 percentage point decline in audit committee participation. The audit committee is regarded as a critical committee within corporate boards since its members monitor financial reporting and disclosure (Ferris, Jagannathan, and Pritchard 2003), suggesting firms may have been less willing to integrate newly appointed female directors into the most important roles. The changes in board composition do not result in greater litigation risk, as measured using records from the Stanford Securities Class Action Clearinghouse.

I conclude by examining the impact of SB826 on financial outcomes, though this is the weakest and least novel part of my analysis. If the constraint imposed by the quota is costly, I may see negative effects as in Greene, Intintoli, and Kahle (2020) and Hwang, Shivdasani, and Simintzi (2018). Existing studies on SB826 primarily focus on short-run share price reactions, with conflicting results. A key challenge in these studies is determining when the market anticipated SB826—whether during its introduction, Senate passage, or Governor Brown's signing. Some studies document negative stock market responses of 1-2% to milestones related to the quota's passage (Greene, Intintoli, and Kahle 2020; Hwang, Shivdasani, and

Simintzi 2018), while others find non-negative to positive effects, with point estimates up to approximately 1% (Allen and Wahid 2024). Recent research using the unexpected repeal of the legislation finds positive abnormal returns of approximately 1% (Klick 2025). To add one more data point, using the standard market model (e.g., MacKinlay 1997), I replicate prior results in finding negative abnormal returns in the magnitude of 0.7% to 1.2% on October, 2018 – the first trading day after Governor Brown's signing (Table A11).

Given informational uncertainty surrounding the passage and enforcement of the legislation, I focus on the quota's effects on various financial outcomes in the medium run. I highlight results for ROA, a profitability metric commonly used to represent operating performance (Adams and Ferreira 2009). In the baseline specification, I observe a precisely estimated 4.5 percentage point increase in ROA, representing a 13% improvement relative to 2017 baseline levels (Figure V). The point estimates on the other financial outcome variables are positive but not significant at conventional levels, with the exception of cash flows and capital intensity (Table A13). Treated companies experience greater increases in employment after the quota, suggestive of the idea that gender-diverse boards undertake fewer workforce reductions (e.g., Matsa and Miller 2013). However, not all point estimates substantially decline when expanding the treatment and control group to be all CA and non-CA firms respectively, indicating these changes may not be due to the law (Figure V). Furthermore, the reduced form results using the standard shift-share instrument yield implausibly large point estimates on ROA and cash flows (.21), which is reconciled by my finding that younger, smaller firms have all-male boards and are on faster growth trajectories.

8 Conclusion

In this paper, I show that board recruitment has traditionally operated within established professional networks, where the costs of identifying and vetting candidates are low. Women are less likely to belong to these professional networks, which has contributed to the frequency of all-male boards. Expanding the search beyond traditional recruitment networks requires incentives, such as pressure from institutional investors or, as studied here, a legislative requirement.

Theoretically, when board appointments are mediated by incumbent professional networks, all-male boards can remain an equilibrium even when comparable alternative allocations exist. This outcome is consistent with models of statistical discrimination in which candidate quality is observed through noisy signals whose precision is higher for individuals embedded within established professional networks, even when group-level mean ability is similar (Aigner and Cain 1977). SB826 acted as a regulatory catalyst that compelled firms to pay additional search and monitoring costs. Viewed through this lens, the negative short-run announcement effects documented in previous literature may represent the market's pricing of these search costs, rather than an anticipation of diminished board quality.

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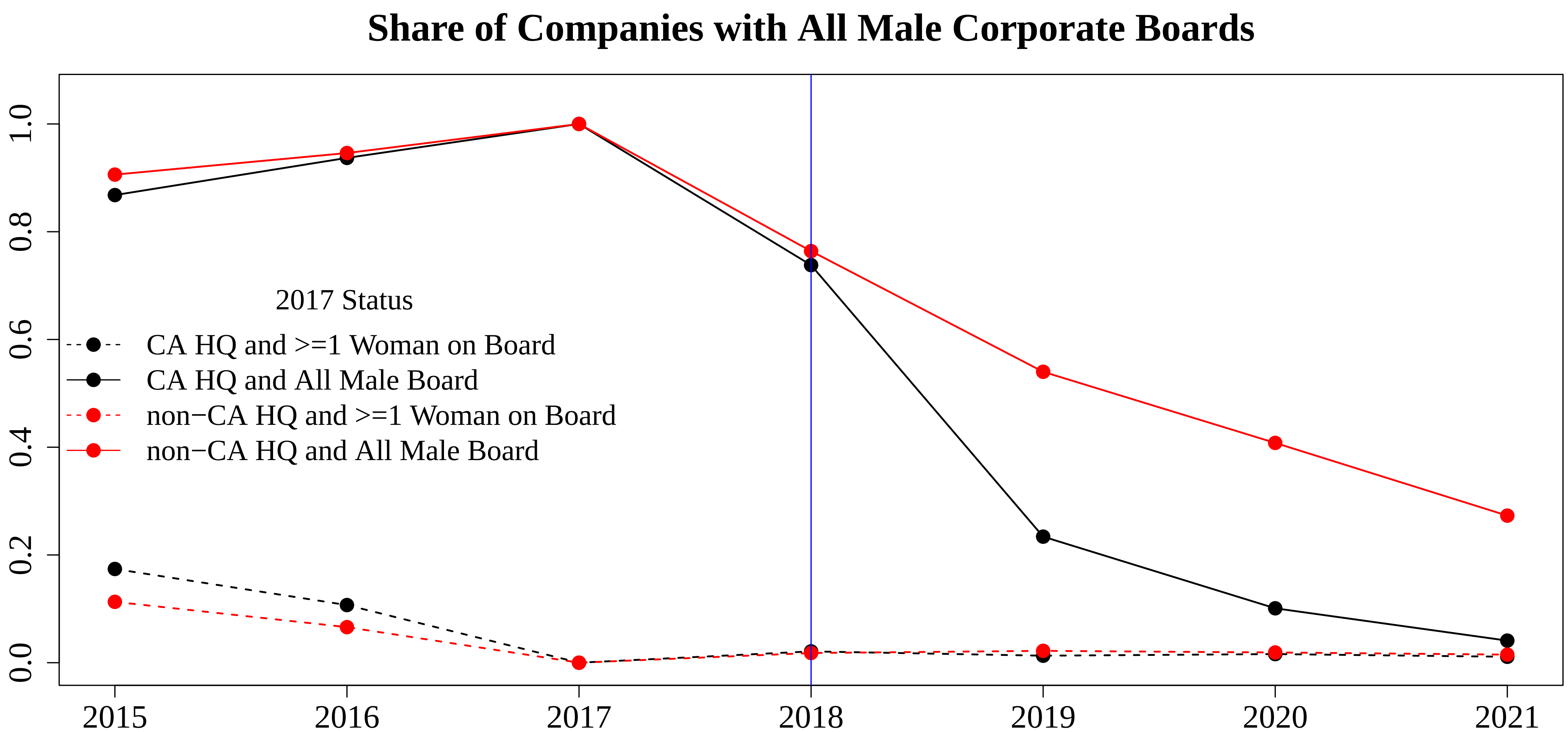
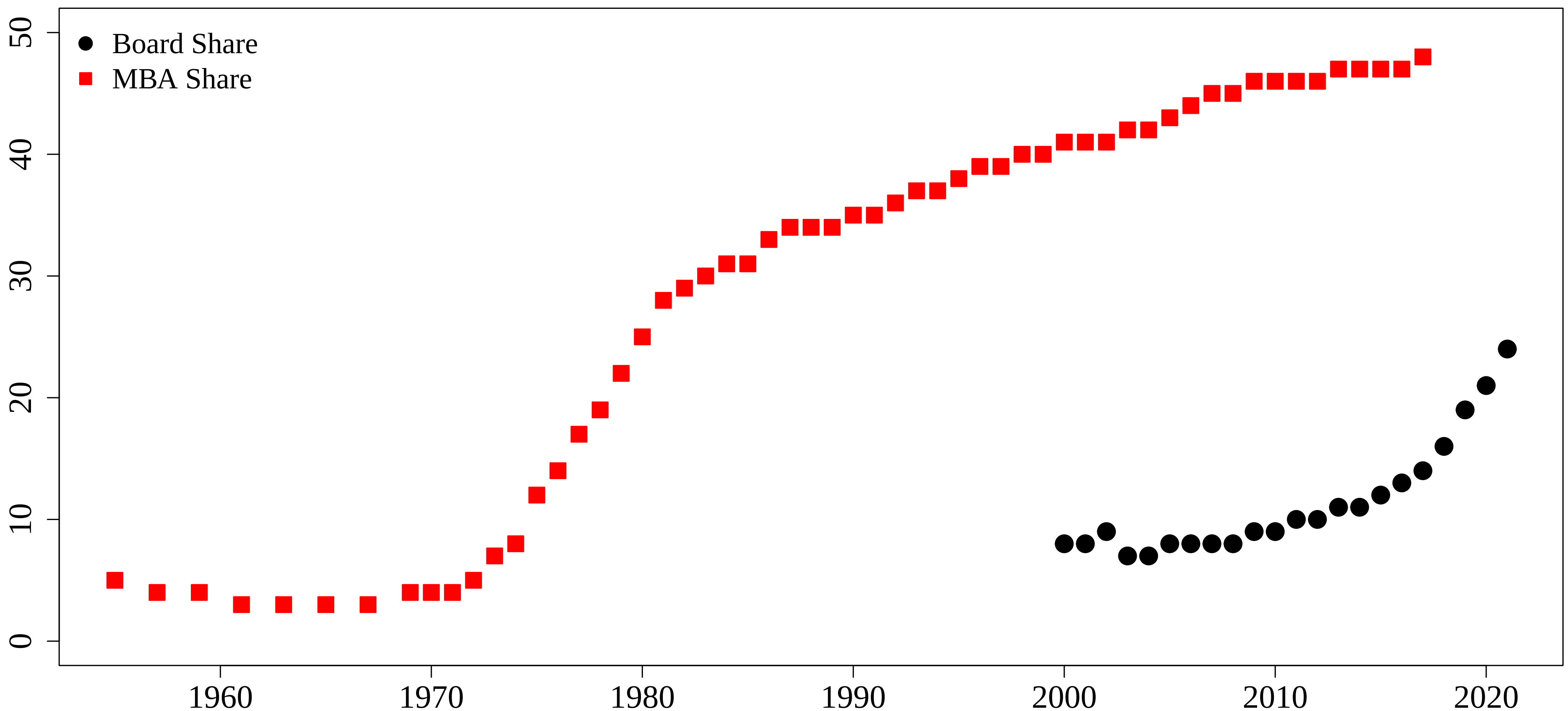
Figure I



Notes: CA SB 826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of any listed company with HQ in CA by 12/31/2019. Listed companies have shares listed on the NASDAQ, NYSE, or NYSE American. The sample tracks an unbalanced panel of firms that were domestic and listed in 2017, the year before SB 826 was signed.

Figure II

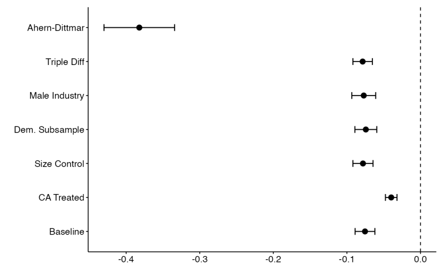
Female Board Share Versus Female Share of MBA graduates



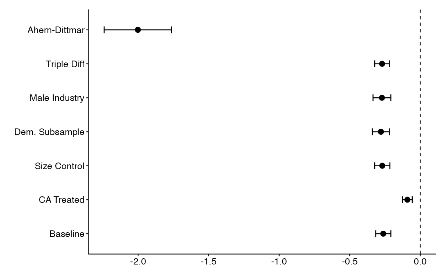
Note: The female share of MBA graduates is taken from NCES Table 325.25, which tracks postsecondary institutions participating in Title IV federal financial aid programs. The annual female board share of domestic and listed companies is derived from BoardEx's Organizational Summary files.

Figure III: Effect of the Quota on Boardroom Composition

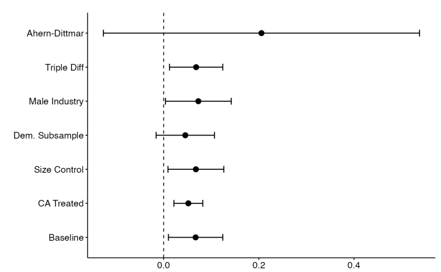
(a) Male Share



(b) 1(All-Male Board)



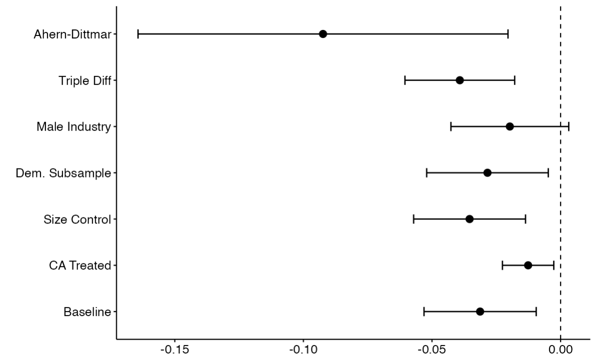
(c) Expand Board



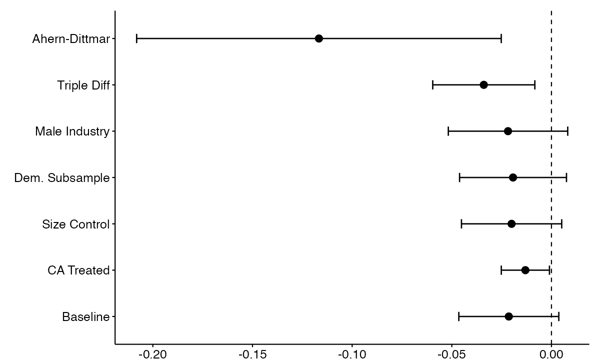
This figure shows heterogeneity and robustness of the first-stage regression. In the baseline DiD model, treated firms are listed firms headquartered in California with all-male boards in 2017, while control firms are listed firms headquartered outside California with all-male boards in 2017. The CA treated row expands the treated and control groups to all California- and non-California-headquartered firms in 2017, regardless of board gender composition. The size control specification adds a control for firm size (log revenues) to the baseline specification. The Democratic Subsample specification estimates the baseline specification but restricts the control group to firms headquartered in states that voted Democratic in the 2016 presidential election. The Male Industry row estimates the baseline specification but restricts the sample to firms in male-dominated industries, defined as those with below-average female board representation based on the 2017 cross-section. The triple differences specification uses all listed firms, leveraging variation before and after the quota, between California and non-California firms, and between all-male and gender-diverse boards prior to the quota. The Ahern–Dittmar shift-share specification restricts the sample to California-based firms and estimates a firm and year fixed-effects specification, where the reported coefficient is the interaction between the male board share in 2017 and an indicator for years greater than or equal to 2018.

Figure IV: Effect of the Quota on Board Experience and Professional Networks

(a) Board Experience



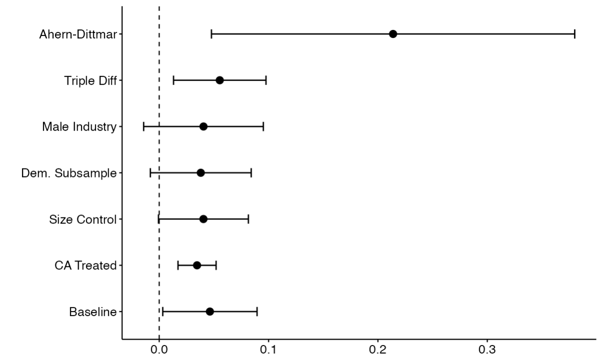
(b) Professional Networks



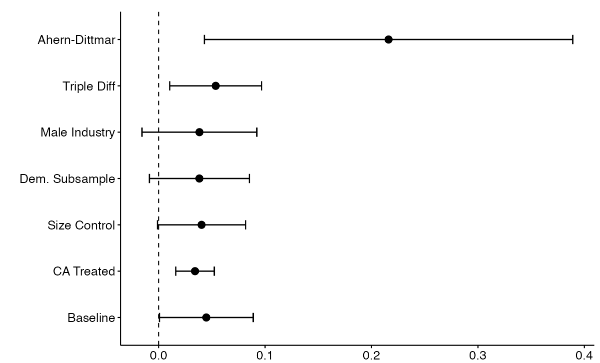
This figure shows the reduced form effects of the quota on board experience and professional networks. In the baseline DiD model, treated firms are listed firms headquartered in California with all-male boards in 2017, while control firms are listed firms headquartered outside California with all-male boards in 2017. The CA treated row expands the treated and control groups to all California- and non-California-headquartered firms in 2017, regardless of board gender composition. The size control specification adds a control for firm size (log revenues) to the baseline specification. The Democratic Subsample specification estimates the baseline specification but restricts the control group to firms headquartered in states that voted Democratic in the 2016 presidential election. The Male Industry row estimates the baseline specification but restricts the sample to firms in male-dominated industries, defined as those with below-average female board representation based on the 2017 cross-section. The triple differences specification uses all listed firms, leveraging variation before and after the quota, between California and non-California firms, and between all-male and gender-diverse boards prior to the quota. The Ahern–Dittmar shift-share specification restricts the sample to California-based firms and estimates a firm and year fixed-effects specification, where the reported coefficient is the interaction between the male board share in 2017 and an indicator for years greater than or equal to 2018.

Figure V: Effect of the Quota on Financial Outcomes

(a) ROA

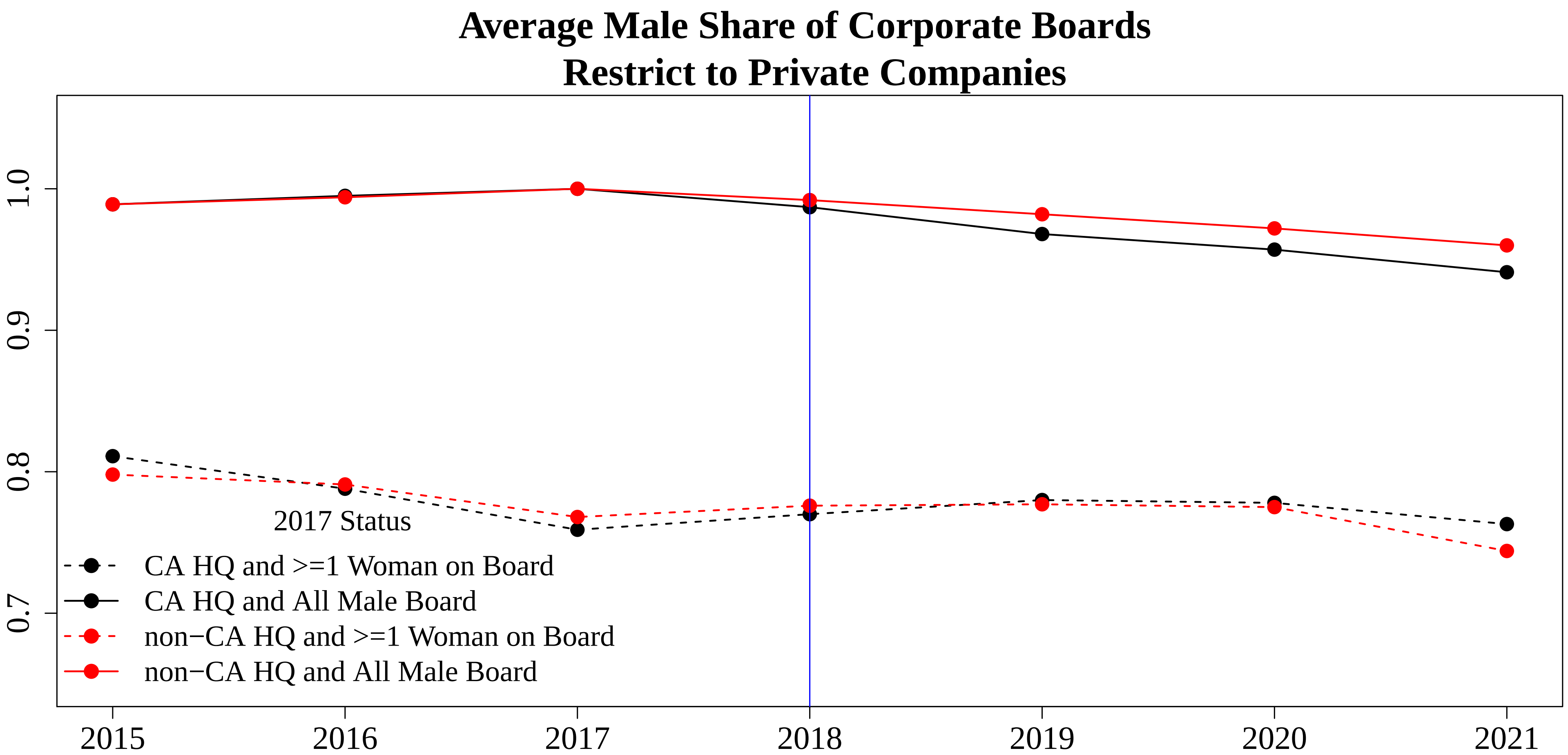


(b) Cash Flows



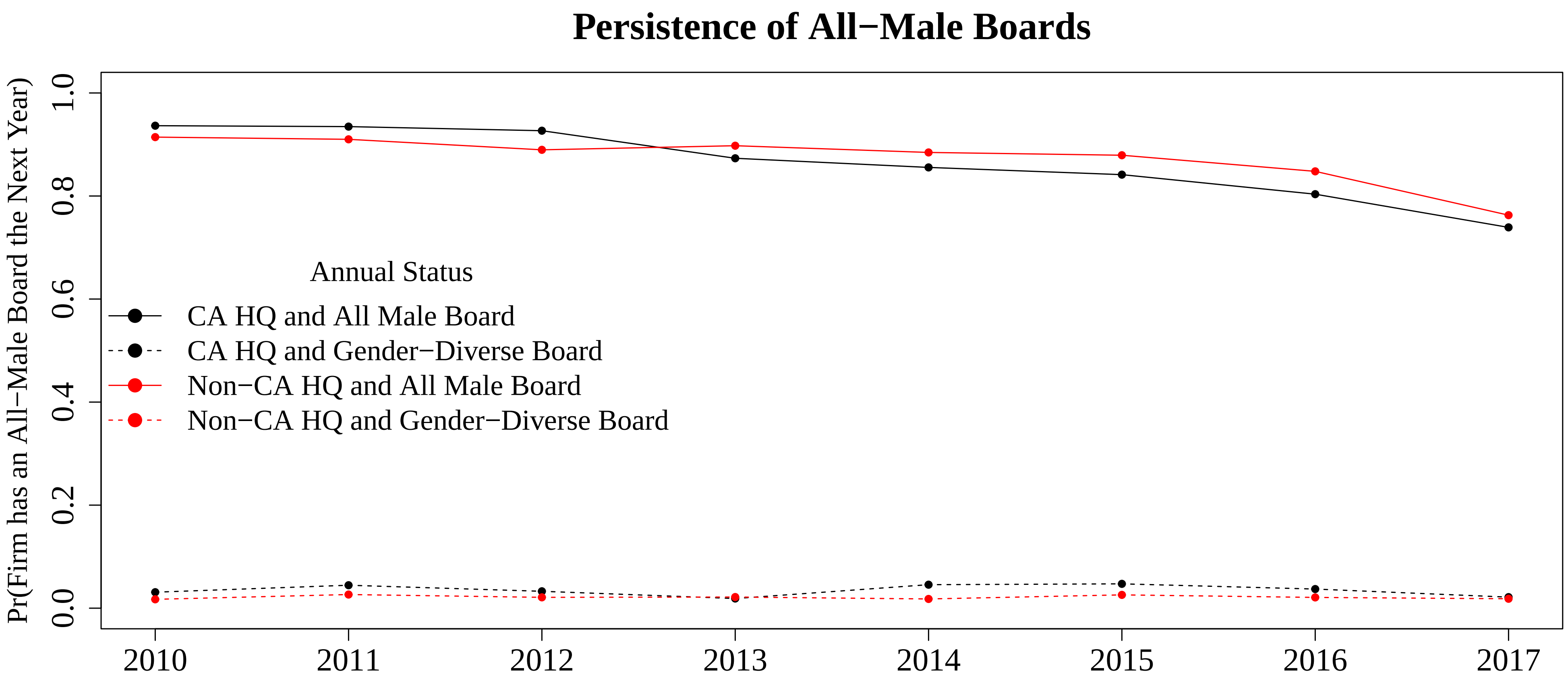
This figure shows the reduced form effects of the quota on financial outcomes. In the baseline DiD model, treated firms are listed firms headquartered in California with all-male boards in 2017, while control firms are listed firms headquartered outside California with all-male boards in 2017. The CA treated row expands the treated and control groups to all California- and non-California-headquartered firms in 2017, regardless of board gender composition. The size control specification adds a control for firm size (log revenues) to the baseline specification. The Democratic Subsample specification estimates the baseline specification but restricts the control group to firms headquartered in states that voted Democratic in the 2016 presidential election. The Male Industry row estimates the baseline specification but restricts the sample to firms in male-dominated industries, defined as those with below-average female board representation based on the 2017 cross-section. The triple differences specification uses all listed firms, leveraging variation before and after the quota, between California and non-California firms, and between all-male and gender-diverse boards prior to the quota. The Ahern–Dittmar shift-share specification restricts the sample to California-based firms and estimates a firm and year fixed-effects specification, where the reported coefficient is the interaction between the male board share in 2017 and an indicator for years greater than or equal to 2018.

Figure A1



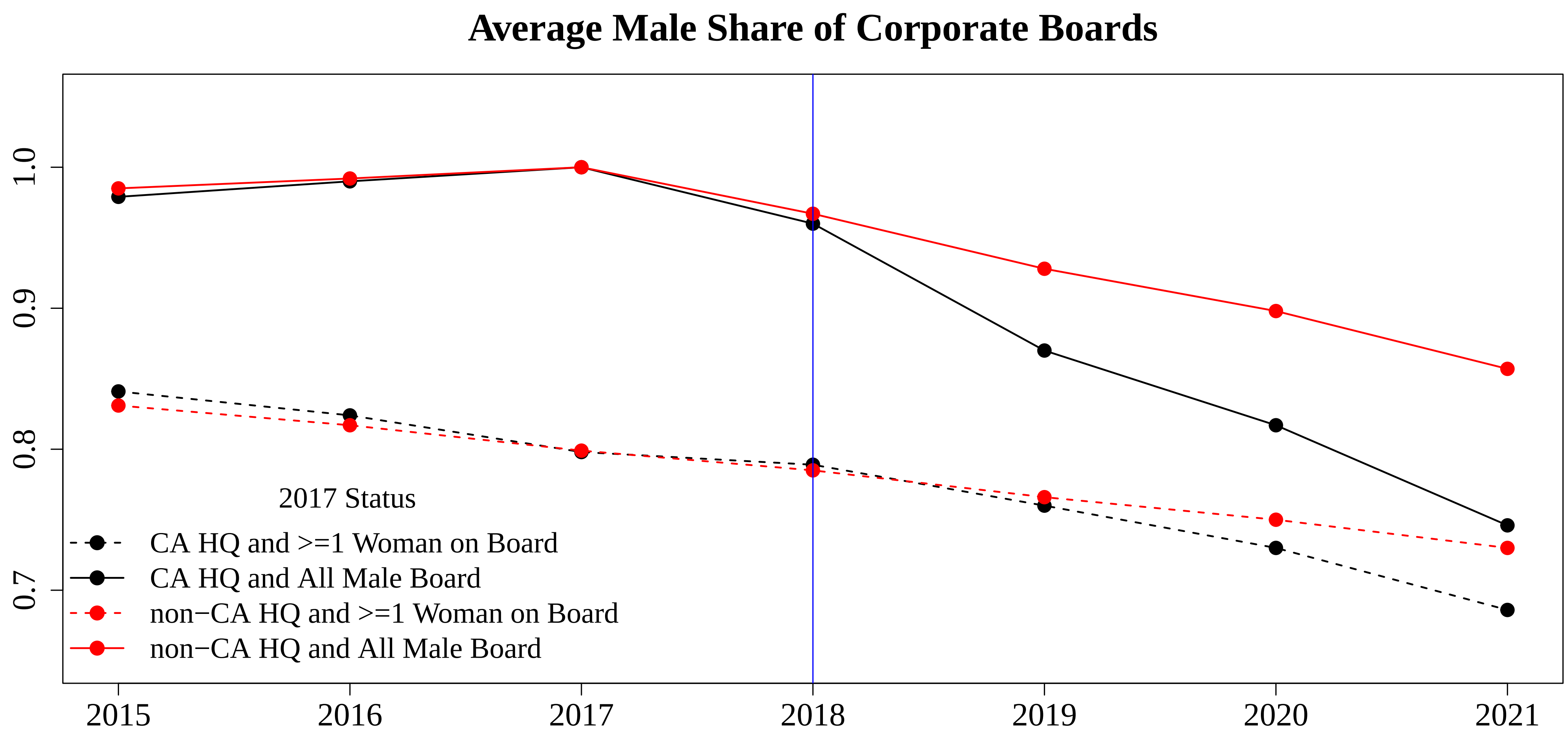
Notes: CA SB 826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of any listed company with HQ in CA by 12/31/2019. Listed companies have shares listed on the NASDAQ, NYSE, or NYSE American. The sample tracks an unbalanced panel of firms that were domestic and listed in 2017, the year before SB 826 was signed.

Figure A2



Note: The sample restricts to domestic and listed companies where annual board gender information is available. The annual board composition is provided by BoardEx. The universe of listed companies is provided by CRSP. Annual headquarter information is triangulated from Compustat, SEC reports, and BoardEx.

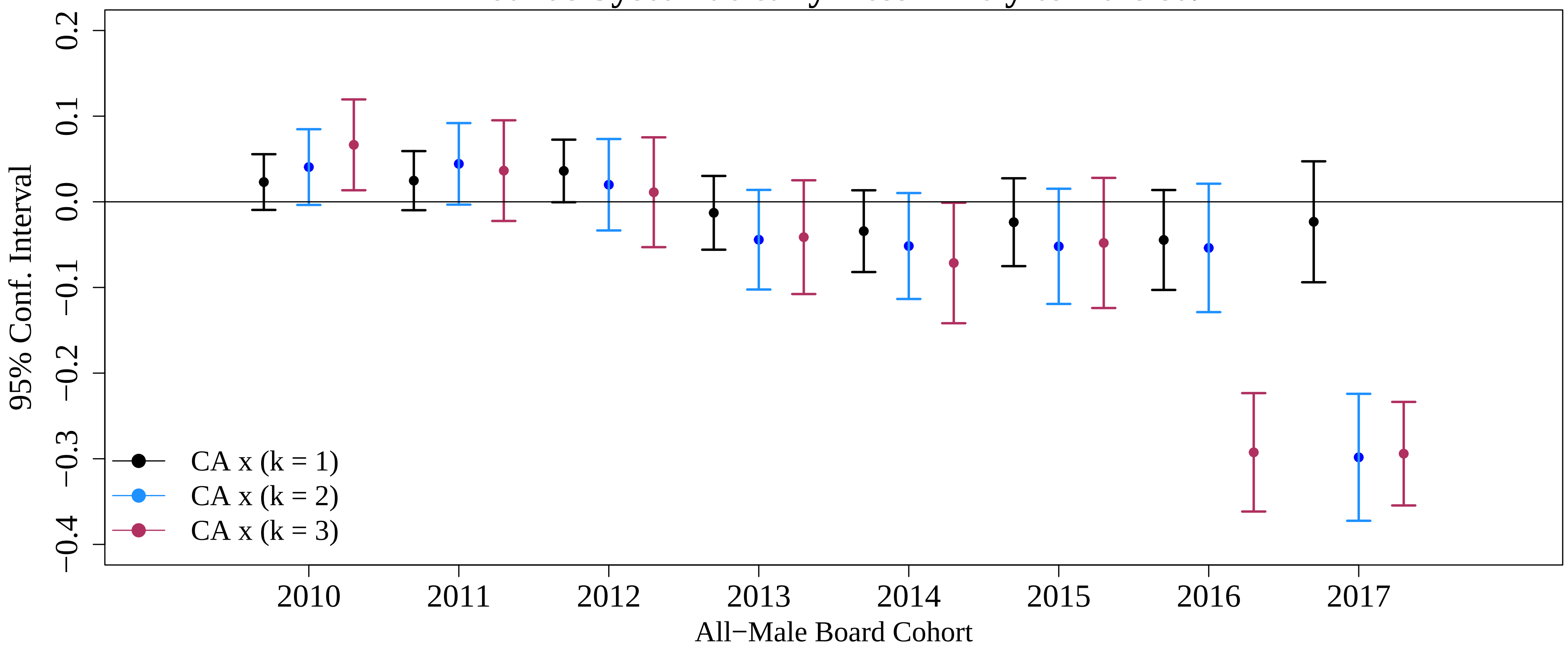
Figure A3



Notes: CA SB 826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of any listed company with HQ in CA by 12/31/2019. Listed companies have shares listed on the NASDAQ, NYSE, or NYSE American. The sample tracks an unbalanced panel of firms that were domestic and listed in 2017, the year before SB 826 was signed.

Figure A4

Differential Mean Reversion: Are California−Based Companies with All−Male Boards Systematically Less Likely to Persist?



Note: Point estimates for each cohort represent

$$\beta_{tk} := \Pr\left(AMB_{t+k} \middle| AMB_t, \text{ CA HQ}\right) - \Pr\left(AMB_{t+k} \middle| AMB_t, \text{ non−CA HQ}\right)$$

CA SB 826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of listed firms with HQ in CA by 12/31/2019.

Table I: Sample Size

This table shows the sample size by year. Column 2 shows the sample size for all listed firms. Column 3 shows the sample size for California-based companies, Column 4 shows the number of California-based companies with all-male boards, and Column 5 shows the share of California-based companies with all-male boards. Columns 6-8 present the analogous statistics for non-California based companies. The sample restricts to domestic and listed companies that report board gender and headquarter location. The annual gender composition of corporate boards is provided by BoardEx and reflects the board's composition as of the company's annual report date. Headquarter location is triangulated from Compustat Snapshot, BoardEx, and SEC filings. The universe of listed companies is derived from CRSP. "AMB" refers to companies with All-Male Boards. CA's SB826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of any listed firm with HQ in CA by 12/31/2019.

		HQ in CA			HQ outside of CA		
Year	N: All Firms	N	N: AMB	Pr(AMB)	N	N: AMB	Pr(AMB)
2015	4013	664	266	0.40	3349	1134	0.34
2016	3872	647	242	0.37	3225	1021	0.32
2017	3845	644	204	0.32	3201	942	0.29
2018	3817	658	166	0.25	3159	760	0.24
2019	3795	671	59	0.09	3124	582	0.19
2020	3861	702	24	0.03	3159	475	0.15
2021	3977	772	12	0.02	3205	314	0.10

Table II: Firm Characteristics in 2017

This table shows the characteristics of treated and control firms in 2017. Treated firms have CA-headquarters and all-male boards in 2017, while control firms have non-CA-headquarters and all-male boards in 2017. Differences and p-values from two-sided t-tests are presented. See Table A12 for variable definitions.

	CA-HQ	Outside CA-HQ	Diff	P-Value	N: CA-HQ	N: Outside-CA-HQ
Boardroom Characteristics						
Board Size	6.38	6.75	-0.37	0.00	204	942
Expand Board	0.19	0.16	0.03	0.29	204	942
Drop Male	0.43	0.39	0.04	0.35	204	941
Incoming Male	0.33	0.29	0.04	0.34	204	940
Prior Board Experience	0.81	0.77	0.04	0.03	204	941
Prior C-Suite Experience	0.69	0.61	0.08	0.00	204	941
Prior Same-Sector Exp.	0.51	0.44	0.07	0.01	204	941
Non-Executive Director	0.78	0.80	-0.02	0.03	204	940
Prior Conx w/Board	0.57	0.54	0.03	0.24	204	940
Prior Brd-Brd Conx	0.41	0.38	0.03	0.26	204	939
Prior Conx w/ C-Suite	0.49	0.44	0.05	0.03	204	940
Prior Same-Gender Conx	0.56	0.54	0.03	0.22	204	942
MBA Degree	0.39	0.34	0.05	0.01	204	940
Ivy League Degree	0.25	0.24	0.00	0.81	191	852
Log(Pred. Comp.)	5.54	5.52	0.02	0.26	191	852
Dual CEO/Chair Role	0.38	0.37	0.00	0.94	194	887
Director Age	61.00	61.66	-0.66	0.14	204	940
Governance Outcomes						
CEO Turnover	0.13	0.13	-0.01	0.86	175	765
1(Lawsuit Filed)	0.06	0.04	0.02	0.18	204	942
1(Delist)	0.02	0.01	0.01	0.23	202	941
1(Merger or Reorg)	0.00	0.00	0.00	0.90	193	876
1(Dividend)	0.14	0.36	-0.22	0.00	194	896
1(Incr. Shares $\geq$ 5%)	0.04	0.04	-0.01	0.72	175	825
1(Decr. Shares $\geq$ 5%)	0.06	0.07	-0.01	0.74	170	806
Audit Share	0.73	0.73	0.00	0.77	170	806
Compensation Share	0.69	0.66	0.03	0.07	188	856
Nominating Share	0.63	0.58	0.06	0.01	194	895
Other Share	0.03	0.05	-0.02	0.00	204	942

Continued on next page

Table II: Firm Characteristics in 2017 *(continued)*

	CA-HQ	Outside CA-HQ	Diff	P-Value	N: CA-HQ	N: Outside-CA-HQ
Avg Committee Load	2.90	2.72	0.17	0.02	189	875
Firm Characteristics						
Return on Assets	-0.30	-0.12	-0.18	0.00	204	942
Return on Equity	-0.63	-0.23	-0.40	0.00	204	942
Log(Tobin's Q)	0.79	0.50	0.30	0.00	204	942
Log(Market to Book)	1.16	0.83	0.33	0.00	204	942
Cash Flows	-0.27	-0.09	-0.18	0.00	204	942
Log(Employees, 1000s)	0.41	0.58	-0.17	0.00	203	938
Capital Intensity	0.03	0.04	-0.01	0.07	203	938
Fin. Outcome Index	-0.13	0.00	-0.13	0.01	203	938
Age	16.07	19.32	-3.25	0.00	203	938
Log(Market Value)	5.37	5.54	-0.16	0.22	203	938
Industry Composition						
Agri., Forest., Fish.	0.00	0.00	0.00	0.59	204	942
Construction	0.00	0.01	-0.01	0.26	204	942
Fin., Insur., Real Estate	0.08	0.18	-0.10	0.00	204	942
Manufacturing	0.34	0.26	0.08	0.03	204	942
Mining	0.01	0.09	-0.08	0.00	204	942
Non-Classified	0.34	0.23	0.12	0.00	204	942
Retail Trade	0.01	0.03	-0.02	0.06	204	942
Services	0.16	0.12	0.04	0.14	204	942
Trans., Comm., Utils.	0.02	0.06	-0.03	0.01	204	942
Wholesale Trade	0.02	0.03	-0.01	0.53	204	942

Table III: Effects of the Gender Quota on Board Composition

This table reports the first-stage effects of the quota. The outcome variables are: the male share of the board (Column 1), an indicator for an all-male board (Column 2), board size (Column 3), an indicator for board expansion (Column 4), and an indicator for the removal of at least one male director (Column 5). The sample restricts to an unbalanced panel of firms that were domestic, listed, and had all-male boards in 2017. The time period covered is 2015 - 2021, with reported effects relative to the 2017 baseline. Standard errors are clustered at the firm level. Treated firms have CA headquarters and all-male boards as of 2017. Sample sizes vary due to missing values of the outcome variable. CA SB 826, approved on 9/30/2018, mandated at least 1 woman be on the corporate board of any listed with HQ in CA by 12/31/2019. Standard errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Dependent Variables:	Male Share	1(All-Male)	Board Size	1(Expand)	1(Dropped)
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
$CA_{2017} \times$ 2015	-0.007	-0.043	0.114	-0.036	0.046
	(0.005)	(0.029)	(0.108)	(0.050)	(0.056)
$CA_{2017} \times$ 2016	-0.0007	-0.005	0.050	-0.043	-0.009
	(0.003)	(0.021)	(0.084)	(0.045)	(0.053)
$CA_{2017} \times$ 2018	-0.006	-0.028	0.060	0.037	0.025
	(0.006)	(0.036)	(0.087)	(0.055)	(0.055)
$CA_{2017} \times$ 2019	-0.056***	-0.300***	0.223**	0.135***	-0.004
	(0.008)	(0.038)	(0.112)	(0.052)	(0.056)
$CA_{2017} \times$ 2020	-0.078***	-0.298***	0.172	-0.024	0.055
	(0.008)	(0.032)	(0.124)	(0.051)	(0.060)
$CA_{2017} \times$ 2021	-0.106***	-0.239***	0.311**	0.064	-0.018
	(0.010)	(0.025)	(0.135)	(0.054)	(0.060)
Fixed-effects					
Firm	Yes	Yes	Yes	Yes	Yes
Year-SIC	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	6,910	6,910	6,910	6,670	6,670
Dep. Var. Mean	0.945	0.692	6.90	0.228	0.414
Number of Firms	1,146	1,146	1,146	1,139	1,139

Table IV: Ahern-Dittmar (2012) and Bertrand et al. (2019) First-Stage Specification

This table shows the first-stage point estimates using the standard shift-share instrument used in prior literature. Column 1 shows the point estimates for the male share of the board using the sample of all non-California listed companies. Column 2 shows the analogous point estimates using the sample of all California-based listed companies. The sample consists of an unbalanced panel of firms that were domestic and publicly listed in 2017 and observed from 2017–2021. Standard errors are clustered at the firm level. All specifications include firm and year fixed effects. The specification interacts year indicators with the firm's 2017 male board-share. Board composition data are from BoardEx organizational summary files, which record director rosters as of the firm's annual report date. California SB 826, approved on September 30, 2018, required at least one female director on the boards of publicly listed firms headquartered in California by December 31, 2019.

	All listed Non-CA Companies	All listed CA Companies
Dependent Variable:	Male Share of Board	
Model:	(1)	(2)
Variables		
Male Share in 2017 × Year = 2018	-0.098***	-0.131***
	(0.009)	(0.022)
Male Share in 2017 × Year = 2019	-0.196***	-0.366***
	(0.013)	(0.031)
Male Share in 2017 × Year = 2020	-0.286***	-0.474***
	(0.015)	(0.034)
Male Share in 2017 × Year = 2021	-0.373***	-0.623***
	(0.017)	(0.040)
Year = 2018	0.064***	0.094***
	(0.008)	(0.019)
Year = 2019	0.124***	0.248***
	(0.011)	(0.026)
Year = 2020	0.181***	0.307***
	(0.013)	(0.030)
Year = 2021	0.231***	0.383***
	(0.015)	(0.034)
Fixed Effects		
Firm	Yes	Yes
Fit Statistics		
Observations	14,177	2,857
Dependent variable mean	0.816	0.796
F-test	2,354.9	413.3
Number of Firms	3,201	644

Table V: Effects of the Gender Quota on Human Capital Measures and Professional Networks

This table shows the reduced-form and 2SLS effects of the quota on boardroom level human capital measures and professional connections. Columns 1-3 show demographic measures including average age, share male, and share with an MBA degree. Columns 4-6 show experience measures, such as share with prior board experience, share with prior c-suite experience, and share with prior sector experience. Columns 7-11 show connection measures, including share with a prior board connection, share with a prior connection formed at a previous boardroom, share with a prior connection to the c-suite, share with a prior connection to the same gender, and the share who are non-executive directors. The sample restricts to all directors within firms that were domestic, listed, and had all-male boards as of 2017. Regressions weighted by inverse of board size. The time period covered is 2015 - 2020, with reported effects relative to the 2017 baseline. Standard errors clustered at the firm level. Treated firms have CA headquarters and all-male boards as of 2017. Director-level characteristics measured upon year of onboarding. Experience and connections gained through work spells in non-listed companies are counted. Industry variable used in the fixed effects are derived from 4 digit SIC codes provided by CRSP. Sample sizes vary due to missing values of director characteristics. Standard errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

	Demographics			Experience			Connections				
Dependent Variables:	Age	Male	MBA	Brd Exp	C-Suite Exp	Sector Exp	Brd Conx	Brd-Brd Conx	C-Suite Conx	Same Gen Brd Conx	Non-Exec Dir.
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variables											
$CA_{2017} \times$ 2015	0.231	-0.007	-0.005	0.013	-0.002	0.007	0.004	0.013	-0.004	0.001	0.013*
	(0.285)	(0.005)	(0.012)	(0.010)	(0.011)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.007)
$CA_{2017} \times$ 2016	-0.039	-0.0007	0.003	0.006	0.003	0.005	-0.006	-0.004	-0.007	-0.005	0.003
	(0.196)	(0.003)	(0.009)	(0.006)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)	(0.006)
$CA_{2017} \times$ 2018	0.035	-0.007	-0.011	-0.004	-0.006	0.016*	-0.015	-0.002	-0.014	-0.022*	0.010*
	(0.179)	(0.006)	(0.009)	(0.008)	(0.009)	(0.009)	(0.012)	(0.010)	(0.010)	(0.011)	(0.006)
$CA_{2017} \times$ 2019	-0.175	-0.056***	-0.015	-0.025**	-0.023*	0.003	-0.028*	-0.024*	-0.023	-0.049***	0.013*
	(0.249)	(0.008)	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)	(0.013)	(0.014)	(0.013)	(0.007)
$CA_{2017} \times$ 2020	-0.111	-0.078***	-0.022	-0.033**	-0.029**	0.010	-0.026	-0.033**	-0.014	-0.053***	0.006
	(0.309)	(0.008)	(0.013)	(0.014)	(0.014)	(0.015)	(0.016)	(0.016)	(0.017)	(0.015)	(0.008)
2SLS											
$1(\widehat{GenDivBrd})$	-0.610	-0.224***	-0.056	-0.111***	-0.089**	0.000	-0.078*	-0.102**	-0.045	-0.156***	0.015
	(0.855)	(0.015)	(0.039)	(0.041)	(0.041)	(0.041)	(0.046)	(0.044)	(0.046)	(0.041)	(0.020)
Fixed-effects											
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-SIC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics											
F-test (1st stage)	238.8	241.1	207.8	237.2	237.2	237.2	231.1	231.1	216.0	231.1	241.1
Observations	40,969	41,567	37,161	41,029	41,029	41,029	39,978	39,978	38,801	39,978	41,567
Dep. Var. Mean	61.9	0.956	0.354	0.759	0.618	0.454	0.529	0.354	0.429	0.512	0.808
Number of Firms	1,146	1,146	1,145	1,146	1,146	1,146	1,145	1,145	1,145	1,145	1,146

Table VI: Characteristics of Incoming, Exiting, and Retained Directors by Treatment Status

This table shows the characteristics of entering, retained, and exiting directors for treated and control firms. Treated firms have CA-HQ and all-male boards in 2017, while control firms have non-CA-HQ and all-male boards in 2017. Entering (Exiting) directors join (leave) sometime between 2018 - 2020. Retained directors remain with the company between 2017 - 2020. See Table A12 for variable definitions. An asterisk (*) indicates that the difference between the treatment and control groups is statistically significant at the 5% level, based on two-sided t-tests. Tests are performed separately for incoming women (comparing California HQ vs Non-California HQ), incoming men, exiting men, and retained men.

	California HQ				Non-California HQ			
	Entering F	Entering M	Exiting M	Retained M	Entering F	Entering M	Exiting M	Retained M
Age & Education								
Age	56.79	56.34	62.37	60.73*	55.90	56.18	62.80	61.56
MBA Degree	0.33	0.33	0.39	0.39*	0.32	0.35	0.34	0.35
Experience								
Prior Board Experience	0.56	0.69	0.81	0.80	0.58	0.67	0.77	0.77
Prior C-Suite Experience	0.63	0.64	0.67*	0.70*	0.62	0.64	0.58	0.61
Prior Same Sector Exp.	0.48	0.59	0.54*	0.52*	0.42	0.53	0.46	0.44
Log(Pred. Compensation)	4.82	5.11	5.26	5.27	4.82	5.06	5.31	5.30
Connections								
Prior Conx w/Board	0.31	0.37*	0.55	0.58	0.29	0.49	0.56	0.55
Prior Board Conx w/Board	0.08	0.13*	0.39	0.41	0.09	0.20	0.38	0.38
Prior Conx w/ C-Suite	0.20	0.30	0.46	0.50*	0.17	0.33	0.44	0.45
Prior Same Gender Conx	0.03	0.35*	0.54	0.58	0.03	0.47	0.55	0.54
Non-Executive Director	0.93	0.80	0.83	0.78	0.95	0.80	0.83	0.80
Committee Composition								
Number of Committees	1.87	2.44	2.77	2.81*	1.90	2.15	2.66	2.66
Audit Committee	0.53	0.62	0.63	0.69	0.57	0.62	0.65	0.68
Compensation Committee	0.51	0.60	0.66	0.64	0.47	0.51	0.63	0.62
Nominating Committee	0.54	0.54*	0.62*	0.60	0.50	0.41	0.55	0.56
Other Committee	0.04	0.03*	0.04*	0.05*	0.06	0.08	0.07	0.07
Sample Size								
Number of Positions	210	221	422	925	558	1040	1740	4777
Number of Directors	206	219	411	904	541	1023	1692	4528
Number of Companies	145	103	151	195	437	488	653	902

Table VII: Characteristics of Incoming Directors by Gender

This table shows the characteristics of male and female directors, measured at the beginning of the directorship. The sample restricts to all incoming directors within domestic and listed companies. The time period considered is 2015 - 2020. Raw means and p-values from a two sided t-test reported. See Table A12 for variable definitions.

	Male	Female	Difference	P Value
Age & Education				
Age	57.03	56.07	0.96	0.00
MBA Degree	0.38	0.38	0.00	0.83
Ivy League Degree	0.27	0.27	0.00	0.91
Law Degree	0.10	0.12	-0.02	0.00
Experience				
Prior Board Experience	0.83	0.72	0.11	0.00
Prior C-Suite Experience	0.70	0.67	0.03	0.00
Prior Same Sector Experience	0.55	0.43	0.12	0.00
Connections				
Prior Connection to Incumbent Board	0.61	0.39	0.21	0.00
Prior Board Connection with Incumbent Board	0.41	0.19	0.22	0.00
Prior Connections to the C-Suite	0.50	0.28	0.22	0.00
Prior Same Gender Connection to Incumbent Board	0.59	0.14	0.45	0.00
Non-Executive Director	0.82	0.95	-0.13	0.00
Sample Size				
Number of Positions	20412	6492		
Number of Directors	16434	4896		
Number of Companies	4516	3581		

Table A1: Compliance with SB826's 2021 Requirements by Year and Headquarter Location

This table reports firms' compliance with SB826's stricter 2021 board gender requirements, evaluated using board composition as of 2017 and 2021. Column (2) reports Shortfall, defined as the number of additional female directors a firm would need to appoint to satisfy the 2021 requirements of SB 826—three women for boards with six or more directors, two women for boards with five directors, and one woman for boards with four directors. Columns (3) and (4) show the number of firms associated with each shortfall value in 2017 and 2021, respectively. Columns (5) and (6) report the corresponding shares of firms meeting each shortfall value in 2017 and 2021. The final column highlights that a substantial fraction of California-based firms remained non-compliant with the stricter 2021 requirements as of 2021. The sample includes domestic, publicly listed firms observed in 2017 and 2021. Board gender composition is measured as of firms' annual report dates using BoardEx Organizational Summary files. Headquarters location is triangulated from Compustat Snapshot, BoardEx, and SEC filings, and the listed firm universe is defined using CRSP.

Headquarter Location	Shortfall	N: 2017	N: 2021	Share: 2017	Share: 2021
California	0	76	488	0.118	0.626
California	1	176	209	0.273	0.268
California	2	252	78	0.391	0.100
California	3	140	5	0.217	0.006
Outside California	0	524	1127	0.164	0.346
Outside California	1	845	1131	0.264	0.348
Outside California	2	1139	819	0.356	0.252
Outside California	3	693	176	0.216	0.054

Table A2: Share of BoardEx Companies Matched with the Following:

This table reports match rates between the primary BoardEx dataset and firm-level identifiers in CRSP and Compustat. Column (2) restricts the sample to BoardEx firms classified as Quoted and headquartered in the United States that report annual board gender composition. The BoardEx–CRSP–Compustat linkage is obtained from the WRDS crosswalk. Financial statement data are drawn from Compustat Annual Fundamentals, while exchange listing information is taken from the CRSP Names file. Geographic identifiers reflect both the state of the firm's principal executive offices and the country of incorporation, as reported in Compustat Snapshot. When unavailable, geographic information is supplemented using the WRDS SEC Analytics Suite (Item regstatehdq). For remaining missing observations in years after 2019, geographic identifiers are sourced from BoardEx header-level company profile files.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	BoardEx N	CRSP/ Compustat	Annual Financials	Listing Exchange	Geographic Identifiers	All of (2-6)
2015	4188	0.967	0.950	0.962	0.960	0.941
2016	4030	0.969	0.953	0.965	0.963	0.944
2017	4000	0.970	0.956	0.966	0.963	0.947
2018	3980	0.967	0.955	0.963	0.960	0.948
2019	3971	0.960	0.952	0.956	0.958	0.948
2020	4149	0.933	0.926	0.929	0.933	0.921
2021	4546	0.874	0.866	0.874	0.874	0.866

Table A3: Characteristics of Gender-Diverse Boards Versus All-Male Boards

This table shows the characteristics of firms with all-male boards and gender-diverse boards in 2017. Differences and p-values from two-sided t-tests are presented. See Table A12 for variable definitions.

	AMB	Gender-Diverse Board	Diff	P-Value	N: AMB	N: Diverse
Boardroom Characteristics						
Board Size	6.69	9.13	-2.45	0.00	1146	2699
Expand Board	0.17	0.26	-0.09	0.00	1146	2699
Drop Male	0.40	0.47	-0.07	0.00	1145	2699
Incoming Male	0.30	0.34	-0.04	0.02	1144	2699
Prior Board Experience	0.78	0.78	0.00	0.93	1145	2699
Prior C-Suite Experience	0.63	0.65	-0.03	0.00	1145	2699
Prior Same-Sector Exp.	0.45	0.42	0.04	0.00	1145	2699
Non-Executive Director	0.79	0.85	-0.06	0.00	1144	2699
Prior Conx w/Board	0.55	0.48	0.06	0.00	1144	2699
Prior Brd-Brd Conx	0.38	0.29	0.09	0.00	1143	2697
Prior Conx w/ C-Suite	0.44	0.38	0.07	0.00	1144	2699
Prior Same-Gender Conx	0.54	0.41	0.13	0.00	1146	2699
MBA Degree	0.35	0.38	-0.03	0.00	1144	2699
Ivy League Degree	0.24	0.27	-0.03	0.00	1043	2581
Log(Pred. Comp.)	5.53	5.45	0.08	0.00	1043	2581
Dual CEO/Chair Role	0.38	0.34	0.04	0.04	1081	2604
Director Age	61.54	61.97	-0.42	0.03	1144	2699
Governance Outcomes						
CEO Turnover	0.13	0.12	0.01	0.27	940	2396
1(Lawsuit Filed)	0.04	0.03	0.01	0.05	1146	2699
1(Delist)	0.01	0.00	0.01	0.01	1143	2698
1(Merger or Reorg)	0.00	0.00	0.00	0.07	1069	2565
1(Dividend)	0.32	0.55	-0.23	0.00	1090	2586
1(Incr. Shares $\geq$ 5%)	0.04	0.02	0.02	0.00	1000	2455
1(Decr. Shares $\geq$ 5%)	0.07	0.05	0.02	0.03	976	2370
Audit Share	0.73	0.57	0.15	0.00	976	2370
Compensation Share	0.67	0.52	0.14	0.00	1044	2436
Nominating Share	0.59	0.48	0.10	0.00	1089	2577
Other Share	0.05	0.09	-0.04	0.00	1146	2699
Avg Committee Load	2.75	2.53	0.22	0.00	1064	2499

Continued on next page

Table A3: Characteristics of Gender-Diverse Boards Versus All-Male Boards *(continued)*

	AMB	Gender-Diverse Board	Diff	P-Value	N: AMB	N: Diverse
Firm Characteristics						
Return on Assets	-0.15	-0.03	-0.12	0.00	1146	2699
Return on Equity	-0.30	-0.04	-0.26	0.00	1146	2699
Log(Tobin's Q)	0.55	0.57	-0.02	0.44	1146	2699
Log(Market to Book)	0.89	1.01	-0.13	0.00	1146	2699
Cash Flows	-0.12	0.00	-0.12	0.00	1146	2699
Log(Employees, 1000s)	0.55	1.46	-0.91	0.00	1141	2696
Capital Intensity	0.03	0.03	0.00	0.08	1141	2696
Fin. Outcome Index	-0.27	0.00	-0.27	0.00	1141	2696
Age	18.74	26.32	-7.58	0.00	1141	2696
Log(Market Value)	5.51	7.35	-1.84	0.00	1141	2696
Industry Composition						
Agri., Forest., Fish.	0.00	0.00	0.00	0.50	1146	2699
Construction	0.01	0.01	0.00	0.98	1146	2699
Fin., Insur., Real Estate	0.16	0.26	-0.09	0.00	1146	2699
Manufacturing	0.27	0.27	0.00	0.82	1146	2699
Mining	0.07	0.03	0.04	0.00	1146	2699
Non-Classified	0.25	0.14	0.11	0.00	1146	2699
Public Administration	0.00	0.00	0.00	0.16	1146	2699
Retail Trade	0.03	0.06	-0.03	0.00	1146	2699
Services	0.12	0.13	-0.01	0.43	1146	2699
Trans., Comm., Utils.	0.05	0.07	-0.02	0.01	1146	2699
Wholesale Trade	0.03	0.03	0.00	0.71	1146	2699

Table A4: Growing Firms Adopt Gender Diverse Boards: Sun and Abraham Estimates

This table presents Sun and Abraham event-study estimates of the effect of adopting gender-diverse boards on firm financial outcomes. The dependent variable is log assets in column (1), log revenues in column (2), and log employment in column (3). The sample consists of an unbalanced panel of all domestic, publicly listed firms observed between 2010 and 2017. Estimated effects are reported relative to one year prior to the adoption of a gender-diverse board. Event time is binned at four or more years before adoption and three or more years after adoption. Firms transition from all-male to gender-diverse boards at some point during the 2010–2017 period; firm-year observations for companies that are always gender-diverse when observed are excluded. Observations with negative revenues or cost of goods sold are dropped. Standard errors are clustered at the firm level. Financial variables are drawn from Compustat Annual Fundamentals. Industry classifications follow OSHA's crosswalk mapping four-digit SIC codes into 11 broad industry divisions, with SIC codes obtained from the CRSP Names file. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Dependent Variables:	Log(Assets)	Log(Revenues)	Log(Employees)
Model:	(1)	(2)	(3)
Variables			
Year relative to Diverse adoption = -4	-0.025	0.003	0.0005
	(0.030)	(0.031)	(0.013)
Year relative to Diverse adoption = -3	-0.050**	-0.035	-0.026***
	(0.025)	(0.025)	(0.009)
Year relative to Diverse adoption = -2	-0.022	-0.014	-0.016***
	(0.014)	(0.016)	(0.005)
Year relative to Diverse adoption = 0	0.044***	0.048***	0.020***
	(0.013)	(0.018)	(0.006)
Year relative to Diverse adoption = 1	0.065***	0.068**	0.022***
	(0.020)	(0.027)	(0.008)
Year relative to Diverse adoption = 2	0.073**	0.082**	0.040***
	(0.029)	(0.036)	(0.012)
Year relative to Diverse adoption = 3	0.073*	0.082*	0.058***
	(0.038)	(0.046)	(0.017)
Fixed-effects			
Firm	Yes	Yes	Yes
Year-SIC	Yes	Yes	Yes
Fit statistics			
Observations	15,639	15,611	15,400
Dependent variable mean	6.05	5.16	0.776
F-test	600.2	552.6	941.2
Number of Firms	2,881	2,875	2,850

Table A5: Non-Compliance, Evasion, and Attrition

This table documents sample attrition and compliance patterns for treated and control firms over time. In 2017, all treated and control firms have all-male boards, and the sample size is maximized in that year. Beginning after 2017, a subset of firms adopts gender-diverse boards, while others attrit from the sample. Treated firms are those headquartered in California and publicly listed as of 2017; control firms are publicly listed firms headquartered in other U.S. states as of 2017. Columns (3)–(6) are constructed using BoardEx organizational summary files, which report firms' annual board gender composition. Firms may drop out of BoardEx coverage if they go private, cease operations, or if BoardEx does not report board gender composition as of the firm's annual reporting date. Column (7) is based on CRSP's Delisting file and defines a firm as delisted if none of its securities remain listed in the subsequent year. The final column reports headquarters location, triangulated using data from Compustat Snapshot, BoardEx, and SEC filings.

Firm Status	Year	N: AMB	N: Diverse	N	Change in N	N: Delist	N: Change HQ
Treated	2015	151	23	174	NA	0	2
Treated	2016	179	12	191	17	0	5
Treated	2017	204	0	204	13	4	2
Treated	2018	135	48	183	-21	8	3
Treated	2019	40	131	171	-12	14	4
Treated	2020	16	143	159	-12	12	3
Treated	2021	6	140	146	-13	10	4
Control	2015	722	75	797	NA	0	19
Control	2016	804	46	850	53	0	16
Control	2017	942	0	942	92	7	30
Control	2018	654	202	856	-86	42	23
Control	2019	431	367	798	-58	77	18
Control	2020	300	436	736	-62	46	25
Control	2021	186	495	681	-55	39	11

Table A6: Differential Attrition?

Annual Board Gender Reporting Rates

This table reports attrition rates for treatment and control firms over time. By construction, there is no attrition in 2017, as treatment and control firms are defined as those with all-male boards in that year. Columns (4)–(7) present differences in attrition rates between treatment and control firms, along with two-sided t-test p-values and year-specific sample sizes for each group. The sample is restricted to firms that (i) had all-male boards in 2017 and (ii) were publicly listed and domestic in that year. Annual board gender composition is obtained from BoardEx Organizational Summary files. Attrition occurs when a firm goes private, ceases operations, or when BoardEx does not report board gender composition as of the firm's annual reporting date.

Year	California HQ	Outside CA HQ	Diff	P-Val	N: California HQ	N: Outside CA HQ
2015	0.85	0.85	0.01	0.80	174	797
2016	0.94	0.90	0.03	0.09	191	850
2017	1.00	1.00	0.00	1.00	204	942
2018	0.90	0.91	-0.01	0.62	183	856
2019	0.84	0.85	-0.01	0.75	171	798
2020	0.78	0.78	0.00	0.95	159	736
2021	0.72	0.72	-0.01	0.84	146	681

Table A7: Industry Composition by FTSE International Classification

This table shows the industry composition for treated and control firms: California and non-California based companies with all-male boards in 2017 respectively. Industries are categorized based on the FTSE classification from BoardEx and ordered based on descending CA share.

Sector	CA share	N: CA	Outside CA share	N: Outside CA
Pharmaceuticals and Biotechnology	0.23	47	0.12	111
Software and Computer Services	0.11	22	0.06	54
Health	0.10	20	0.05	46
Information Technology Hardware	0.10	20	0.02	19
Electronic and Electrical Equipment	0.07	14	0.07	64
Real Estate	0.04	9	0.07	64
Business Services	0.04	8	0.03	33
Telecommunication Services	0.04	8	0.02	16
Banks	0.03	6	0.06	60
Engineering and Machinery	0.02	5	0.04	37
Food Producers and Processors	0.02	5	0.02	15
Media and Entertainment	0.02	5	0.02	19
Renewable Energy	0.02	5	0.01	9
Speciality and Other Finance	0.02	4	0.05	45
Beverages	0.01	3	0.00	2
Clothing and Personal Products	0.01	3	0.00	4
General Retailers	0.01	3	0.02	16
Containers and Packaging	0.01	2	0.00	1
Insurance	0.01	2	0.02	15
Automobiles and Parts	0.00	1	0.01	9
Blank Check / Shell Companies	0.00	1	0.00	2
Construction and Building Materials	0.00	1	0.03	32
Education	0.00	1	0.00	1
Electricity	0.00	1	0.00	4
Household Products	0.00	1	0.01	7
Investment Companies	0.00	1	0.02	19
Leisure and Hotels	0.00	1	0.03	24
Leisure Goods	0.00	1	0.01	5
Oil and Gas	0.00	1	0.12	109
Private Equity	0.00	1	0.01	5
Steel and Other Metals	0.00	1	0.01	8
Utilities - Other	0.00	1	0.00	3
Aerospace and Defence	0.00	0	0.01	5
Chemicals	0.00	0	0.01	13
Consumer Services	0.00	0	0.00	4
Diversified Industrials	0.00	0	0.01	6
Food and Drug Retailers	0.00	0	0.00	2
Forestry and Paper	0.00	0	0.00	2
Life Assurance	0.00	0	0.00	3
Mining	0.00	0	0.02	21
Publishing	0.00	0	0.00	2
Tobacco	0.00	0	0.00	1
Transport	0.00	0	0.03	25

Table A8: Dynamic Effects of the Gender Quota on Board Composition: Robustness Checks

This table presents a series of first-stage robustness checks. Columns (1)–(7) use an indicator for an all-male board as the outcome variable, while columns (8)–(14) use an indicator for board expansion as the outcome. The sample is an unbalanced panel of domestic, publicly listed firms observed between 2015 and 2021, with effects reported relative to the 2017 baseline. Standard errors are clustered at the firm level. Column (1) includes a control for firm size, proxied by log revenues, and restricts the sample to firms with all-male boards in 2017. Column (2) further restricts the control group to firms headquartered in Democratic states (states that voted for Hillary Clinton in the 2016 presidential election). Column (3) restricts the sample to firms that had all-male boards throughout 2015–2017. Column (4) restricts the sample to firms with small boards, defined as having fewer than seven directors (the median board size) in 2017. Column (5) restricts the sample to firms in male-dominated industries, defined as industries with below-average female board representation in the 2017 cross-section. Column (6) imposes no additional sample restrictions and expands the sample to all listed firms to run a triple-differences specification. Column (7) also includes all listed firms but redefines treatment and control groups as California and non-California firms, respectively. Columns (8)–(14) apply the same sequence of sample restrictions for the board expansion outcome. California SB 826, approved on September 30, 2018, required listed firms headquartered in California to have at least one female director by December 31, 2019. Significance levels are denoted by *** (1%), ** (5%), and * (10%).

Dependent Variables:	1(All-Male Board)							1(Expand Board)						
	Size Control	Dem. Subsample	AMB 2015-2017	Small Brd	Male Industry	Triple Diff	CA Treated	Size Control	Dem. Subsample	AMB 2015-2017	Small Brd	Male Industry	Triple Diff	CA Treated
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Variables														
Treated × Year = 2015	-0.022	-0.040	0.0009	-0.030	-0.045	-0.107***	0.017	0.007	-0.054	0.004	0.036	-0.063	-0.041	-0.005
	(0.029)	(0.031)	(0.002)	(0.042)	(0.036)	(0.035)	(0.018)	(0.053)	(0.054)	(0.055)	(0.061)	(0.066)	(0.061)	(0.030)
Treated × Year = 2016	-0.005	-0.004	0.002	0.022	-0.007	-0.055**	0.021	-0.017	-0.063	-0.080*	-0.102**	-0.082	-0.034	-0.026
	(0.021)	(0.022)	(0.002)	(0.029)	(0.026)	(0.025)	(0.014)	(0.047)	(0.049)	(0.047)	(0.047)	(0.058)	(0.058)	(0.029)
Treated × Year = 2018	-0.042	-0.049	-0.008	-0.055	-0.024	-0.032	-0.009	0.051	0.039	0.046	0.040	0.030	0.054	-0.007
	(0.039)	(0.039)	(0.041)	(0.049)	(0.044)	(0.037)	(0.013)	(0.056)	(0.058)	(0.063)	(0.069)	(0.069)	(0.065)	(0.030)
Treated × Year = 2019	-0.281***	-0.331***	-0.303***	-0.364***	-0.322***	-0.301***	-0.094***	0.160***	0.102*	0.151***	0.197***	0.142**	0.079	0.073**
	(0.041)	(0.043)	(0.045)	(0.056)	(0.047)	(0.038)	(0.020)	(0.055)	(0.056)	(0.058)	(0.063)	(0.066)	(0.062)	(0.029)
Treated × Year = 2020	-0.299***	-0.334***	-0.329***	-0.389***	-0.283***	-0.306***	-0.088***	0.040	-0.031	-0.037	-0.028	-0.066	0.006	-0.021
	(0.033)	(0.037)	(0.034)	(0.048)	(0.039)	(0.032)	(0.021)	(0.054)	(0.054)	(0.058)	(0.066)	(0.063)	(0.061)	(0.029)
Treated × Year = 2021	-0.236***	-0.223***	-0.210***	-0.308***	-0.240***	-0.239***	-0.068***	0.109**	0.032	0.068	-0.027	0.083	-0.026	0.077**
	(0.027)	(0.031)	(0.030)	(0.040)	(0.029)	(0.025)	(0.021)	(0.054)	(0.059)	(0.060)	(0.068)	(0.069)	(0.065)	(0.031)
Log(Revenues)	-0.031***							0.004						
	(0.010)							(0.010)						
Fixed-effects														
Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-SIC	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes
1(CA HQ)-Year						Yes							Yes	
1(AMB)-Year						Yes							Yes	
Fit statistics														
Observations	6,233	4,013	5,426	3,237	4,094	24,038	24,016	6,056	3,865	5,366	3,116	3,899	23,464	23,448
Dependent variable mean	0.690	0.683	0.729	0.725	0.689	0.226	0.226	0.227	0.234	0.217	0.203	0.235	0.257	0.257
Number of Firms	1,096	685	866	536	692	3,845	3,845	1,090	675	866	532	686	3,830	3,830

Table A9: Triple Differences: Within-State Control is Compliant with 2021 Requirements in 2017

This table reports triple-differences point estimates of the effect of California's board gender quota on boardroom-level characteristics. Relative to the baseline triple-differences specification, the within-group control firms in this table are those that were already compliant with SB 826's stricter 2021 requirements as of 2017. Column 1 is the male share of the board, Column 2 is an indicator for all-male board, Column 3 is board size, Column 4 is an indicator variable for board expansion, Column 5 is an indicator variable for whether a male was dropped from the board. The sample consists of an unbalanced panel of domestic, publicly listed firms observed in 2017 that had either all-male boards or boards compliant with the 2021 requirements (76 California firms), and is followed over the period 2015–2021, with 2017 as the baseline year. Standard errors are clustered at the firm level. SB 826 mandated that California-headquartered listed firms have at least one female director by December 31, 2019. *Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Dependent Variables:	Male Share of Board	1(All-Male Board)	Board Size	1(Expand Board)	1(Male Dropped)
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Treated × Year = 2015	-0.032**	-0.070**	0.346	-0.023	0.012
	(0.014)	(0.035)	(0.211)	(0.105)	(0.108)
Treated × Year = 2016	-0.014	-0.004	0.223	0.005	0.098
	(0.011)	(0.020)	(0.162)	(0.088)	(0.104)
Treated × Year = 2018	-0.017*	-0.039	0.080	0.127	0.083
	(0.010)	(0.038)	(0.160)	(0.102)	(0.102)
Treated × Year = 2019	-0.072***	-0.316***	0.076	0.087	0.137
	(0.012)	(0.040)	(0.204)	(0.092)	(0.097)
Treated × Year = 2020	-0.087***	-0.332***	0.003	0.0002	0.023
	(0.014)	(0.037)	(0.223)	(0.099)	(0.099)
Treated × Year = 2021	-0.113***	-0.281***	0.136	0.055	0.043
	(0.016)	(0.032)	(0.242)	(0.095)	(0.103)
Fixed effects					
Firm	Yes	Yes	Yes	Yes	Yes
1(CA HQ)-Year	Yes	Yes	Yes	Yes	Yes
1(AMB)-Year	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	10,821	10,821	10,821	10,543	10,543
Dep. Var. Mean	0.850	0.445	8.22	0.249	0.446
Number of Firms	1,746	1,746	1,746	1,739	1,739

Table A10: Potential Labor Supply: Number of Women with Top-Level Experience in 2017

This table compares, by industry, the number of female directorships in 2017 with the number of treated firms in 2017. Female directorships substantially exceed the number of treated firms across industries, indicating a large supply of potential female board candidates. All variables are constructed from BoardEx employment history files, which record board members' career histories. Industry classifications follow the FTSE sector definitions provided by BoardEx. Industries are ordered by the number of treated firms—defined as publicly listed firms headquartered in California as of 2017.

Sector	Any Position	Board Position	C-Suite Position	N: Treated Firms
Pharmaceuticals and Biotechnology	746	310	182	47
Software and Computer Services	710	243	117	22
Health	360	206	75	20
Information Technology Hardware	248	87	45	20
Electronic and Electrical Equipment	360	226	46	14
Real Estate	351	251	47	9
Business Services	364	186	58	8
Telecommunication Services	212	76	31	8
Banks	1043	649	138	6
Engineering and Machinery	243	140	42	5
Food Producers and Processors	205	127	31	5
Media and Entertainment	171	85	33	5
Renewable Energy	46	32	6	5
Speciality and Other Finance	472	213	76	4
Beverages	71	24	18	3
Clothing and Personal Products	191	108	30	3
General Retailers	421	219	93	3
Containers and Packaging	40	28	5	2
Insurance	323	157	71	2
Automobiles and Parts	127	65	20	1
Blank Check / Shell Companies	2	1	0	1
Construction and Building Materials	134	101	13	1
Education	36	21	7	1
Electricity	64	23	11	1
Household Products	123	80	17	1
Investment Companies	110	89	9	1
Leisure and Hotels	375	205	76	1
Leisure Goods	46	30	6	1
Oil and Gas	238	146	32	1
Private Equity	41	12	4	1
Steel and Other Metals	56	40	8	1
Utilities - Other	274	168	46	1

Table A11: Abnormal Returns on October 1st, 2018

This table reports abnormal stock returns on the announcement day of California's board gender quota. The sample reports mean abnormal returns on Monday, October 1, 2018, for firms that were domestic, publicly listed, and headquartered in California as of 2017. SB 826 was announced on Sunday, September 30, 2018, making October 1 the first trading day following the announcement. For each firm, abnormal returns are computed as observed returns minus expected returns, where expected returns are obtained from a market-model regression estimated over the 252 trading days from September 15, 2017 to September 15, 2018. The CRSP value-weighted index is used as the market return. The sample excludes firms with fewer than 100 observations in the estimation window and firms with missing returns on October 1, 2018. Shortfall measures the number of additional female directors a firm would need—based on its 2017 board composition—to comply with all phases of SB 826. Daily stock returns are obtained from CRSP; for firms with multiple securities, the security with the highest average trading volume between January 2, 2015 and March 31, 2022 is used. Annual board gender composition and board size are drawn from BoardEx Organizational Summary files.

			Parametric Tests		Non-Parametric Tests	
	Abnormal Return	N Firms	T-Test	Patell (1976) T-Test	Cowan (1992) Sign-Test	Wilcoxon (1945) Signed Rank Test
Shortfall 0	-0.006	76	***	***	***	***
Shortfall 1	-0.010	169	***	***	***	***
Shortfall 2	-0.012	243	***	***	***	***
Shortfall 3	-0.009	135		***	***	***

Table A12: Variable Definitions, Data Sources, and Summary Statistics

This table shows the variable definitions along with summary statistics. Summary statistics are calculated from the 2017 cross-section and comprise only firms in the treated and control groups (California all-male board companies and non-California all-male board companies). Windsorized variables use the 1st and 99th percentiles of the sample distribution.

Variable	Description	Source	Mean	SD	Min	Max	Median
Boardroom Characteristics							
Board Size	Number of directors on the board	BoardEx	6.686	1.798	1.000	15.000	7.000
Expand Board	Indicator for board size increase	BoardEx	0.167	0.373	0.000	1.000	0.000
Drop Male	Indicator for male director dropped	BoardEx	0.399	0.490	0.000	1.000	0.000
Incoming Male	Indicator for male director added	BoardEx	0.301	0.459	0.000	1.000	0.000
Prior Board Exp.	Share with prior board experience	BoardEx	0.780	0.230	0.000	1.000	0.833
Prior C-Suite Exp.	Share with prior C-suite experience	BoardEx	0.626	0.234	0.000	1.000	0.667
Prior Sector Exp.	Share with prior same-sector exp.	BoardEx	0.454	0.315	0.000	1.000	0.400
Non-Exec Dir.	Share of non-executive directors	BoardEx	0.795	0.110	0.000	1.000	0.833
Prior Conx/Board	Prior connections to board	BoardEx	0.546	0.299	0.000	1.000	0.571
Prior Brd-Brd Conx	Prior board connections to board	BoardEx	0.382	0.335	0.000	1.000	0.333
Prior Conx/C-Suite	Prior connections to C-suite	BoardEx	0.444	0.308	0.000	1.000	0.400
Prior Same-Gen Conx	Prior same-gender connections	BoardEx	0.542	0.302	0.000	1.000	0.571
MBA Degree	Share of directors with MBA	BoardEx	0.348	0.229	0.000	1.000	0.333
Ivy League	Share of directors with Ivy degree	BoardEx	0.244	0.224	0.000	1.000	0.200
Log(Pred. Comp.)	Natural log of pred. compensation	Constructed	5.528	0.226	4.257	6.348	5.542
Dual CEO/Chair	Indicator for CEO/Chair duality	BoardEx	0.375	0.484	0.000	1.000	0.000
Director Age	Average age of directors	BoardEx	61.541	5.931	37.667	80.500	61.750
Governance Outcomes							
CEO Turnover	Indicator for CEO turnover	BoardEx	0.130	0.336	0.000	1.000	0.000
1(Lawsuit Filed)	Securities class action filed	Stanford	0.044	0.204	0.000	1.000	0.000
1(Delist)	Indicator for firm delisting	CRSP	0.010	0.098	0.000	1.000	0.000
1(Merger/Reorg)	Indicator for merger or reorg	CRSP	0.004	0.066	0.000	1.000	0.000
1(Dividend)	Indicator for dividend payment	CRSP	0.320	0.467	0.000	1.000	0.000
1(Incr Shares $\geq$ 5%)	Share increase $\geq$ 5%	CRSP	0.044	0.204	0.000	1.000	0.000
1(Decr Shares $\geq$ 5%)	Share decrease $\geq$ 5%	CRSP	0.069	0.253	0.000	1.000	0.000
Audit Share	Share on audit committee	BoardEx	0.729	0.208	0.000	1.000	0.714
Comp. Share	Share on compensation committee	BoardEx	0.665	0.256	0.000	1.000	0.667
Nominating Share	Share on nominating committee	BoardEx	0.588	0.324	0.000	1.000	0.600
Other Share	Share on other committees	BoardEx	0.048	0.107	0.000	0.556	0.000

Continued on next page

Table A12: Variable Definitions, Data Sources, and Summary Statistics *(continued)*

Variable	**Description**	**Source**	**Mean**	**SD**	**Min**	**Max**	**Median**
Avg Comm. Load	Avg committees per director	BoardEx	2.752	0.928	1.000	6.500	2.600
Firm Characteristics							
Return on Assets	Net income / total assets	Compustat	-0.151	0.391	-1.741	0.307	0.001
Return on Equity	Net income / total equity	Compustat	-0.301	1.056	-5.789	1.449	0.014
Log(Tobin's Q)	Natural log of Tobin's Q	Compustat	0.549	0.714	-0.699	9.103	0.359
Log(Mkt to Book)	Natural log of market-to-book	Compustat	0.886	1.087	-1.620	9.674	0.717
Cash Flow	Cash flow measure	Compustat	-0.123	0.403	-1.766	0.348	0.015
Log(Employees)	Natural log of employees (1000s)	Compustat	0.546	0.744	0.000	4.830	0.200
Capital Intensity	Cap-ex / total assets	Compustat	0.035	0.055	0.000	0.271	0.015
Fin. Outcome Index	Standardized index	Constructed	-0.023	0.566	-2.497	4.912	0.000
Firm Age	Firm age since IPO	Compustat	18.742	14.739	0.000	93.000	15.000
Log(Market Value)	Natural log of market value	Compustat	5.509	1.744	1.155	10.510	5.517

Table A13: Effects of the Gender Quota: Heterogeneity and Robustness

This table shows the reduced form effects of the quota. In the baseline DiD model, treated firms are listed firms headquartered in California with all-male boards in 2017, while control firms are listed firms headquartered outside California with all-male boards in 2017. The CA treated column expands the treated and control groups to all California- and non-California-headquartered firms in 2017, regardless of board gender composition. The size control specification adds a control for firm size (log revenues) to the baseline specification. The Democratic Subsample specification estimates the baseline specification but restricts the control group to firms headquartered in states that voted Democratic in the 2016 presidential election. The Male Industry column estimates the baseline specification but restricts the sample to firms in male-dominated industries, defined as those with below-average female board representation based on the 2017 cross-section. The triple differences specification uses all listed firms, leveraging variation before and after the quota, between California and non-California firms, and between all-male and gender-diverse boards prior to the quota. The Ahern–Dittmar shift-share specification restricts the sample to California-based firms and estimates a firm and year fixed-effects specification, where the reported coefficient is the interaction between the male board share in 2017 and an indicator for years greater than or equal to 2018. The time period covered is 2015 – 2021. Standard errors are clustered at the firm level. See data appendix for variable definitions.

	(1) Baseline	(2) CA Treated	(3) Size Control	(4) Dem. Subsample	(5) Male Industry	(6) Triple Diff	(7) Ahern-Dittmar
Compliance							
1(All-Male Board)	-0.262	-0.091	-0.269	-0.279	-0.272	-0.271	-2.002
	(0.027)	(0.018)	(0.028)	(0.031)	(0.032)	(0.027)	(0.122)
Male Share	-0.075	-0.040	-0.078	-0.074	-0.077	-0.079	-0.382
	(0.007)	(0.004)	(0.007)	(0.008)	(0.008)	(0.007)	(0.024)
Board Size	0.180	0.257	0.236	0.199	0.167	0.215	0.599
	(0.095)	(0.051)	(0.090)	(0.100)	(0.105)	(0.094)	(0.370)
Expand Board	0.067	0.052	0.068	0.045	0.073	0.068	0.205
	(0.029)	(0.015)	(0.030)	(0.031)	(0.035)	(0.029)	(0.169)
Drop Male	-0.004	0.018	-0.005	-0.011	-0.031	-0.002	0.493
	(0.035)	(0.019)	(0.035)	(0.037)	(0.043)	(0.035)	(0.184)
Incoming Male	-0.052	-0.017	-0.050	-0.058	-0.080	-0.053	-0.354
	(0.030)	(0.018)	(0.031)	(0.033)	(0.036)	(0.029)	(0.179)
Boardroom Characteristics							
Board Experience	-0.031	-0.013	-0.035	-0.028	-0.020	-0.039	-0.092

Table A13 – continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.011)	(0.005)	(0.011)	(0.012)	(0.012)	(0.011)	(0.037)
C-Suite Experience	-0.025	-0.012	-0.027	-0.033	-0.017	-0.024	-0.098
	(0.011)	(0.005)	(0.011)	(0.012)	(0.013)	(0.011)	(0.038)
Sector Experience	-0.001	-0.000	-0.002	-0.001	0.017	-0.002	0.004
	(0.012)	(0.005)	(0.011)	(0.012)	(0.015)	(0.011)	(0.036)
Non-Exec Dir	0.003	0.004	0.004	0.004	0.001	0.006	0.058
	(0.006)	(0.003)	(0.006)	(0.006)	(0.007)	(0.006)	(0.020)
Prior Brd-Conx	-0.021	-0.013	-0.020	-0.019	-0.022	-0.034	-0.117
	(0.013)	(0.006)	(0.013)	(0.014)	(0.015)	(0.013)	(0.047)
Prior Brd-Brd Conx	-0.028	-0.020	-0.029	-0.025	-0.031	-0.044	-0.102
	(0.012)	(0.006)	(0.012)	(0.013)	(0.015)	(0.013)	(0.102)
Prior C-Suite Conx	-0.012	-0.013	-0.008	-0.005	-0.006	-0.028	-0.123
	(0.013)	(0.006)	(0.013)	(0.014)	(0.016)	(0.013)	(0.048)
Prior SG Conx	-0.044	-0.027	-0.042	-0.042	-0.052	-0.057	-0.230
	(0.012)	(0.006)	(0.012)	(0.013)	(0.014)	(0.012)	(0.043)
MBA Degree	-0.018	-0.013	-0.015	-0.021	-0.019	-0.023	0.010
	(0.011)	(0.005)	(0.011)	(0.012)	(0.014)	(0.011)	(0.049)
Ivy League Degree	-0.010	0.001	-0.008	-0.009	-0.002	-0.014	-0.080
	(0.009)	(0.005)	(0.009)	(0.010)	(0.012)	(0.009)	(0.032)
Log(Pred Comp)	-0.019	-0.011	-0.023	-0.016	-0.004	-0.024	-0.182
	(0.015)	(0.007)	(0.015)	(0.016)	(0.017)	(0.014)	(0.058)
Financial Outcomes							
ROA	0.046	0.035	0.040	0.038	0.040	0.055	0.214
	(0.022)	(0.009)	(0.021)	(0.024)	(0.028)	(0.022)	(0.085)
ROE	0.072	0.090	0.067	0.051	0.083	0.083	0.442
	(0.074)	(0.032)	(0.073)	(0.078)	(0.097)	(0.073)	(0.318)
Log(Q)	0.071	0.044	0.070	0.057	0.074	0.065	-0.311
	(0.041)	(0.019)	(0.041)	(0.042)	(0.051)	(0.041)	(0.164)
Log(M-to-B)	0.099	0.086	0.097	0.085	0.118	0.102	-0.640
	(0.065)	(0.032)	(0.065)	(0.068)	(0.083)	(0.066)	(0.264)
Cash Flow	0.045	0.034	0.040	0.038	0.038	0.054	0.216
	(0.022)	(0.009)	(0.021)	(0.024)	(0.028)	(0.022)	(0.088)
Log(Employment)	0.023	0.056	0.017	0.021	0.034	0.029	-0.059
	(0.015)	(0.011)	(0.014)	(0.017)	(0.017)	(0.029)	(0.065)
Cap Intensity	0.004	0.002	0.004	0.002	0.004	0.006	0.013

Table A13 – continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.010)
Governance Outcomes							
CEO-Chairman	0.021	-0.003	0.021	0.025	0.032	0.014	0.026
	(0.023)	(0.015)	(0.022)	(0.026)	(0.032)	(0.023)	(0.090)
CEO Turnover	0.026	0.007	0.010	0.023	0.014	0.024	0.164
	(0.027)	(0.014)	(0.027)	(0.029)	(0.035)	(0.027)	(1.142)
1(Lawsuit)	0.003	0.002	0.006	0.003	-0.004	0.003	-0.058
	(0.012)	(0.007)	(0.012)	(0.012)	(0.016)	(0.012)	(0.077)
1(Delist)	0.001	-0.002	-0.001	-0.001	-0.002	0.001	0.126
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.014)	(0.050)
1(Merger)	-0.001	-0.001	-0.000	-0.001	-0.001	0.003	0.024
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.010)	(0.040)
1(Dividend)	0.011	-0.002	0.005	0.026	0.011	0.017	0.046
	(0.016)	(0.008)	(0.016)	(0.017)	(0.017)	(0.015)	(0.055)
1(Shares Decr)	0.029	0.009	0.029	0.018	0.025	0.020	0.141
	(0.016)	(0.007)	(0.017)	(0.018)	(0.021)	(0.014)	(0.086)
1(Shares Incr)	0.007	0.005	0.003	-0.000	0.000	-0.004	0.137
	(0.018)	(0.009)	(0.018)	(0.019)	(0.023)	(0.016)	(0.102)
Committee Composition							
Audit Share	-0.019	-0.011	-0.024	-0.013	-0.035	-0.024	-0.080
	(0.012)	(0.006)	(0.012)	(0.013)	(0.015)	(0.012)	(0.042)
Comp. Share	-0.001	-0.004	-0.002	0.005	-0.013	-0.004	-0.037
	(0.012)	(0.006)	(0.012)	(0.013)	(0.014)	(0.012)	(0.041)
Nom. Share	-0.007	-0.009	-0.009	0.000	-0.010	-0.007	-0.018
	(0.014)	(0.006)	(0.014)	(0.015)	(0.017)	(0.014)	(0.048)
Other Share	-0.008	0.003	-0.008	-0.011	0.000	-0.006	0.007
	(0.006)	(0.003)	(0.006)	(0.006)	(0.006)	(0.005)	(0.020)
Avg. Load	-0.062	-0.050	-0.085	-0.051	-0.028	-0.071	0.050
	(0.054)	(0.026)	(0.052)	(0.057)	(0.070)	(0.055)	(0.259)