Gender and Professional Networks on Bank Boards

Ann L. Owen, Judit Temesvary and Andrew Wei

Gender and Professional Networks on Bank Boards*

Ann L. Owen

Hamilton College, Clinton, NY, USA

aowen@hamilton.edu

Judit Temesvary**

Federal Reserve Board, Washington, DC, USA

Judit.temesvary@frb.gov

Andrew Wei

Federal Reserve Board, Washington, DC, USA

Andrew.L.Wei@frb.gov

July 2021

Abstract

Women are underrepresented on bank boards. Using a newly compiled dataset of bank board membership over the 1999-2018 period, we find that within-board professional networks are extensive, but female board members are significantly less connected than male directors, both in number and length of connections. We also find that professional networks play an important role in determining the appointment of bank board directors. Connections also positively impact compensation for female directors, especially connections to other women. These results suggest that there are differences in the breadth, depth, and value of the professional networks of male and female board members and that these differences could be a contributing channel through which women's underrepresentation on boards prevails.

Keywords: bank boards; professional networks; gender; gender diversity

JEL Codes: G21; G34; J16

1 Introduction

Social networks are important. Networks within an organization have the potential to improve the flow of information, resolve agency problems, and reduce information asymmetry, making an organization operate more efficiently. [2] In segregated networks, however, social connections form on similarity in gender, age, and income (Schelling, 1969; Henry et al., 2011). Individuals with different characteristics from the in-group can be excluded from important connections and be deprived of benefits provided by the network (Montgomery, 1991). In finance, women, who have fewer connections to male-dominated executive networks, are heavily underrepresented among executives while they are overrepresented in non-executive positions (Fuhrmans, 2020; Liao et al, 2019; Catalyst, 2015).[3] In this paper, we find evidence that networks play a role in generating the (under)representation of women on bank board of directors.

Utilizing a new and unique data set from Boardex, we explore the relationship between professional networks and the employment and compensation of directors. We provide evidence on three important aspects of the extent and nature of professional networks within bank boards. First, we examine the relationship between gender and professional networks of bank directors to describe these within-board networks and the ways in which they differ for male and female directors. We show that women are significantly less connected than male directors, both in the number and length of connections. Second, we show that connections play an important role in director appointments. Finally, we examine the relationship between professional networks and

---

[2] However, networks also have the potential to decrease efficiency if they serve as systematic barriers to those not in the network and an impediment to more meritocratic operations.

[3] A related literature cites the lack of informal social connections as the largest barrier to female directorships (Adams and Ferreira 2009; Medland, 2004; Fan et al. 2019).

the compensation of bank directors and find that better connected female directors earn more, especially when they are connected to other women. We find no such effect for male directors.

We draw these conclusions using a unique database on the professional and social connections of individual directors on the boards of a large number of U.S. banks. This new database, obtained from Boardex, enables us to link each director with every other director with whom that person had a previous connection with, creating a measure of the extent and nature of within-board connections. We link this database with additional director and bank characteristics (from Boardex) and with bank balance sheet and financial traits (from the Call Reports). Our use of regulatory balance sheet and financial data allows us to retain private banks as well in our sample. In total, our dataset includes 11,097 individual directors who serve on the boards of 717 banks over the 1999-2018 time period – providing a detailed view of banks and their boards. The unique breadth and granularity of our database enables us to provide convincing evidence on the role of connections in appointments to boards using a matching estimation procedure.[4]

Our data and methodology are unique contributions to the literature and allow us to draw new conclusions about the professional network relationships within the boardroom. By focusing on the connections a director has to other directors on the same bank board, our approach differs from that in prior work. Related previous studies typically examine the overall social capital of board members or CEOs (Omer et al., 2014; El-Khatib et al., 2015), social connections between board members and executives (e.g., Berger et al., 2013; Hwang and Kim, 2009), or social

---

[4] We match each director to another director with similar characteristics and test if appointed directors have more connections to the board they were appointed to relative to the matched director. Our use of matching estimators is based on Malmendier and Tate (2009) and Abadie and Imbens (2011).

connections between executives and CEOs (Kramarz and Thesmar, 2013; Fracassi and Tate, 2012).

Our results make several important contributions to the literature. First, to our knowledge, we are the first to examine the gender dimension of networks within bank boards, and to find evidence that male and female networks matter for the recruitment of appointed bank directors. Specifically, our results suggest that candidates with stronger connections to a specific bank are more likely to be appointed as directors of that bank and that the strength of these effects differs across the gender of appointed directors. This gendered dimension to the role of networks in appointments combined with the fact that female networks are less extensive could explain why women are underrepresented on bank boards.[5] In addition, our analysis of gendered connections adds a new perspective to the literature examining director networks (Kramarz and Thesmar, 2013; Kim and Lee, 2018; Fracassi and Tate, 2012; Omer et al., 2014; Cohen et al., 1998; Bang Dan Nguyen, 2012; Hwang and Kim, 2009; Liu, 2008;). Finally, to our knowledge we are also first to examine the relationship between the gendered dimension of director connectedness and compensation.[6]

The paper proceeds as follows: In Section 2, we review the related literature in more detail and we describe the data in Section 3. We describe male and female networks in Section 4 and outline our matching methods and discuss our results in Section 5. We show results relating to compensation in Section 6 and conclude in Section 7.

2 Literature Review

---

[5] We also provide empirical evidence consistent with the sociology literature that men and women have fundamentally different networks (O'Neil et al., 2011; Forret and Dougherty, 2004).
[6] Compensation decisions result from negotiations between the board and the CEO (Lalanne and Seabright, 2014; Hermalin and Weisbach, 1998; Bebchuk et al, 2002).

The extensive literature related to our work can be divided into several strands. The first strand of these papers, which spans the disciplines of sociology, psychology, and economics, examines gendered dimensions of professional networks in the workplace. A general conclusion of this strand is that the structure of male and female networks depends on organizational context (Sapadin, 1988; Friebel and Seabright, 2011; Fischer and Oliker, 1983; Booth, 1972; Aguilera, 2008). For instance, there is evidence that women enjoy large networks outside the workplace, but experience exclusion from male networks inside the workplace (Moore, 1990; Campbell, 1998; Tharenou, 1999). Consistent with these papers, we find evidence of significant differences in the size and gender of networks between male and female directors on bank boards.

The second strand of related literature consists of papers that show evidence of the importance of networks in corporate (specifically, bank) leadership. A male-dominated organizational culture may drive women to develop their own separate informal networks, excluding them from top management positions and reducing the benefits women derive from influential networks (Birema, 2005; Huffman and Torres, 2002; Markiewicz et al., 2000; Schor, 1997; Ibarra, 1992, 1997; Ragins and McFarlin, 1989; Burt, 1998). For example, Lalanne and Seabright (2014) suggest that lower presumed workplace legitimacy makes women less willing to utilize prestigious connections, making their social capital less valuable. There is evidence that women utilize networks differently compared to men. Specifically, women may perceive their networks as a source of competition, while men use their networks for career advancement (Felton et al., 2003; Borghans et al., 2009; Powell and Ansic, 1997). In a related manner, we find that networks, including same-gender networks, play an important role in determining the gender composition of bank boards.

A third, related, strand of literature specifically examines the relationship between board connectedness and compensation. Horton et al. (2012) find that directors with more social capital (more connections to directors at other firms in the UK) enjoy higher director compensation. Ryan and Wiggins (2004) show that independent directors have more equity (rather than direct cash-based compensation.) Previous papers focusing on CEO compensation show that bank CEOs earn more when they have a longer relationship with the board (Byrd et al., 2010), when directors have stronger networks (Renneboog and Zhao, 2011), and when directors have stronger social ties with the CEO (Hwang and Kim, 2009; Lee et al., 2014). We present some suggestive evidence that female directors who are connected to other board members earn more total compensation, but that effect is larger when they are connected to other women. This result emphasizes the importance of the gendered dimension of networks.

3 Data Description

Our main research questions involve understanding the nature and extent of professional networks on bank boards and their impact. For this purpose, we need data on social and professional connections, characteristics of bank board members, and characteristics of banks.

We collect data on connections and director characteristics from Boardex. The Boardex data is comprehensive, allowing us to avoid extensive imputation. We construct two datasets: one at the director level and the other at the bank level. The two datasets cover the 1999-2018 period with quarterly frequency, and consist of 11,097 unique individuals who served as directors at 717 banks; both individuals and banks are observed over time. This results in 469,010 director-quarter and 70,792 bank-quarter observations. This is a significantly larger sample than the datasets used in related papers (e.g. Kramarz and Thesmar, 2013; Fracassi and Tate, 2012).

We use identifier mapping provided by the Federal Reserve Bank of New York and Compustat to match banks' identifiers from the Boardex data on individual directors with bank balance sheet measures derived from the Call Reports. For those observations where such mapping is not available, we use a probabilistic matching methodology (Baxster et al., 2003).[7]

3.1 Connections

Measures of connections within the bank boards are of primary interest in our study, and we calculate several different types of connections. All of these measures of connectedness start with a basic definition of "connected": We define two directors as connected if they were at the same institution at the same time prior to being on the same bank board at the time of observation. We examine a range of institutions to search for these connections including those related to education, business, and charities.[8] For example, we identify two directors currently serving on the board of bank i in quarter t as being connected if, previously, they attended the same school at the same time. We would also count them as connected if they overlapped at any of the different types of organizations that are listed in Table 1. We create a second type of connections measure that captures the length of director connections by accounting for the total years a director is connected to others on the board. As the composition of boards change over time, the number of connections

---

[7] We use the Stata packages *matchit* and *reclink*. We run many matching iterations to maximize accuracy and sample size. In each iteration, we generate the set of all possible matches, removing matches we cannot separately verify. We also adjust relative weights given to bank names and addresses and recycle unmatched banks to the next iteration. After utilizing the mappings and probabilistic matching, we match 687 Boardex banks to their RSSD crosswalk, a unique identifier assigned to financial institutions by the Federal Reserve. After additional eliminations due to data availability, our final sample consists of 577 unique banks.

 Probabilistic matching uses string distance approximation to rank bank names and addresses by similarity. In particular, probabilistic matching enables us to include private banks with no ISIN identifier or ticker in some of our analysis, giving us a larger sample of banks.

[8] We place similar restrictions on the timing of connections as Fracassi and Tate (2012) and Intintoli et al. (2018). We only count employment connections if two directors overlapped simultaneously at a company different than the bank we count connections for. We only count education connections if directors graduated within 2 years of each other. We place no restrictions on the timing of other activities.

of individual directors will change with it. In addition, the same directors can become connected outside the board over time if they subsequently join the same organizations after becoming directors.

We use this director-level connection data to construct several additional measures of connectedness at the director and bank level, normalizing them to account for scale effects due to differences in board sizes. For each connectedness measure, we construct two indices. We construct unweighted connection indices as well as indices that capture both the number and length of connections.

The first measure of director connections, *%Board Connected*, is the share of directors on the same board to whom an individual is connected in a given quarter. This index is a measure of how connected a director is to the board. For example, a value of zero for this measure implies no connections to directors on the same board and a value of one implies connections to every director on the same board. The median director in our sample is connected to 24 percent of other directors on the same board (Table 2).

The second measure of director connections, *%Female Connected*, is the share of female directors on the same board an individual is connected to in a given quarter. This index is calculated for both men and women and is a measure of how connected a director is to female directors on the same board. For example, a value of zero for this measure implies no connections to any female directors on the same board, and a value of one implies that an individual is connected to every female director on the same board. The measure is not defined for boards with no women. Even conditional on there being women on the board, the average director is connected to only 22 percent of female directors on the board, and the median is zero (Table 2). In comparison, our third measure of director connections, *%Male Connected¸* has a mean of 24

percent and median of eight percent. Therefore, the average director has fewer connections with female board members than with male board members. This relatively lower share of previous connections is consistent with the historically lower representation of women in corporate and executive circles.

We also construct connections measures that account for the length of connections. Specifically, *Connection-Years / Director* is the cumulative number of years of a director's connections divided by the number of directors on the board, *Female Connection-Years / Woman* is the cumulative years of a director's female connections divided by the number of female directors on the board, and *Male Connection-Years / Man* is the cumulative years of a director's male connections divided by the number of male directors on the board. These connections measures capture the length of a director's connections. Table 2 reveals that the average connection length is somewhat longer among male directors (0.85 years) than female directors (0.70 years).

3.2 Director and Bank Match Variables

In director matching estimations, we match directors along a set of characteristics that potentially influence our outcomes of interest (connections and compensation). We limit the number and type of variables we include to prioritize the match on age, experience, education, and employment, the characteristics most likely to influence connections. Including match variables that are uncorrelated or weakly correlated with connections may decrease match quality by decreasing the influence of variables important to connections in determining the match.

We capture characteristics that influence connections by including as part of our set of match variables a director's age (*Age*), the total number of years spent on bank boards (*Bank Board Experience*), the number of bank boards a director sits on (*Current Bank Employment*), and an

indicator if a director attended post-secondary schooling (*Grad School*). The average director in our sample is 60 years old, spent 10 years on bank boards, and sits on 1.6 bank boards (Table 2). In addition, 44 percent of directors in our sample attended graduate school.

We also perform a separate bank matching estimation in which we match bank boards based on a set of bank match variables including the average characteristics of the board and the total assets of the bank. We measure the average characteristics of the board with five bank-level variables (*Average Age*, *Average Bank Board Experience*, *Average Current Bank Employment*, *Percent Grad School, and Percent Female*). The variables are generated by calculating the mean of director-level characteristics for all directors on the board. The mean bank board has directors with an average age of 57 years, average bank board experience of over 9 years and average tenure on the current board of 1.6 years. As mentioned in the introduction, women are heavily underrepresented on bank boards, with the average board having only one woman and the median board having no women on it. We also include an additional bank match variable, the natural log of total assets, *Ln(Total Assets)*. The average bank has assets totaling 15.3 billion dollars.

3.3 Compensation Data

In section 6, we perform matching estimations that test if connected directors earn a different compensation than unconnected directors. Compensation data is available for a subset of our sample from Boardex. *Total Compensation* measures a director's base annual pay plus cash bonuses and equity-linked compensation. It is measured in dollars, with the average director earning total compensation of $126,000. In our data, the average male director earns $105,000 and the average female director earns less, $99,000 per year.

4 Description of Male and Female Networks

The extent of connections of men and women in the quarter of appointment in our sample have not changed significantly over time (Figure 1). Over our entire sample period, on average about 14% of current board members are connected to newly appointed men, but slightly less (11%) are connected to newly appointed women. Table 1 describes the nature of the connections for all board members, indicating that for both men and women they are dominated by professional contacts at banks. About 75 percent of all connections for men and 81 percent of connections for women occur in private or quoted banks (Table 1). Consistent with informal connections being more prevalent in male networks, a greater share of connections for men occur in memberships at charities, clubs, and sporting organizations.

We explore how connection type and connection length differs between networks with different genders. Figure 2 further characterizes connections by type and shows how they differ by gender. For example, in Figure 2a, 90.16 percent of the connections between two female directors (FF) are business connections, 4.06 percent of the connections between a male and female director (MF) are the result of schooling, and 12.65 percent of the connections between two male directors (MM) are the result of other activities such as professional associations, charities or clubs. Figure 2a shows that connections between men in other activities occur at a rate twice as high as connections between women. Figure 2b provides the number of connections in our data in each category by gender of connections. Of course, because there are fewer female directors, there are many fewer connections with a female counterpart.

Figure 3a shows how the length of connections differs between men and women, indicating that connections between two male directors are more than twice as likely to exceed 10 years relative to connections between two female directors. Figure 3b shows the corresponding number of connections in each category. To the extent that longer connections also indicate stronger

connections, this suggests that the connections between men may be deeper. With that interpretation, Figures 2 and 3 show that that the networks of male board members may be broader and deeper: they come from a greater variety of interactions and are longer.

Differences in the extent and nature of networks of male and female board members could explain the underrepresentation of women on bank boards if connections are used in the appointment of directors. Although we follow up on the causal role of connections in appointments to boards with matching estimations discussed in the following section, we first present a fixed effects estimation that provides more descriptive correlations between the characteristics of the newly appointed directors and their connections to the bank board to which they are appointed. Because we include bank fixed effects in all estimations, essentially we compare the characteristics of directors appointed to the same bank. Table A-1 provides summary statistics for the estimation subsample that contains directors only in their quarter of appointment.

We present results of these fixed effects estimations in Table 3. The positive and significant coefficient on *Age* and *Bank Board Experience* in all specifications indicates that, as expected, older directors and those with more experience on bank boards have more connections to the bank board to which they are appointed. Age and experience should provide more opportunities to make connections. Our focus on gendered aspects of networks and their role in creating an underrepresentation of women makes us especially interested in the coefficient on the female dummy which is negative and significant in all estimations. Compared to men, the results in Table 3 indicate that, on average, the share of directors to which appointed women are connected is 3 percentage points lower, the share of female directors is 4.2 percentage points lower, and the share of male directors is 3 percentage points lower. With an average board size of about 8, about one in four newly appointed women will be connected to one less director than a man. In the next

12

section, we follow-up on these correlations with matching estimations that provide causal evidence for the role of connections in board appointments.

5 Methods and Results: Professional networks and Board Composition

We use two sets of matching estimations to provide a causal interpretation of the association between connections and appointments. In the first set, we match each individual director to a similar director appointed to a different bank. In the second set, we match each bank board to a similar board at another bank. Papers that use a similar matching procedure include Malmendier and Tate (2009), Girma and Gorg (2007), and Colak and Whited (2007).

5.1 Director Matching

Director matching estimations are constructed in two steps. In the first step, we match an appointed director with another director, and we calculate the difference in connections to the appointed director's bank. In the second step, we collapse pairs of matched directors into a single observation, then match pairs of men with pairs of women, and compare differences in connections between male and female pairs.

Specifically, in the first step, we match a director appointed to bank *b* with a director appointed to a bank different than *b*. To reduce the dimensionality of the match and ensure match quality, we impose several restrictions. In the first restriction, we require the matched director to have the same gender and the same quarter of appointment as the appointed director. This restriction reduces the number of match candidates and ensures that any differences between the matched directors do not result from differences in gender or time of appointment. In the second restriction, we require that all continuous variables (*Age*, *Bank Board Experience*, and *Current*

Bank Employment) match on quartiles in each quarter. This restriction prevents any matches across different segments of the distribution and excludes, for example, matches between the oldest and youngest directors.[9]

In the first step of matching, we create pairs of matched directors. One of the directors in the pair is designated as the appointed director and the connections of each director are calculated relative to the appointed director's bank. We perform a second step of matching to test if differences in connections between appointed and matched directors are larger for male directors. We difference the connections and characteristics of each matched pair relative to the appointed director (so that a positive age difference indicates the appointed director is older), collapse each matched pair into a single observation, and match each female pair with the male pair that minimizes the distance across the differenced match variables.[10]

It is important to note that our sample consists entirely of directors that were appointed to a bank. We do not have any individuals in our data that were candidates for a director position, but did not get appointed to a bank board at least once. Because of this, arguably all of the individuals in our data are qualified to be bank directors, but they do not all have the same number of connections to every bank. This aspect of our data makes it particularly well-suited to study the

---

[9] The restriction on quartiles also ensures that matches remain balanced across continuous match variables and prevents "edge" cases where a minimizing match disproportionately reduces the distance of one match variable at the cost of larger distances for other match variables. Although the restrictions we impose eliminate many potential matches, the average appointed director still has 19 match candidates. We finalize the match by selecting the candidate that simultaneously minimizes (the mahalanobis) distance across director match variables (Age, Bank Board Experience, Grad. School, and Current Bank Employment). For directors with multiple matches that equally minimize distance, we finalize the match randomly so that all matches are one-to-one. We also eliminate directors with no suitable candidates by dropping matches with distances beyond the 99th percentile.

[10] Intuitively, the matching in the second step chooses for each female pair the male pair with the closest match quality. By matching pairs with similar match qualities, we can account for the possibility that unrestricted differences in connections between men and women are caused by one gender having greater differences in match characteristics. The matching methodology is based on Malmendier and Tate (2009) and uses nearest-neighbor matching technology from Abadie and Imbens (2011).

within-board connections (as opposed to general social capital) that might earn an individual a board position.

A final point is that matching on propensity scores is an alternative to nearest-neighbor matching. Propensity score methods are appropriate when there is a clear treatment group and there exists data to predict the probability of treatment (e.g. Malmendier and Tate, 2009). In the appendix, we show that our results are robust to matching with this method.[11]

5.2 Director Balance Tests

In order to capture the excess connections responsible for a director's appointment, the matched director must be similar across characteristics that influence connections. In Table A5, we present balance tests. Columns 1 and 2 show the average within-pair difference in characteristics for male and female pairs and the p-values in columns 3 and 4 indicate that none of the differences in director characteristics are statistically significant. In Column 5, we report p-values and t-statistics for the second set of matching between male and female pairs. All differences are statistically insignificant. These balance tests validate the matching procedure.

5.3 Director Matching Results

In Table 4, columns (W) and (M) show, for each gender, differences in connections between appointed and matched directors. An interpretation of these differences is that they measure the extent a certain type of connection is used in the appointment of men or women. A positive

---

[11] In propensity matching, we predict the probability a matched pair is female with differences in match variables. We match each female pair with the male pair with the closest predicted probability of being female. We perform this procedure with the Stata command *teffects psmatch*. An alternative method from Malmendier and Tate (2009) predicts propensity scores separately and uses the propensity score as the sole match variable in a nearest-neighbor match. We show the results for both methods in the appendix. The second method that predicts propensity scores separately allows us to adjust for bias caused by differences in propensity scores between matched directors.

difference indicates that an appointed director is more connected to the board they were appointed to relative to some other matched director.

We find that all differences are significant both statistically and in terms of magnitude. Appointed women are connected to a share of directors that is 8.3 percentage points higher, a share of female directors that is 6.7 percentage points higher, and a share of male directors that is 8.6 percentage points higher. Appointed men are connected to a share of all directors that is 14.5 percentage points higher, a share of female directors that is 15.9 percentage points higher, and a share of male directors that is 14.5 percentage points higher. Although the magnitude of the effects differs, the results for both women and men indicate that connections to the board to which an individual is appointed matter in receiving the appointment. This is consistent with professional networks being a means by which individuals are recruited for bank boards.

If connections play a larger role in the appointment of men relative to the appointment of women, then the differences in connections we observe in the first two columns should be greater for men. Column (W – M) indicates that all differences between women and men are negative and statistically significant. The differences amount to 6.1 percentage points for overall connections, 9.15 percentage points for female connections, and 5.91 percentage points for male connections. This result suggests that networks are more important for men to receive appointments than women, or, possibly that men are able to use their connections to receive appointments in ways that women are not able to do so.

Finally, to address the possibility that remaining differences in match quality bias our results, we conduct a bias adjustment procedure from Abadie and Imbens (2011). This procedure accounts for the possibility that estimates from nearest-neighbor matching are less consistent when

multiple continuous match variables are used (Abadie and Imbens, 2006, 2011).[12] The results are nearly indistinguishable from those shown in Column (W − M).

5.4 Bank Matching

Director matching held bank characteristics constant by comparing connections each director in the pair had to the same bank board. In the next set of estimations, we present an alternative perspective by holding director characteristics constant in a bank matching estimation. We match an appointed director's board with a similar board, and we compare differences in the appointed director's connections to the appointed and matched board.

Specifically, we calculate connections for both the appointed and the matched board relative to the same appointed director i. We then test if i has greater connections to the board that appointed i relative to a matched board that did not appoint i.

We choose the matched board with a similar matching procedure and a similar set of restrictions as director level matching. First, we require the matched board to appoint a director, different than i, with the same gender and quarter of appointment as i. This restriction enables us to compare banks that made appointments of the same gender in the same quarter.[13] Second, we perform a similar balancing procedure by blocking matches on continuous variables by quartiles.[14] Balance tests shown in Table A5 support the validity of this procedure.[15]

---

[12] The procedure uses an OLS regression to predict the treatment outcome (i.e. the matched pair is female) with match variables as regressors.

[13] This addresses issues with selection bias, such as if the probability of appointment is correlated with characteristics that influence a board's connections.

[14] In the case that several matches equally minimize distance, we choose the final match randomly, and we drop matches with distances beyond the 99th percentile.

[15] All differences in characteristics are significant except for one test that is marginally significant with a p-value of 0.09. The fact that we perform many tests (> 10) increases the possibility that this significant result is due to chance.

Table 5 shows results for bank matching and indicate they are consistent with director matching. Relative to connections to a matched board, women are connected to a share of the board to which they are appointed that is 7.96 percentage points higher. The same difference is 15.2 percentage points for men. Column (W – M) indicates that differences in connections are greater for men. The one difference between the conclusions from the estimations reported in Table 5 and those reported in Table 4 is that in Table 5, for women, we find no difference in female connections to the appointed and matched board.

The results from our descriptive statistics and matching estimations indicate that 1) women are underrepresented on bank boards, 2) male board members have broader and deeper within-board networks, and 3) connections matter in making appointments to the board. Taken together, these results suggest that one of the reasons that women are underrepresented on bank boards is that, on average, they do not have the strong professional networks that men have.

6 Methods and Results: Professional networks and Compensation

A final dimension of the professional networks that we explore in this paper is their value in generating higher compensation for directors. Earlier, we showed that male and female networks differ along both qualitative and quantitative dimensions and we extend that analysis to include the ability of the connections to generate higher pay for directors.

6.1 Matching for Compensation

To examine the relationship between connections and director compensation, we follow a similar director matching procedure as explained above. We first form pairs by matching connected directors to unconnected directors. We then collapse each pair into a single observation by differencing compensation and characteristics relative to the connected director. In a second step

that allows us to test if connections influence men and women differently, we match each female pair with a male pair of directors and compare differences in compensation between the two genders.

There are several important differences between the matching for compensation and the matching for connections. First, when matching for compensation, the treatment group is composed of connected directors and the control group is composed of unconnected directors. In other words, each connected director is matched with an unconnected director with similar characteristics. In addition, when we estimate the impact of either male or female connections, we restrict the treatment group to directors with only male or only female connections. This restriction, in addition to the fact that compensation data is not available for all the directors in our sample, limits our sample sizes considerably and does urge caution in the interpretation of the results. The second difference is we allow matches to occur between directors appointed in different quarters. We now enter appointment quarter as a match variable (as in Girma and Gorg, 2007). This change maximizes potential matches for directors in our sample and is necessary because the availability of compensation data limits the number of matches.[16]

Another complication that we need to address in the matching estimations using the compensation data is that compensation policy may differ across banks. As a result, it is no longer sufficient to match on director characteristics alone. So, we also include *ln(Total Assets)* and *Percent Female* of the bank to which the individual was appointed when we perform our matching.

---

[16] Entering appointment quarter as a match variable minimizes differences in appointment quarter between matches and strikes a compromise between eliminating time differences and having an ample set of match candidates. A final point is that blocking matches by quarter in previous estimations was necessary to remove the influence of quarter-to-quarter changes in board composition. This allowed us to ensure that connections were calculated relative to the same directors on the board. This is issue is not present with compensation because compensation can be compared across quarters.

In addition, to account for differences in compensation policies across banks, we normalize *Total Compensation* by dividing by the average compensation of the board to which directors are appointed. In other words, we look for differences in how the connected directors are compensated relative to others on the same board vs. how the unconnected directors are compensated relative to others on their boards.

Table 6 shows estimates for compensation matching. The treatment group in Panel A consists of directors with at least one connection, the treatment group in Panel B consists of directors with only female connections (and no male connections), and the treatment group in Panel C consists of directors with only male connections (and no female connections). In Panel D, we test if female connections have a different impact than male connections by matching directors with only female connections to directors with only male connections.

Column (W) indicates that women with connections earn higher compensation than women with no connections. The effect is consistent for both male and female connections, but the results in Column W of panel D compare a female director who is connected to only women to a female director who is connected to only men. These results show that connections to other women are particularly valuable for female board members. However, as noted in Figure 2b, these valuable female-female connections are relatively rare in the male-dominated bank boardroom. These findings are consistent with female networks being qualitatively different from male networks and could explain the slightly lower average compensation for female directors. In column (M), we find no evidence that men with connections earn a different compensation than men with no connections.

The differences in compensation we observe for women are significant in magnitude. Column (W) indicates that at appointment connected women earn almost 23,000 more dollars in

total compensation, women with female connections earn about 38,000 more dollars in total compensation, and women with only male connections earn about 25,000 more dollars in total compensation. Although our limited sample size urges caution in the interpretation, these results suggest another dimension in which networks are important to female board members and that women may pay a financial penalty for less extensive networks.

7 Conclusion

In this paper, we use a unique and rarely accessed database to examine the relationship between the connectedness of bank boards, appointments of male and female directors, and director compensation over the 1999-2018 period. We find, overall, that connections on bank boards are extensive; however, male and female board members have professional networks that differ in terms of extent and intensity, with men having connections to other board members that are greater in number and length.

These connections do appear to matter in determining the composition of the board. Newly appointed directors have more and deeper connections to both men and women on the board they are appointed to relative to matched directors with similar characteristics. Connections also appear to play a larger role in the appointment of men than women. We also find evidence that stronger connections to the board are associated with higher compensation for female directors, but we find no evidence that connections affect male directors' compensation.

Overall, we conclude that the professional networks of female board members are smaller and less intense, but are valuable in earning appointments and higher compensation. Our most important finding is the evidence for the causal role that connections to the specific bank board

play in generating an appointment. Combined with the finding that women do not have the same

quality of networks as men do, this suggests that director recruitment strategies that rely on

networks play a role in maintaining the underrepresentation of women on bank boards.

References

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of financial economics*, *94*(2), 291-309.

Abadie, A., & Imbens, G. W. (2006). Large sample properties of matching estimators for average treatment effects. *econometrica*, *74*(1), 235-267.

Abadie, A., & Imbens, G. W. (2011). Bias-corrected matching estimators for average treatment effects. *Journal of Business & Economic Statistics*, *29*(1), 1-11.

Aguilera, M. B. (2008). Personal networks and the incomes of men and women in the United States: do personal networks provide higher returns for men or women?. *Research in Social Stratification and Mobility*, *26*(3), 221-233.

Bear, S., Rahman, N., & Post, C. (2010). The impact of board diversity and gender composition on corporate social responsibility and firm reputation. *Journal of Business Ethics*, 97(2), 207-221.

Bebchuk, L, J. Fried and D. Walker (2002). "Managerial power and rent extraction in the design of executive compensation," *University of Chicago Law Review* 69, pp. 751-846

Berger, A., Kick, T, Koetter, M. & Shaeck, K. (2013). Does it pay to have friends? Social ties and executive appointments in banking. *Journal of Banking and Finance*, 37(6): 2087-2105.

Booth, A. (1972). Sex and social participation. *American Sociological Review*, 183-193.

Borghans, L., Heckman, J. J., Golsteyn, B. H., & Meijers, H. (2009). Gender differences in risk aversion and ambiguity aversion. *Journal of the European Economic Association*, 7(2-3), 649-658.

Bhat, G., & Desai, H. (2016). Bank Capital and Monitoring: Evidence from Loan Quality.

Burt, R. S. (1998). The gender of social capital. *Rationality and society*, *10*(1), 5-46.

Byrd, John, Elizabeth S. Cooperman, and Glenn A. Wolfe (2010). "Director tenure and the compensation of bank CEOs." *Managerial Finance*

Campbell, K. E. (1988). Gender differences in job-related networks. *Work and Occupations*, 15(2), 179-200.

Catalyst (2015). Pyramid: Women in S&P 5000 finance. New York: January 13.

Cohen, L. E., Broschak, J. P., & Haveman, H. A. (1998). And then there were more? The effect of organizational sex composition on the hiring and promotion of managers. *American Sociological Review*, 711-727.

Çolak, G., & Whited, T. M. (2007). Spin-offs, divestitures, and conglomerate investment. *The Review of Financial Studies*, *20*(3), 557-595.

Felton, J., Gibson, B., & Sanbonmatsu, D. M. (2003). Preference for risk in investing as a function of trait optimism and gender. *The Journal of Behavioral Finance*, 4(1), 33-40.

Fischer, C. S., & Oliker, S. J. (1983). A research note on friendship, gender, and the life cycle. *Social Forces.*, *62*, 124.

Forret, M. L., & Dougherty, T. W. (2004). Networking behaviors and career outcomes: differences for men and women?. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, *25*(3), 419-437.

Fracassi, C., & Tate, G. (2012). External networking and internal firm governance. *The Journal of Finance*, *67*(1), 153-194.

Friebel, G., & Seabright, P. (2011). Do women have longer conversations? telephone evidence of gendered communication strategies. *Journal of Economic Psychology*, *32*(3), 348-356.

Fuhrmans, V. (2020). Where are all the women CEOs. *The Wall Street Journal*.

Girma, S., & Görg, H. (2007). Evaluating the foreign ownership wage premium using a difference-in-differences matching approach. *Journal of International Economics*, *72*(1), 97-112.

Green, C. P., & Homroy, S. (2018). Female directors, board committees and firm performance. *European Economic Review*, *102*, 19-38.

Hermalin, B. and M. Weisbach (1998). "Endogenously chosen boards of directors and their monitoring of the CEO," *American Economic Review* 88, pp. 96-118.

Horton, Joanne, Yuval Millo, and George Serafeim (2012). "Resources or power? Implications of social networks on compensation and firm performance." Journal of Business Finance & Accounting 39(3-4), pp. 399-426.

Huffman, M. L., & Torres, L. (2002). It's not only "who you know" that matters: Gender, personal contacts, and job lead quality. *Gender & Society*, *16*(6), 793-813.

Hwang, B. H., & Kim, S. (2009). It pays to have friends. *Journal of Financial Economics*, *93*(1), 138-158.

Ibarra, H. (1992). Homophily and differential returns: Sex differences in network structure and access in an advertising firm. *Administrative Science Quarterly*, 422-447.

Ibarra, H. (1997). Paving an alternative route: Gender differences in managerial networks. *Social Psychology Quarterly*, 91-102.

Kaczmarek, S., Kimino, S., & Pye, A. (2012). Antecedents of board composition: The role of nomination committees. *Corporate Governance: An International Review*, *20*(5), 474-489.

Kim, J., & Lee, H. R. (2018). Friends in the Boardroom: Attendance, voting, and turnover. *Economics Letters*, *169*, 11-14.

Kramarz, F., & Thesmar, D. (2013). Social networks in the boardroom. *Journal of the European Economic Association*, *11*(4), 780-807.

Lalanne, M., & Seabright, P. (2014). The old boy network: Gender differences in the impact of social networks on remuneration in top executive jobs, mimeo

Lee, J., Lee, K. J., & Nagarajan, N. J. (2014). Birds of a feather: Value implications of political alignment between top management and directors. *Journal of Financial Economics*, *112*(2), 232-250.

Liao, R. C., Loureiro, G., & Taboada, A. G. (2019). Women on Bank Boards: Evidence from Gender Quotas around the World, mimeo

Liu, Y. (2008). Employment networks and the CEO labor market. *Available at SSRN 1361776*.

Malmendier, U., & Tate, G. (2009). Superstar ceos. *The Quarterly Journal of Economics*, *124*(4), 1593-1638.

Markiewicz, D., Devine, I., & Kausilas, D. (2000). Friendships of women and men at work: Job satisfaction and resource implications. *Journal of Managerial Psychology*, *15*(2), 161-184.

Medland, D., 2004. Small steps for womankind. Corporate Board Member Europe, Winter.

Mehran, H., & Thakor, A. (2011). Bank capital and value in the cross-section. *The Review of Financial Studies*, *24*(4), 1019-1067.

Moore, G. (1990). Structural determinants of men's and women's personal networks. *American Sociological Review*, 726-735.

Nguyen, B. D. (2012). Does the Rolodex matter? Corporate elite's small world and the effectiveness of boards of directors. *Management Science*, *58*(2), 236-252.

Omer, T. C., Shelley, M. K., & Tice, F. M. (2014). Do well-connected directors affect firm value?. *Journal of Applied Finance (Formerly Financial Practice and Education)*, *24*(2), 17-32.

Owen, A. L., & Temesvary, J. (2018). The performance effects of gender diversity on bank boards. *Journal of Banking & Finance*, *90*, 50-63.

O'Neil, D. A., Hopkins, M. M., & Sullivan, S. E. (2011). Do women's networks help advance women's careers? Differences in perceptions of female workers and top leadership. *Career Development International*, *16*(7), 733-754.

Powell, M., & Ansic, D. (1997). Gender differences in risk behaviour in financial decision-making: An experimental analysis. *Journal of Economic Psychology*, *18*(6), 605-628.

Ragins, B. R., & McFarlin, D. B. (1989, August). Mentor Roles: An Investigation of Cross-Gender Mentoring Relationships. In *Academy of Management Proceedings* (Vol. 1989, No. 1, pp. 58-62). Briarcliff Manor, NY 10510: Academy of Management.

Renneboog, Luc, and Yang Zhao. "Us knows us in the UK: On director networks and CEO compensation," *Journal of Corporate Finance* 17(4), pp. 1132-1157.

Ryan Jr, Harley E. and Roy A. Wiggins III (2004). "Who is in whose pocket? Director compensation, board independence, and barriers to effective monitoring," *Journal of Financial Economics* 73(3), pp. 497-524.

Sapadin, L. A. (1988). Friendship and gender: Perspectives of professional men and women. *Journal of Social and Personal Relationships*, *5*(4), 387-403.

Schor, S. M. (1997). Separate and unequal: The nature of women's and men's career-building relationships. *Business Horizons*, *40*(5), 51-59.

Shivdasani, A., & Yermack, D. (1999). CEO involvement in the selection of new board members: An empirical analysis. *The Journal of Finance*, *54*(5), 1829-1853.

Tharenou, P. (1999). Gender differences in advancing to the top. *International Journal of Management Reviews*, 1(2), 111-132.

Figure 1. Connections Through Time.
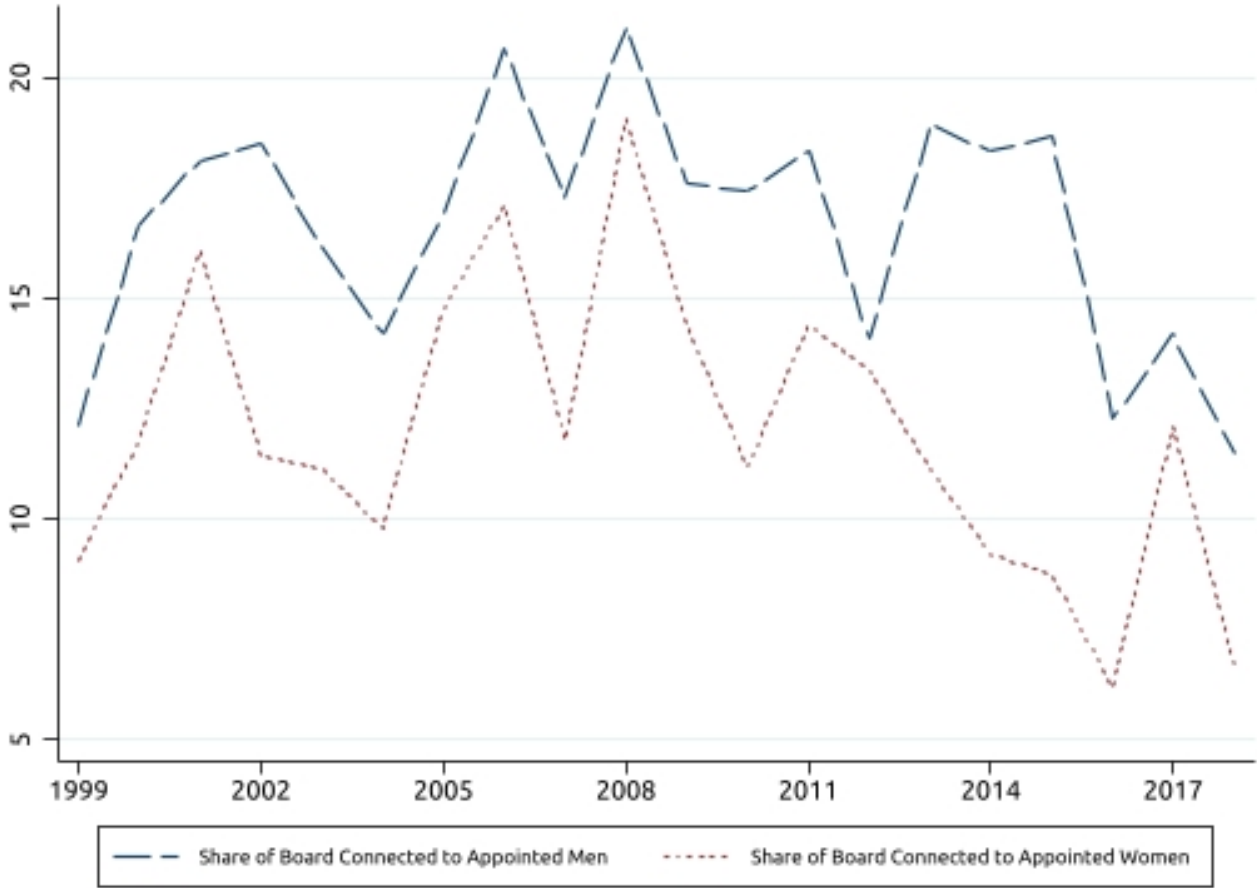
Figure 2: Connection Types by Connection Gender.
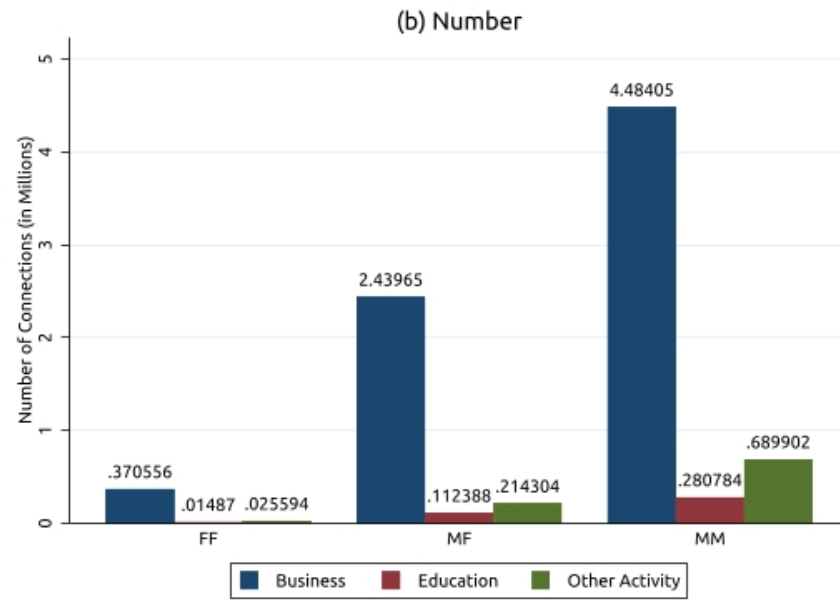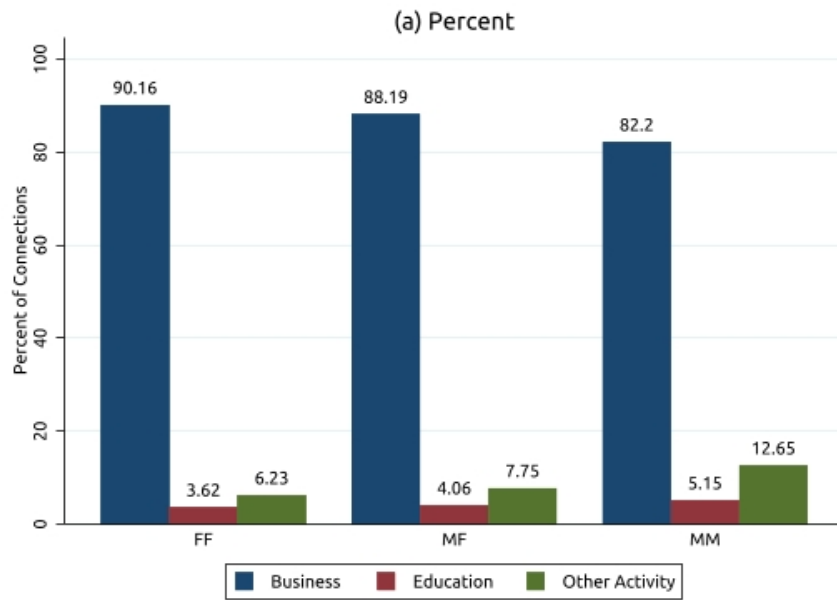
Figure 3: Connection Lengths by Connection Gender.
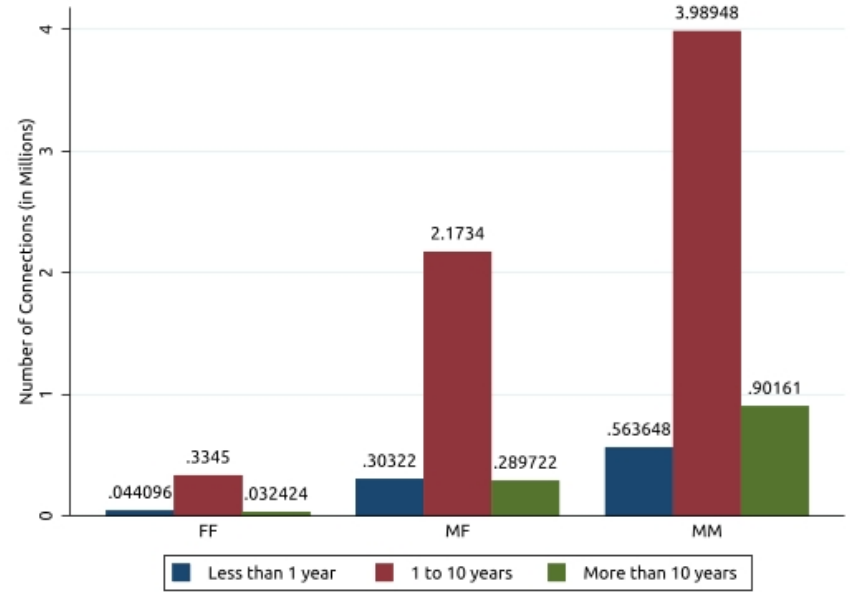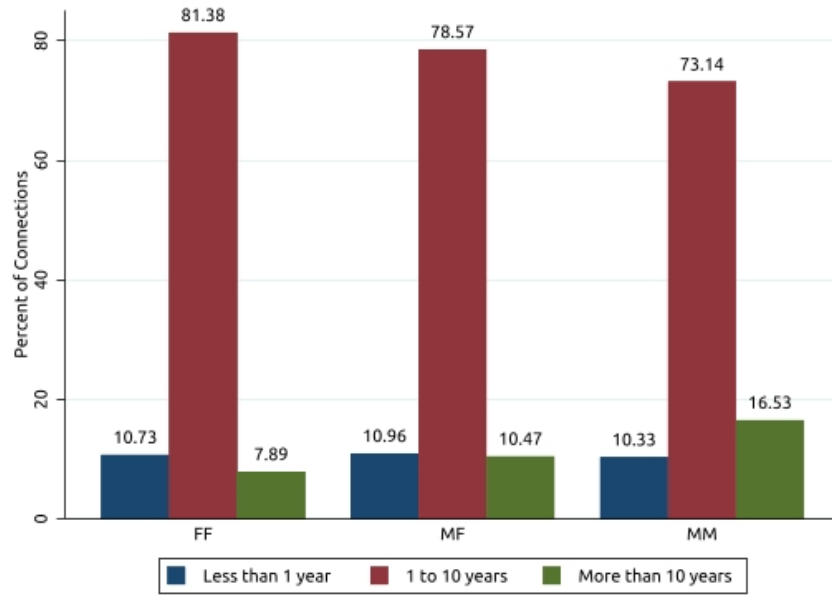
Table 1: Connection Types by Gender

Connection Type	Number	Percent of Total, Male Directors	Percent of Total, Female Directors
Armed Forces	37344	.66	.06
Charities	90160	1.33	1.24
Clubs	149550	2.47	1.1
Government	63390	.91	.95
Medical	21070	.31	.29
Partnership	81222	1.27	.85
Private Bank	1801116	25.53	28.13
Private Non-Bank	416898	6.18	5.63
Professional Association	402158	6.45	3.68
Quoted Bank	1710794	24.24	27.54
Quoted Non-Bank	1701633	24.54	25.53
Sporting	1230	.02	.01
Universities	403446	6.08	5

Table 2: Summary Statistics, Full Sample

VARIABLES	(1) N	(2) mean	(3) SD	(4) min	(5) p10	(6) p25	(7) p50	(8) p75	(9) max
Connection Measures									
%Board Connected	476,174	0.237	0.327	0	0	0	0.0833	0.357	1
%Female Connected	273,380	0.220	0.383	0	0	0	0	0.333	1
%Male Connected	465,602	0.238	0.329	0	0	0	0.0833	0.375	1
Weighted Connection Measures									
Connection-Years / Director	484,797	0.711	1.262	0	0	0	0.0909	0.893	14.62
Female Connection-Years / Woman	273,380	0.698	1.729	0	0	0	0	0.333	25.38
Male Connection-Years / Man	465,602	0.848	1.525	0	0	0	0.0909	1.047	22.62
Director Characteristics									
Age	496,857	59.61	9.736	18	47	53	60	66	97
Bank Board Experience	500,874	10.11	8.374	0	1.250	3.500	8	14.75	56
Current Bank Employment	501,368	1.642	0.628	1	1	1	2	2	11
Grad. School Dummy	260,544	0.437	0.496	0	0	0	0	1	1
Board Characteristics									
Average Age	70,420	57.01	8.020	18	46	52.20	58.38	62.60	83
Percent Grad.	59,831	0.411	0.329	0	0	0	0.400	0.625	1
Average Bank Board Expr.	70,630	9.259	5.140	0	2.750	5.568	9	12.40	48
Average Curr. Bank Board	70,661	1.591	0.464	1	1	1.091	1.667	2	5.500
Percent Female	61,376	0.0889	0.119	0	0	0	0	0.150	1
Ln(Total Assets)	39,753	14.15	1.738	8.289	12.27	13.03	13.86	15.01	21.31
Compensation									
Total Compensation (in thousands)	8,291	126.0	245.7	0	0	20	94	190	11,863

Notes: Director connections and characteristics are measured at the director-bank-quarter level. Bank connections and characteristics are measured at the bank-quarter level. Total compensation is defined as salary plus cash bonus plus equity linked compensation.

Table 3. Fixed Effects Estimates: Differences in Connections between Men and Women.

VARIABLES	Director Connections		Female Director Connections		Male Director Connections	
	(1)	(2)	(3)	(4)	(5)	(6)
Female Dummy	-0.0302***	-0.0998***	-0.0424***	-0.0982*	-0.0298***	-0.115***
	(0.00922)	(0.0286)	(0.0132)	(0.0526)	(0.00960)	(0.0318)
Age	0.00244***	0.0114***	0.00343***	0.0133***	0.00242***	0.0133***
	(0.000497)	(0.00121)	(0.000853)	(0.00316)	(0.000498)	(0.00224)
Grad. Dummy	-0.00675	-0.0255	-0.00278	0.0228	-0.00758	-0.0348
	(0.00718)	(0.0197)	(0.0119)	(0.0418)	(0.00723)	(0.0269)
Bank Board Experience	0.00782***	0.0323***	0.00627***	0.0239***	0.00761***	0.0378***
	(0.000849)	(0.00186)	(0.00135)	(0.00609)	(0.000851)	(0.00492)
Current Bank Employment	0.0144**	0.00338	-0.000908	-0.0186	0.0145**	0.00626
	(0.00627)	(0.0144)	(0.00986)	(0.0301)	(0.00636)	(0.0235)
Constant	-0.0116	-0.216	0.0414	-0.0665	-0.00722	-0.306***
	(0.0333)	(0.746)	(0.0551)	(0.195)	(0.0340)	(0.107)
Bank and Year-Quarter FE	X	X	X	X	X	X
Weighted Connections		X		X		X
Observations	6,067	6,230	3,607	3,607	6,042	6,042
R-squared	0.423	0.405	0.402	0.317	0.417	0.400

Notes: All standard errors clustered at the bank level. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Director Matching, Estimation Results.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Δ %Board Connected	5,290	0.0833***	0.145***	-0.0614***	-0.0613***
		(0.00238)	(0.00379)	(0.0111)	(0.0111)
Δ Connection-years/Director	5,393	0.172***	0.341***	-0.169***	-0.169***
		(0.00578)	(0.0112)	(0.0376)	(0.0376)
Δ %Female Connected	3,156	0.0674***	0.159***	-0.0915***	-0.0918***
		(0.00303)	(0.00596)	(0.0155)	(0.0155)
Δ Female Connection-years/Female Director	3,156	0.168***	0.410***	-0.242***	-0.242***
		(0.0107)	(0.0204)	(0.0547)	(0.0547)
Δ %Male Connected	5,267	0.0856***	0.145***	-0.0591***	-0.0589***
		(0.00247)	(0.00382)	(0.0121)	(0.0121)
Δ Male Connection-years/Male Director	5,267	0.203***	0.395***	-0.192***	-0.192***
		(0.00726)	(0.0133)	(0.0474)	(0.0474)

Notes for Table 2B: Δ indicates the difference in connections to bank *b* between a director appointed to *b* and a matched director appointed to a bank different than *b*. Δ is constructed by matching directors with the same gender, the same quarter of appointment, and minimizing the mahalanobis distance across *Age, Grad School*, *Bank Board Experience*, and *Current Bank Employment*. When constructing Δ, matches on continuous variables are blocked by quartiles in each gender-quarter, matches with distances beyond the 99th percentile are dropped, and matches are chosen by random if several matches are equally good. Estimates in column (W – M) are calculated with nearest-neighbor matching estimators from Abadie and Imbens (2011). Pairs of women are matched with pairs of men by minimizing the distance across within-pair differences in match characteristics. The last column shows bias-adjusted estimates from Abadie and Imbens (2011). Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Bank Matching, Estimation Results.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Panel A: Nearest Neighbor Match					
Δ %Board Connected	891	0.0796***	0.152***	-0.0725***	-0.0731***
		(0.00671)	(0.00928)	(0.0214)	(0.0214)
Δ Connection-years/Director	891	0.204***	0.415***	-0.211***	-0.212***
		(0.0182)	(0.0324)	(0.0623)	(0.0624)
Δ %Female Connected	426	-0.00786	0.144***	-0.152***	-0.156***
		(0.0120)	(0.0158)	(0.0425)	(0.0425)
Δ Female Connection-years/Female Director	426	0.0757	0.385***	-0.309*	-0.323**
		(0.0604)	(0.0591)	(0.159)	(0.158)
Δ %Male Connected	888	0.0861***	0.153***	-0.0672***	-0.0680***
		(0.00683)	(0.00931)	(0.0214)	(0.0214)
Δ Male Connection-years/Male Director	888	0.239***	0.471***	-0.232***	-0.233***
		(0.0203)	(0.0371)	(0.0679)	(0.0679)

Notes: Δ indicates the difference in connections to director *i* between the bank that appointed *i* and a matched bank that did not appointed *i*. Matched banks are required to appointed a director of the same gender in the same quarter, and are required to minimize the mahalanobis distance across *Average Age, Average Grad School*, *Average Bank Board Experience*, *Average Current Bank Employment*, *Percent Female*, and *Ln(Total Assets)*. All other details of the matching method are identical to Table 4. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Director Matching, Estimation Results for Compensation.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Panel A: Match Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	261	0.226***	0.871	-0.644	-0.619
		(0.0332)	(0.855)	(0.867)	(0.868)
Panel B: Match Female-Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	67	0.379***	0.266	0.113	0.463
		(0.0661)	(0.598)	(0.754)	(0.778)
Panel C: Match Male-Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	195	0.254***	1.103	-0.849	-0.841
		(0.0393)	(1.127)	(1.452)	(1.453)
Panel D: Match Female-Connected Directors to Male-Connected Directors					
Δ Total Compensation / Avg. Tot. Comp.	61	0.370***	-2.201	2.570	2.318
		(0.0545)	(1.737)	(1.758)	(1.868)

Notes: Δ (in Panels A-C) indicates the differences in compensation between a connected and unconnected director. The directors are matched with a similar procedure as Table 4. Matches are no longer blocked by appointment quarter. Instead, appointment quarter is entered as a match variable. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A1. Summary Statistics for Appointed Directors

VARIABLES	(1) N	(2) mean	(3) SD	(4) min	(5) p10	(6) p25	(7) p50	(8) p75	(9) max
Connection Measures									
%Board Connected	11,936	0.184	0.321	0	0	0	0	0.214	1
%Female Connected	6,431	0.183	0.363	0	0	0	0	0	1
%Male Connected	11,577	0.184	0.321	0	0	0	0	0.214	1
Weighted Connection Measures									
Connection-Years / Director	12,302	0.412	0.959	0	0	0	0	0.298	10.21
Female Connection-Years / Woman	6,431	0.443	1.201	0	0	0	0	0	13.92
Male Connection-Years / Man	11,577	0.496	1.149	0	0	0	0	0.375	13.61
Director Characteristics									
Age	12,062	54.61	9.766	18	42	48	55	62	88
Bank Board Experience	12,230	2.836	6.194	0	0	0	0	2	47.25
Current Bank Employment	12,257	1.766	0.827	1	1	1	2	2	11
Grad. School Dummy	6,940	0.456	0.498	0	0	0	0	1	1
Compensation									
Total Compensation	707	103.8	238.6	0	1	13	50	125	3,762

Notes: Director connections and characteristics are measured at the director-bank-quarter level. All quarters are restricted to the quarter of appointment. Total compensation is defined as salary plus cash bonus plus equity linked compensation.

Table A2. Director Matching, Estimation Results for Propensity Score Match.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Δ %Board Connected	5,290	0.0651***	0.146***	-0.0812***	-0.0726***
		(0.00200)	(0.00381)	(0.00910)	(0.00932)
Δ Connection-years/Director	5,393	0.158***	0.343***	-0.185***	-0.185***
		(0.00611)	(0.0112)	(0.0276)	(0.0270)
Δ %Female Connected	3,156	0.0627***	0.157***	-0.0939***	-0.0997***
		(0.00293)	(0.00593)	(0.0152)	(0.0145)
Δ Female Connection-years/Female Director	3,156	0.141***	0.403***	-0.262***	-0.272***
		(0.00993)	(0.0204)	(0.0575)	(0.0565)
Δ %Male Connected	5,267	0.0693***	0.145***	-0.0756***	-0.0715***
		(0.00205)	(0.00382)	(0.00924)	(0.00957)
Δ Male Connection-years/Male Director	5,267	0.158***	0.396***	-0.239***	-0.214***
		(0.00587)	(0.0134)	(0.0291)	(0.0312)

Notes: The matching used to construct Δ is identical to Table 4. The matching in the second stage is done using propensity scores with *teffects psmatch*. The bias-adjusted difference is calculated following Malmendier and Tate (2009). We calculate propensity scores with a separate logit regression and use nearest-neighbor matching with propensity scores as the only match variable. Standard errors are in parentheses.   *** p<0.01, ** p<0.05, * p<0.1.

Table A3. Bank Matching, Estimation Results for Propensity Score Match.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Panel B: Propensity Score Match					
Δ %Board Connected	891	0.0676***	0.154***	-0.0860***	-0.0860***
		(0.00552)	(0.00936)	(0.0204)	(0.0210)
Δ Connection-years/Director	891	0.194***	0.418***	-0.225***	-0.225***
		(0.0169)	(0.0325)	(0.0683)	(0.0670)
Δ %Female Connected	426	0.0651***	0.136***	-0.0709	-0.0788
		(0.0122)	(0.0154)	(0.0502)	(0.0669)
Δ Female Connection-years/Female Director	426	0.258***	0.347***	-0.0885	0.146
		(0.0621)	(0.0541)	(0.266)	(0.422)
Δ %Male Connected	888	0.0814***	0.156***	-0.0746***	-0.0803***
		(0.00647)	(0.00939)	(0.0184)	(0.0214)
Δ Male Connection-years/Male Director	888	0.232***	0.472***	-0.240***	-0.246***
		(0.0191)	(0.0370)	(0.0642)	(0.0753)

Notes: The matching used to construct Δ is identical to Table 5. The matching in the second stage is done using propensity scores with *teffects psmatch*. The bias-adjusted difference is calculated following Malmendier and Tate (2009). We calculate propensity scores with a separate logit regression and use nearest-neighbor matching with propensity scores as the only match variable. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A4. Director Matching, Estimation Results for Compensation with Matching on Propensity Score.

	N	Women (W)	Men (M)	Difference (W – M)	Bias-adjusted difference
Panel A: Match Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	261	0.160***	0.863	-0.703	-0.798
		(0.0330)	(0.859)	(0.867)	(0.877)
Panel B: Match Female-Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	67	0.274***	0.312	-0.0374	0.286
		(0.0631)	(0.601)	(0.562)	(0.712)
Panel C: Match Male-Connected Directors to Unconnected Directors					
Δ Total Compensation / Avg. Tot. Comp.	195	0.179***	1.034	-0.854	-0.901
		(0.0325)	(1.128)	(1.128)	(1.127)
Panel D: Match Female-Connected Directors to Male-Connected Directors					
Δ Total Compensation / Avg. Tot. Comp.	61	0.143**	-1.843	1.986	6.796*
		(0.0663)	(1.781)	(1.815)	(3.597)

Notes: The matching used to construct Δ is identical to Table 6. The matching in the second stage is done using propensity scores with *teffects psmatch*. The bias-adjusted difference is calculated following Malmendier and Tate (2009). We calculate propensity scores with a separate logit regression and use nearest-neighbor matching with propensity scores as the only match variable. Standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A5. Balance Tests for Director Matching.

	Mean		One-Variable Test (Mean = 0)		Two-Variable Test (F-M = 0)
	Female (Treated)	Male (Control)	Female: *t*-stat (*p*-value)	Male: *t*-stat (*p*-value)	F-M Difference: *t*-stat (*p*-value)
Panel A: Nearest Neighbor Match					
Δ Age	-0.188	-0.181	-1.02 (0.31)	-1.02 (0.31)	-0.03 (0.98)
Δ Grad School	-0.00194	-0.00194	-0.08 (0.94)	-0.08 (0.94)	-0.00 (1.00)
Δ Bank Board Experience	0.0228	0.0248	0.33 (0.74)	0.35 (0.72)	-0.02 (0.98)
Δ Current Bank Employment	0.00777	0.00583	0.35 (0.73)	0.26 (0.80)	0.06 (0.95)
Panel B: Propensity Score Match					
Δ Age	-0.188	-0.186	-1.02 (0.31)	-1.15 (0.25)	-0.01 (0.99)
Δ Grad School	-0.00194	-0.00583	-0.08 (0.94)	-0.28 (0.78)	0.12 (0.90)
Δ Bank Board Experience	0.0228	0.0762	0.33 (0.74)	0.52 (0.60)	-0.33 (0.74)
Δ Current Bank Employment	0.00777	0.00583	0.35 (0.73)	0.27 (0.79)	0.06 (0.95)

Notes: Means reflect the average difference in characteristics between matched directors. Differences are calculated relative to the appointed director, e.g. a positive age difference means the appointed director is older. Univariate tests in C3-C4 test if differences summarized in the first two columns are different than zero. A significant test means that matches differ along some characteristic. In the last column, bivariate tests test the performance of the second matching procedure. A significant difference means that differences between female matched pairs differ significantly from differences between male matched pairs.

Table A6. Balance Tests for Bank Matching.

	Mean		One-Variable Test (Mean = 0)		Two-Variable Test (F-M = 0)
	Female (Treated)	Male (Control)	Female: *t*-stat (*p*-value)	Male: *t*-stat (*p*-value)	F-M Difference: *t*-stat (*p*-value)
Panel A: Nearest Neighbor Match					
Δ Average Age	0.0331	0.0409	0.15 (0.88)	0.20 (0.84)	-0.03 (0.98)
Δ Average Grad School	0.00780	0.00320	0.26 (0.80)	0.10 (0.92)	0.10 (0.92)
Δ Average Bank Board Experience	-0.0939	-0.0813	-0.57 (0.57)	-0.54 (0.59)	-0.06 (0.96)
Δ Average Current Bank Employment	0.00429	-0.00312	0.23 (0.82)	-0.15 (0.88)	0.27 (0.79)
Δ Percent Female	0.00637	0.00351	0.67 (0.50)	0.41 (0.68)	0.22 (0.82)
Δ Ln(Total Assets)	0.0100	-0.00545	0.09 (0.93)	-0.05 (0.96)	0.09 (0.93)
Panel B: Propensity Score Match					
Δ Age	0.0331	0.126	0.15 (0.88)	0.63 (0.53)	-0.32 (0.75)
Δ Grad School	0.00780	0.0417	0.26 (0.80)	1.17 (0.24)	-0.72 (0.47)
Δ Bank Board Experience	-0.0939	-0.249	-0.57 (0.57)	-1.69 (0.09)	0.70 (0.48)
Δ Current Bank Employment	0.00429	-0.00498	0.23 (0.82)	-0.32 (0.75)	0.38 (0.71)
Δ Percent Female	0.00637	0.00450	0.67 (0.50)	0.50 (0.62)	0.14 (0.89)
Δ Ln(Total Assets)	0.0100	0.109	0.09 (0.93)	0.97 (0.33)	-0.61 (0.54)

Notes: Means reflect the average difference in characteristics between matched directors. Differences are calculated relative to the appointed director, e.g. a positive age difference means the appointed director is older. Univariate tests test if differences summarized in the first two columns are different than zero. A significant test means that matched directors differ significantly along some characteristic. In the last column, we show bivariate tests. These test the performance of the second matching procedure. A significant difference indicates that female matched pairs differ from male matched pairs in some way.

Table A7. Director Matching, Balance Tests for Compensation Estimations.

	Mean		One-Variable Test (Mean = 0)		Two-Variable Test (F-M = 0)
	Female (Treated)	Male (Control)	Female: t-stat (p-value)	Male: t-stat (p-value)	F-M Difference: t-stat (p-value)
Panel A-1: Nearest Neighbor, Match Connected Directors to Unconnected Directors					
Δ Age	-0.108	0.0270	-0.25 (0.80)	0.10 (0.92)	-0.27 (0.79)
Δ Grad School	-0.135	-0.135	-2.37 (0.02)	-2.37 (0.02)	-0.00 (1.00)
Δ Bank Board Experience	0.122	0.122	0.36 (0.71)	0.43 (0.67)	0.00 (1.00)
Δ Current Bank Employment	0.0811	0.0811	1.78 (0.08)	1.78 (0.08)	0.00 (1.00)
Δ Ln(Bank Size)	0.125	0.0868	0.74 (0.47)	0.76 (0.45)	0.19 (0.85)
Δ Percent Female	0.00244	0.00479	0.28 (0.78)	0.62 (0.54)	-0.20 (0.84)
Δ Quarter	0	0	-	-	-
Panel A-2: Propensity, Match Connected Directors to Unconnected Directors					
Δ Age	-0.108	-0.0270	-0.25 (0.80)	-0.07 (0.94)	-0.14 (0.89)
Δ Grad School	-0.135	-0.0541	-2.37 (0.02)	-1.00 (0.32)	-1.03 (0.31)
Δ Bank Board Experience	0.122	1.088	0.36 (0.72)	1.83 (0.08)	-1.41 (0.16)
Δ Current Bank Employment	0.0811	0.0541	1.78 (0.08)	1.43 (0.16)	0.46 (0.65)
Δ Ln(Bank Size)	0.125	0.136	0.74 (0.47)	0.80 (0.43)	-0.05 (0.96)
Δ Percent Female	0.00244	-0.00198	0.28 (0.78)	-0.36 (0.72)	0.42 (0.67)
Δ Quarter	0	0	-	-	-
Panel B-1: Nearest Neighbor, Match Female Connected Directors to Unconnected Directors					
Δ Age	-0.108	0.0270	-0.25 (0.80)	0.10 (0.92)	-0.27 (0.79)
Δ Grad School	-0.135	-0.135	-2.37 (0.02)	-2.37 (0.02)	-0.00 (1.00)
Δ Bank Board Experience	0.122	0.122	0.36 (0.72)	0.43 (0.67)	0.00 (1.00)
Δ Current Bank Employment	0.0811	0.0811	1.78 (0.08)	1.78 (0.08)	0.00 (1.00)
Δ Ln(Bank Size)	0.125	0.0868	0.74 (0.47)	0.76 (0.45)	0.19 (0.85)
Δ Percent Female	0.00244	0.00479	0.28 (0.78)	0.62 (0.54)	-0.20 (0.84)
Δ Quarter	0	0	-	-	-

	Mean		One-Variable Test (Mean = 0)		Two-Variable Test (F-M = 0)
	Female (Treated)	Male (Control)	Female: *t*-stat (*p*-value)	Male: *t*-stat (*p*-value)	F-M Difference: *t*-stat (*p*-value)
Panel B-2: Propensity, Match Female Connected Directors to Unconnected Directors					
Δ Age	-0.108	-0.0270	-0.25 (0.80)	-0.07 (0.94)	-0.14 (0.89)
Δ Grad School	-0.135	-0.0541	-2.37 (0.02)	-1.00 (0.32)	-1.03 (0.31)
Δ Bank Board Experience	0.122	1.088	0.36 (0.72)	1.83 (0.08)	-1.41 (0.16)
Δ Current Bank Employment	0.0811	0.0541	1.78 (0.08)	1.43 (0.16)	0.46 (0.65)
Δ Ln(Bank Size)	0.125	0.136	0.74 (0.47)	0.80 (0.43)	-0.05 (0.96)
Δ Percent Female	0.00244	-0.00198	0.28 (0.78)	-0.36 (0.72)	0.42 (0.67)
Δ Quarter	0	0	-	-	-
Panel C-1: Nearest Neighbor, Match Male Connected Directors to Unconnected Directors					
Δ Age	-0.108	0.0270	-0.25 (0.80)	0.10 (0.92)	-0.27 (0.79)
Δ Grad School	-0.135	-0.135	-2.37 (0.02)	-2.37 (0.02)	-0.00 (1.00)
Δ Bank Board Experience	0.122	0.122	0.36 (0.72)	0.43 (0.67)	0.00 (1.00)
Δ Current Bank Employment	0.0811	0.0811	1.78 (0.08)	1.78 (0.08)	0.00 (1.00)
Δ Ln(Bank Size)	0.125	0.0868	0.74 (0.47)	0.76 (0.45)	0.19 (0.85)
Δ Percent Female	0.00244	0.00479	0.28 (0.78)	0.62 (0.54)	-0.20 (0.84)
Δ Quarter	0	0	-	-	-
Panel C-2: Propensity Score Match Male Connected Directors to Unconnected Directors					
Δ Age	-0.108	-0.0270	-0.25 (0.80)	-0.07 (0.94)	-0.14 (0.89)
Δ Grad School	-0.135	-	-2.37 (0.02)	-	-
Δ Bank Board Experience	0.122	1.088	0.36 (0.72)	1.83 (0.08)	-1.41 (0.16)
Δ Current Bank Employment	0.0811	0.0541	1.78 (0.08)	1.43 (0.16)	0.46 (0.65)
Δ Ln(Bank Size)	0.125	0.136	0.74 (0.47)	0.80 (0.43)	-0.05 (0.96)
Δ Percent Female	0.00244	-0.00198	0.28 (0.78)	-0.36 (0.72)	0.42 (0.67)
Δ Quarter	0	0	-	-	-

Panel D-1: Nearest Neighbor, Match Female Connected Directors to Male Connected Directors

Δ Age	-0.108	0.0270	-0.25 (0.80)	0.10 (0.92)	-0.27 (0.79)
Δ Grad School	-0.135	-0.135	-2.37 (0.02)	-2.37 (0.02)	-0.00 (1.00)
Δ Bank Board Experience	0.122	0.122	0.36 (0.72)	0.43 (0.67)	0.00 (1.00)
Δ Current Bank Employment	0.0811	0.0811	1.78 (0.08)	1.78 (0.08)	0.00 (1.00)
Δ Ln(Bank Size)	0.125	0.0868	0.74 (0.47)	0.76 (0.45)	0.19 (0.85)
Δ Percent Female	0.00244	0.00479	0.28 (0.78)	0.62 (0.54)	-0.20 (0.84)
Δ Quarter	0	0	-	-	-

Panel D-2: Propensity, Match Male Connected Directors to Unconnected Connected Directors

Δ Age	-0.108	-0.0270	-0.25 (0.80)	-0.07 (0.94)	-0.14 (0.89)
Δ Grad School	-0.135	-	-2.37 (0.02)	-	-
Δ Bank Board Experience	0.122	1.088	0.36 (0.72)	1.83 (0.08)	-1.41 (0.16)
Δ Current Bank Employment	0.0811	0.0541	1.78 (0.08)	1.43 (0.16)	0.46 (0.65)
Δ Ln(Bank Size)	0.125	0.136	0.74 (0.47)	0.80 (0.43)	-0.05 (0.96)
Δ Percent Female	0.00244	-0.00198	0.28 (0.78)	-0.36 (0.72)	0.42 (0.67)
Δ Quarter	0	0	-	-	-

Notes: Means reflect the average difference in characteristics between matched directors. Differences are calculated relative to the appointed director, e.g. a positive age difference means the appointed director is older. Univariate tests test if differences summarized in the first two columns are different than zero. A significant test means that matched directors differ significantly along some characteristic. In the last column, we show bivariate tests. These test the performance of the second matching procedure. A significant difference indicates that female matched pairs differ from male matched pairs in some way.