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Gender and Social Networks on Bank Boards

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Gender and Social Networks on Bank Boards*

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Abstract

We examine the effect of the social networks of bank directors on board gender diversity and compensation using a unique, newly compiled dataset over the 1999-2018 period. We find that within-board social networks are extensive, but there are significant differences in the size and gender composition of social networks of male vs female bank directors. We also find that same-gender networks play an important role in determining the gender composition of bank boards. Finally, we show that those connected to male directors receive higher compensation, but we find no evidence that connections to female directors are influential in determining pay and bonuses.

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

JEL Codes: G21; G34; J16

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1 Introduction

Social 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. However, they 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. In this paper, we seek to document the extent and nature of social networks within bank boards, paying particular attention to the gendered aspects of these networks. In doing so, we are able to explore relationships between social networks and characteristics of those serving on bank boards as well as how directors are compensated.²

At financial firms, women are particularly underrepresented in leadership positions, and female board members are minorities on boards (Liao et al, 2019), suggesting that their social networks differ from those of male board members. In this paper, we explore the causes and consequences of the underrepresentation of women on bank boards by using a unique data set that allows us to explore the relationship between social networks and the employment of female directors as well as the compensation of directors. In doing so, we seek to answer three important questions. First, we examine the relationship between gender and social networks at the bank director level to address the question: in what ways do the social networks of female directors differ from those of male directors? Second, we ask: what is the role of social networks within the board in influencing the gender composition of the board? Finally, what is the evidence on the

² We use the term “social” to cover social as well as professional connections. We settle on this terminology because it is the effect of the social/personal aspect of networks that we seek to study in this paper, whether through professional or non-work connections. As such, our work ties into the broader literature on the impact of social networks.

relationship between social networks and the compensation of bank directors? We pursue this third question with an emphasis on examining the gendered dimension of these networks.

We find that the social networks within bank boards are extensive, but male and female board members have different networks. On average, women on bank boards are less connected to other board members in both number and intensity of connections than their male counterparts.³ We also find that social connections do matter in recruiting a board with more gender diversity; boards with stronger female-female networks have a higher percentage of women. Finally, we find that directors who are more connected to male directors enjoy higher compensation, even after controlling for bank performance. Interestingly, we do not find evidence that connections to female directors are lucrative. Overall, these conclusions indicate that the social networks of male and female board members differ and that these differences have consequences for the composition of the board as well as its compensation.

We find 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 match each director with every other director at the same bank with whom that person has had a previous connection, creating a measure of the extent and nature of social connections within a bank board. We then link this connections database with Boardex data on additional director and bank characteristics over the 1999-2018 period. We also match this database to Call Reports to obtain information on bank balance sheet and financial characteristics. Our use of regulatory balance sheet and financial data allows us to retain private

³ 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. For instance, two board members X and Y at bank Z count as “connected” at time t if X and Y overlapped at a different institution/in a different capacity (e.g., simultaneously served on the board of the same charity) prior to time t.

banks as well in our sample. In total, our data set includes 8,470 individual directors who serve on the boards of 577 banks over the 1999-2018 time period. The data includes both small and big banks and we exploit that variation in some of our analysis.

By focusing on the connections within a board, our approach differs from that in prior work. Previous studies typically examine either the overall social capital of board members, as measured primarily by social connections outside the board as in Omer et al. (2014), or the social connections between board members and executives (e.g., Berger et al., 2013; Fracassi and Tate, 2012; or Hwang and Kim, 2009). Thus, our data and approach focusing on the connections within a board allow us to draw unique conclusions about the social network relationships within the boardroom.

Our results make several important contributions to the literature. First, to our knowledge, we are the first to examine the gender of networks within bank boards, and to find evidence that same-gender networks matter for gender diversity. Specifically, our results suggest that stronger female networks are associated with a larger share of women on the board, potentially due to an impact on the board's ability to recruit and retain new female board members to further enhance female participation. This is important because it is not simply female representation on the board that matters but the extent to which women can participate in decision-making by serving on the committees that perform core functions of the board (Green and Homroy, 2018). Second, we 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). Third, our analysis of within-board 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; Lalanne

and Seabright, 2014). Lastly, to our knowledge we are also first to examine the relationship between the gendered dimension of director connectedness and compensation. Compensation decisions result from negotiations between the board and the CEO (Hermalin and Weisbach, 1998; Bebchuk et al, 2002). We find that directors with more connections receive a higher compensation on average, but the size of the effect also depends on the gender of connections and suggests that male connections are disproportionately more lucrative compared to female connections.

The paper proceeds as follows: In Section 2, we review the related literature in more detail. We describe the data in Section 3 and outline our methods in Section 4. We discuss the results in Section 5, and conclude in Section 6.

2 Literature Review

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 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. Our results on the positive relationship between board connectedness and compensation is consistent with Ryan and Wiggins (2004), who 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).

3 Data Description

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

We collect data on social 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 as indicated in Table 1A consist of 8,470 unique individuals who served as directors at 577 banks; both individuals and banks are observed over time. This results in 260,947 director-quarter and 30,959 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).⁴

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 (Baxter et al., 2003). Probabilistic matching uses string distance approximation to rank bank names and addresses by similarity.⁵ 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.

Because our sample includes a large range of banks by size, we are able to divide our sample of 577 unique banks into “big” and “small” banks with “big” banks defined as those with total assets at the 95th percentile or higher in each time period. In our sample, big banks hold 72 percent of total assets – so results that focus on big banks may have more economic relevance.

⁴ To reduce the influence of outliers in our analysis, we winsorize the director-level data at the ninety-ninth and first percentiles.

⁵ 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.

However, because the vast majority of banks are small, most directors are actually at small banks – so understanding the social networks of those board members is important if we want to draw conclusions about the individuals who serve on bank boards. Fortunately, because our data set is so comprehensive, we are able to ask questions that focus on both dimensions of importance.

3.1 Social connections

Measures of social 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. 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, Panel B. We create a second measure of connections that captures the intensity of the connection by weighting each connection by the total number of years in the overlapping organizational memberships. This weighted connection measure increases with the number of years that directors overlap at the same organization and also with the number of organizations at which an overlap occurs.

All of our aggregated measures of connections begin with either this simple definition of “connected” or the weighted connections at the director level. As the composition of boards change over time, the number of connections 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.

Panel B of Table 1 reveals that the vast majority of connections (99 percent) are business connections that occur at private or quoted companies. The networks of bank board of directors are linked strongly to the banking industry. Among those business connections, a little more than half of them are from either private or quoted banks. Although the relative importance of each type of connection is similar for both men and women, there are some differences in the nature of the connections. Panel B of Table 1 reveals that the connections of women are slightly more likely to be from university or charities and less likely to be from business. In addition, Table 1 Panel C reveals that the networks of bank board of directors are comprised primarily of connections between men.

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, one weighted by length of connection and a second, unweighted index.

3.1.1 Director-level social connections

We first construct indices of connections for individual directors. We construct these indices to correct for the fact that directors who sit on larger boards have more opportunities to be connected or boards with more women have more opportunities for directors to be connected to female board members. We construct four indices examining director connections and four indices examining CEO and C-Suite connections. The first measure of director connections, *Director Connection Index*, 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 52 percent of other directors on the same board (Table 2).

The second measure of director connections, *Director Female Connection Index*, 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 average director is connected to 29 percent of female directors on the board, but the median is zero (Table 2). These low female connections could be a result of few women on bank boards. If we remove banks from our sample that have no women on their boards, the average director is connected to 41 percent of the female board members, which is still lower than the average connections to male board members. In other words, lack of opportunity for connections does not completely explain the pattern of relatively lower connections with female board members. Even conditional on there being women on the board, 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.

Following the same procedures, we also calculate two additional measures of director connections, *Director Bank Connection Index* and *Director Non-Bank Connection Index*. For these indices, we distinguish between connections that occurred at a bank vs. connections that occurred at any other organization. The descriptive statistics in Table 2 reveal that banking connections are prevalent: the median director is connected to 50 percent of the other directors on

the board via a connection at another bank but is not connected to any directors via a non-bank connection.

To capture connections between directors and executive management of a bank, we use a dummy variable indicating a connection between directors and the CEO and directors and any member of the executive management team that includes the CEO, CFO, COO, risk officer, compliance officer, or technology officer. We further characterize those connections by creating an additional dummy variable that indicates a connection to a CEO who is female. On average 64 percent of directors are connected to the CEO; only 1.7 percent are connected to a female CEO, but that statistic is heavily influenced by the fact that there are very few female CEOs in our sample. Seventy-one percent of the directors in our sample are connected to at least one member of the executive management team, but only 13 percent of the directors are connected to a member of the executive management team who is female. Eighteen percent of the executive team in our sample is female; therefore, the low percentage of connections is not completely explained by the smaller representation of women on the executive management team.

3.1.2 Bank-level social connections

At the bank level, we construct three indices that measure the intensity of within-board networks. The first measure, *Board Connection Index*, is the share of the board members the average director on the board is connected to in a given quarter. We calculate this measure by taking the average of the *Director Connection Index* across all directors on the board. This index is an overall representation of the strength of networks within a board. For example, a value of zero for this measure implies no connections between directors on the board, while a value of one implies that every director is connected to every other director on the board (Table 2). We find that on the average bank board, 54 percent of the directors are connected.

The second and third measures represent the strength of same-gender networks. Specifically, the second measure, *Male-Male Connection Index*, measures the strength of male networks on the board. This index shows that on the median board 62 percent of male directors are connected to each other. The third index, *Female-Female Connection Index*, measures the strength of female networks on the bank board. This index shows that on the median board female directors are connected to zero percent of women. The low values for this index can be partially attributed to the fact that boards that have no women or only one woman have a value of zero for the *Female-Female Connection Index*. That said, the median value of the *Female-Female Connection Index* for boards with more than one woman on them remains at zero.

3.2 Dependent Variables

As mentioned in our introduction, we are interested in describing the social networks of bank board members and determining the extent to which the networks of male and female board members differ. In addition, we are also interested in exploring the effect that these social networks have on the composition of the board, especially its gender composition. Finally, we ask if social networks within the board influence bank director compensation.

To answer questions about the effect of social networks on the composition of the board, we examine the determinants of board gender diversity. Our main measure of gender diversity is *Percent Female*, defined as the percent share of the board comprised of female directors. *Percent Female* has a mean of 0.12, implying that the average board is about 12 percent women – corresponding to about one out of eight bank board members being female over the sample period (Table 2). Female representation on bank boards has increased over time, reaching 18 percent in 2018.

When we study the effect of social networks on board compensation, we use as dependent variables various proxies of bank director compensation. Specifically, we measure cash-based remuneration with *Direct Compensation*, defined as base annual pay. Second, we use *Total Direct Compensation*, defined as base annual pay plus bonus. This measure also takes into account idiosyncratic year-to-year variation in performance-based monetary awards.

3.3 Control Variables

We include three demographic characteristics that may differ between male and female board members. The first characteristic, *Age*, is the age of a director in years. The second characteristic, *Current Boards*, is the number of company boards a director sits on in a given quarter. The third characteristic, *Board Tenure*, is the average number of years an individual spends on a company board. The average director in our sample is 62 years old, sits on 2.5 boards, and spends 8.77 years on a board (Table 2). In the bank-level estimations, we average these demographic characteristics across board members to obtain bank-level variables that capture the average demographics of the board.

In addition to demographic characteristics of the board, we include a set of bank-specific measures in our bank-level estimations. *Capital to Asset Ratio* is defined as total capital divided by total assets multiplied by 100. We include this measure as Mehran and Thakor (2011) and Bhat and Desai (2016) suggest that the *Capital to Asset Ratio* measures the proficiency of management. *Total Assets*, is the natural logarithm of the sum of a bank's fixed and current assets, representing the scale of a bank's operation. *Return on Assets* is a measure of profitability. Finally, *Board Size* is the total number of directors on the board, representing the scale of a bank's management (Table 2).

The summary statistics in Table 2 are from our entire sample. Because of limited data availability for some variables, all the data is not used in the estimations and we provide summary statistics for the estimation sample in the appendix. As mentioned above, the entire sample includes multiple observations from the same director, and the summary statistics in Table 2 should be interpreted as the characteristics of board members on average, weighted by their time of service.

We examine the characteristics of board members at the time of appointment and present some preliminary analysis of the differences between male and female board members. Table 3 presents differences in means for director characteristics at the time of their appointment to a bank board. These results suggest that new female board members are more likely to be connected to other women on the board than men, less likely to be connected to a bank executive, and less likely to be connected to men on the board. In addition, they are more likely to be younger and to have less experience on boards overall.

4 Social networks and board composition

4.1 Director-level estimations

The statistics that new female board members are more likely to be connected to other women on the board and less likely to be connected to the men (Table 3) suggest that female networks may be particularly important in recruiting women to the board. In this section, we investigate that hypothesis more thoroughly, taking two different estimation strategies. The first approach uses the director level data and examines the type of connections of the director at the time of appointment to the board. In the second approach, we use the data that is aggregated at the bank level to confirm our director-level results with a different perspective.

The director-level estimations take a difference-in-difference approach. The essential idea of this approach is that if female networks are used to recruit female directors, then newly appointed female directors should have stronger connections to the women on the board than the men do. To implement this estimation strategy, we stack the *Director Connection Index* on the *Director Female Connection Index* and then include as controls a dummy variable that equals one if the dependent variable is the *Director Female Connection Index* (*Female Connection Dummy*), a dummy variable that equals one if the director is female (*Female Dummy*) and an interaction of those two dummy variables. If women are more likely to join the board as a result of connections to other women on the board, the interaction term should have a positive coefficient. Specifically, we estimate:

$$(1) \text{ Connection Index}_i = \beta_1 \text{ Female Dummy}_i * \text{ Female Connection Dummy}_i + \beta_2 \text{ Female Dummy}_i + \beta_3 \text{ Female Connection Dummy}_i + \beta_4 X_i + \lambda_t + \alpha_b$$

Where i indexes the individual director, *Connection Index* is *Director Connection Index* stacked on *Director Female Connection Index*, and X is a vector that contains director *Age*, number of boards the individual serves on (*Current Boards*), and the number of years that individual has served on boards of directors (*Board Tenure*). The individual characteristics are measured at the time of appointment to the board, and λ_t and α_b are year and bank fixed effects.⁶ In interpreting the results, we will be particularly interested in examining the coefficient on the interaction of *Female Dummy* and *Female Connection Dummy*. A positive and significant coefficient would

⁶ The inclusion of bank fixed effects accounts for time-invariant bank-specific factors, such as differences in board networks across banks that are related to location or size (such as more closely connected board networks at small banks in more rural locations).

indicate that new female directors have stronger connections to the other women on the board than the men do.

The set of results using the difference-in-difference estimation strategy appears in Table 4. In this table, we present results for the newly appointed directors' connections to other directors (Columns 1 through 4), to the CEO (Columns 5 through 8), and to the senior executive team (Columns 9 and 10). For each type of connection, we present results using unweighted connections and connections that are weighted by connection length. All connections are measured at the time of appointment.

We draw several conclusions from this exercise. First, the negative coefficients on *Female Dummy* indicate that newly appointed female directors are less connected to other directors, to the CEO, and to the senior executives at the bank than newly appointed male directors. In most cases, this is true when we consider just the number of connections or the weighted connections which take into account the length of connection. For connections to the CEO, we obtain statistically significant results only when we weight connections by length, suggesting that newly appointed female board members have a less intense connection to the CEO. This conclusion is reinforced by the fact that the *Female Connection Dummy* is negative and significant in all the estimations. This is the result of fewer female connections overall.

A second interesting conclusion is that networks on bank boards have a gendered dimension to them: female board members have more women in their networks than the men do. This is consistent with banks using female networks to recruit new female board members. Specifically, although women have fewer connections overall, they are more connected to other women on the board, female CEOs, and female senior executives (positive coefficients on the interaction of *Female Dummy*Female Connection Dummy* in the first row of Table 4). Overall,

these results allow us to conclude that the newly appointed female board members have less extensive networks than the newly appointed men do, and the nature of the networks that they do have is different.

4.2 Bank-level estimations

In this section, we present additional evidence on the importance of gendered networks in recruiting women to the board by examining the issue at the bank level. Specifically, we aggregate the director characteristics to the level of the bank board and perform two estimations. The first estimation uses the percent of the board that is male as the dependent variable and the *Male-Male Connection Index* as a key explanatory variable. The *Male-Male Connection Index* is the average percent of men on a bank board a given man is connected to, and is a proxy for the strength of male networks on the board. In the second estimation, we use the percent of the board that is female as the dependent variable and the *Female-Female Connection Index* as a key explanatory variable, excluding all quarters in which banks have no women on the board. The *Female-Female Connection Index* is the average percent of women on a bank board a given woman is connected to. In both estimations, we allow the effect of gendered networks to vary between small and big banks. Specifically, we estimate:

$$(2) \text{ Percent Female}_{b,t} = \beta_1 \text{ Female-Female Connection Index}_{b,t-1} + \beta_2 Z_{b,t-1} + \lambda_t + \alpha_b$$

where b indexes a bank and Z is a vector of bank characteristics that include the *Average Age* of the board members, *Average Current Boards*, *Average Board Tenure*, *Board Size*, $\ln(\text{Total Assets})$, and the *Capital to Assets Ratio*. We also present some specifications in which we interact the *Female-Female Connection Index* with a dummy indicating that the bank is in the top five percent

of asset holdings (*Big Bank*). Finally, we present a complementary specification in which we estimate the relationship between the *Male-Male Connection Index* and the percent of the board that is male (*Percent Male*).

The results appear in Table 5. Panel A reports the results using the percent of the board that is male (*Percent Male*) as the dependent variable. The strength of male networks enters into these estimations sporadically and inconsistently, providing no evidence that the strength of male networks is related to the percent of the board that is male. In contrast, in Panel B, the *Female-Female Connection Index* enters with a positive and statistically significant coefficient, consistent with the idea that female networks are used to recruit women to boards. Panel C provides results that confirm that the coefficients on male networks and the coefficients on female networks in predicting the gender composition of the board are in fact different. Interestingly, the results in columns 5 through 8 of Table 5 indicate that the correlation between female networks and the percent of women on the board (*Percent Female*) is smaller at big banks, suggesting that female networks are less important in recruiting female board members at the largest banks. This would be consistent with larger banks having a more comprehensive system for identifying and recruiting board members that relies on additional recruitment strategies beyond networking.

The magnitude of the effects of female networks is significant. For example, the results in column 2 of Table 5 suggest that a one standard deviation increase in the *Female-Female Connection Index* is associated with a 4.2 percentage point increase in the share of women on the board (*Percent Female*). The results in column 6 of Table 5 refine that finding, suggesting that this increase at small banks would be 4.4 percentage points, but the increase at big banks is about half that size at 2.4 percentage points. Given that the average *Percent Female* for our entire sample is 11.7 percent, these are economically meaningful increases.

5 Social networks and board compensation

Our first set of results suggests that social networks influence who is on the board, and that women and men have different social networks. In our second set of results, we examine whether social networks and the nature of those networks influence the compensation of board members. Specifically, we ask if being connected to a male director or a female director is associated with compensation offered at the time of appointment.

In the first four columns of Table 6, we present results for an estimation predicting the natural log of director salary at the time of appointment and in columns 5 through 8, we present results predicting the natural log of total compensation. For both measures of compensation, we receive similar results. Specifically, although on average, female directors earn less (columns 1 and 5 of Table 6), once we control for other characteristics, especially experience on other boards, that difference is no longer statistically significant. Interestingly, however, the results in Table 6 suggest that being connected to another male director at the time of appointment is associated with higher compensation, even after controlling for a host of individual characteristics, bank profitability (as measured by *Return on Assets*) as well as bank and year fixed effects. We do not find a similar effect for connections to a female director. Interestingly, the interaction of *Female Dummy* and *Connections to a Male Director* does not yield a statistically significant coefficient, suggesting that the impact of being connected to a man is the same for both men and women. That said, the descriptive statistics presented in Table 3 indicate that female directors are less likely to be connected to men and, if we put a causal interpretation on the results in Table 6, that connection could be worth about five percent of the median compensation paid to directors.

6 Conclusion

In this paper, we use a unique and rarely accessed database to examine the relationship between the connectedness of bank boards, board gender composition and director compensation over the 1999-2018 period. We find, overall, that social connections on bank boards are extensive, with the typical director having a connection to 52 percent of the other directors on the board. However, male and female board members have social networks that differ in terms of extent and intensity, with men having stronger and deeper social connections to other board members.

These social connections do appear to matter in determining the composition of the board. Banks that have stronger female networks on their boards also have a higher percentage of board members who are female. Finally, we find evidence that stronger connections to the men on the board are associated with higher director compensation, but we find no evidence that connections to women on the board have the same effect.

Overall, we conclude that the social networks of female board members are smaller, less intense, contain more women, and, in terms of garnering compensation for serving on a board, less lucrative. These findings are particularly relevant for initiatives to further diversify board membership; our results also suggest that female networks are an important means by which banks increase board gender diversity, especially at the many small banks in our sample.

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Table 1: Connection Data Summary**Panel A: Sample**

Variable	Observations
Number of Directors	8,470
Number of Banks	577

Panel B: Connection Types

Connection Type	Number	Percent of total, male directors	Percent of total, female directors
Armed Forces	446	0.01	0
Charities	17,322	0.21	0.45
Clubs	6,468	0.06	0.11
Government	14,347	0.14	0.2
Medical	6,582	0.08	0.14
Partnership	3,278	0.05	0.02
Private Bank	2,621,639	34.03	33.88
Quoted Bank	1,257,164	17.95	18.77
Private Non-Bank	1,080,792	10.03	10.54
Quoted Non-Bank	2,543,114	36.8	34.94
Sporting	292	0	0.01
Universities	48,171	0.64	0.94

Panel C: Connection Genders

Connection Type	Frequency	Percent
Female-Female	85,518	1.38
Male-Female	1,357,844	21.99
Male-Male	4,732,522	76.63

Notes: Table 1 summarizes the connections-level data over the 1999-2018 period. “Partnership” is a connection type that occurs when two directors are both partners at a firm.

Table 2. Summary Statistics.

VARIABLES	N	Mean	SD	Min	p25	p50	p75	Max
<i>Director Level Connection Variables</i>								
Director Connection Index	272,625	0.518	0.410	0	0.0500	0.545	1	1
Director Female Connection Index	259,099	0.285	0.429	0	0	0	0.750	1
CEO Dummy	253,278	0.642	0.479	0	0	1	1	1
Female CEO Dummy	253,278	0.0167	0.128	0	0	0	0	1
Executive Dummy	267,025	0.706	0.455	0	0	1	1	1
Female Executive Dummy	267,025	0.132	0.339	0	0	0	0	1
Male Connection Dummy	259,099	0.424	0.494	0	0	0	1	1
Female Connection Dummy	259,099	0.326	0.469	0	0	0	1	1
Director Bank Connection Index	272,625	0.490	0.422	0	0	0.500	1	1
Director Non-Bank Connection Index	272,625	0.0516	0.157	0	0	0	0	1
<i>Weighted Director Level Connection Variables</i>								
Director Connection Index	272,625	5.931	5.991	0	0.0579	4.709	9.525	25.77
Director Female Connection Index	272,625	0.596	1.159	0	0	0	0.788	5.525
CEO Dummy	253,277	1.402	1.596	0	0	1	2.160	18.04
Female CEO Dummy	253,277	0.0357	0.328	0	0	0	0	9
Executive Dummy	267,022	3.329	3.506	0	0	2.601	5.225	31.12
Female Executive Dummy	267,022	0.125	0.326	0	0	0	0	1
Director Bank Connection Index	272,625	0.691	0.709	0	0	0.575	1.157	7.949
Director Non-Bank Connection Index	272,625	0.0603	0.212	0	0	0	0	3.813
<i>Director Characteristics</i>								
Ln(Salary)	20,483	3.814	0.919	0	3.258	3.912	4.500	7.550
Ln(Total Compensation)	20,483	3.815	0.922	0	3.258	3.912	4.500	7.972
Age	213,993	61.60	8.417	40	56	62	68	81
Current Boards	221,568	2.525	1.529	0	2	2	3	9
Board Tenure	263,491	8.773	6.841	0.300	3.600	6.900	12.50	30.30
<i>Bank Level Connection Variables</i>								
Board Connection Index	31,872	0.543	0.382	0	0.164	0.571	1	1
Male-Male Index	31,872	0.573	0.388	0	0.178	0.621	1	1
Female-Female Index	31,872	0.058	0.164	0	0	0	0	0.75
<i>Weighted Bank Level Connection Variables</i>								
Board Connection Index	31,872	5.249	4.723	0	1.356	4.170	8.067	25.60
Male-Male Index	30,959	0.507	0.542	0	0	0.324	0.911	3.618
Female-Female Index	31,872	0.0749	0.241	0	0	0	0	2.763
<i>Bank Characteristics</i>								
Percent Female	30,959	0.117	0.115	0	0	0.111	0.182	0.667
Percent Male	30,959	0.883	0.115	0.333	0.818	0.889	1	1
Big Bank Dummy	37,695	0.0541	0.226	0	0	0	0	1
Average Age	25,884	61.31	4.530	40	58.62	61.33	64.10	79.33
Average Current Boards	28,528	2.351	1.034	0	1.917	2.333	2.875	9
Average Board Tenure	31,825	8.856	4.202	0.300	5.887	8.580	11.47	28.03
Board Size	31,872	8.190	3.549	2	6	8	10	30
Ln(Total Assets)	37,695	14.25	1.727	8.771	13.14	13.92	15.06	21.31
Capital / Assets	37,695	2.583	0.223	2.121	2.434	2.543	2.680	3.541
Return on Assets	37,695	19.22	31.41	-174.6	16.24	25.09	32.27	73.68

Notes: Table 2 provides summary statistics. Director connections and characteristics are measured at the director-quarter level. Bank connections and characteristics are measured at the bank-quarter level.

Table 3: Difference of Means Tests

Women – Men	Difference	S.E.	p-value
Director Index	-0.02	0.01	0.15
Female Director Index	0.11***	0.02	0.00
CEO Dummy	-0.02	0.02	0.29
Female CEO Dummy	-0.01	0.00	0.31
Executive Dummy	-0.03*	0.02	0.09
Female Executive Dummy	0.02	0.01	0.13
Male Connection Dummy	-0.17***	0.02	0.00
Female Connection Dummy	0.13***	0.02	0.00
Bank Connection Index	-0.02	0.01	0.14
Non-Bank Connection Index	0.00	0.01	0.71
Ln(Salary)	0.09	0.09	0.34
Ln(Total Compensation)	0.08	0.09	0.38
Age	-3.12***	0.34	0.00
Current Boards	-0.06	0.06	0.35
Board Tenure	-1.96***	0.19	0.00

Notes: Table 3 shows difference of means tests. All differences are measured in the quarter of appointment.

Table 4. Director-level Specifications.

Connection Index Type:	Director Connections				CEO Connections				Executive Connections			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Fem. Dummy * Fem. Conn. Dummy	0.131*** (0.0173)	0.118*** (0.0188)	0.386** (0.182)	0.693*** (0.209)	0.0141 (0.0191)	0.0367* (0.0208)	0.134*** (0.0432)	0.186*** (0.0485)	0.0471** (0.0199)	0.0603*** (0.0220)	0.425*** (0.0966)	0.545*** (0.112)
Female Dummy	-0.0534*** (0.00993)	-0.0565*** (0.0122)	-0.749*** (0.160)	-0.807*** (0.182)	-0.0177 (0.0171)	-0.0273 (0.0181)	-0.147*** (0.0414)	-0.131*** (0.0440)	-0.0305** (0.0154)	-0.0336** (0.0166)	-0.0268* (0.0153)	-0.0311* (0.0165)
Female Conn. Dummy	-0.226*** (0.0136)	-0.164*** (0.0150)	-5.379*** (0.201)	-5.900*** (0.230)	-0.578*** (0.0150)	-0.611*** (0.0169)	-1.003*** (0.0346)	-1.073*** (0.0405)	-0.589*** (0.0153)	-0.583*** (0.0181)	-0.597*** (0.0149)	-0.596*** (0.0176)
Age		0.000623 (0.000625)		0.0351*** (0.00617)		0.00109** (0.000460)		0.0099*** (0.00152)		0.000786 (0.000493)		0.0252*** (0.00335)
Current Boards		0.0102*** (0.00340)		0.0783** (0.0335)		0.0104*** (0.00260)		0.0107 (0.00736)		0.0170*** (0.00306)		0.0590*** (0.0178)
Board Tenure		0.00330** (0.00134)		0.139*** (0.0197)		0.00514*** (0.00120)		0.0363*** (0.00577)		0.00229* (0.00119)		0.0639*** (0.0109)
Observations	12,758	9,262	13,086	9,484	11,246	8,658	11,246	8,658	12,046	9,160	12,044	9,158
R-squared	0.468	0.495	0.496	0.534	0.530	0.567	0.351	0.398	0.564	0.582	0.575	0.595
Weighted by Connection Length			X	X			X	X			X	X
Year & Bank FE	X	X	X	X	X	X	X	X	X	X	X	X

Notes: Table 4 shows director-level specifications. The coefficient on *Female Dummy* estimates the difference in overall connections between female and male directors. The coefficient on the interaction term estimates the difference in female connections between female and male directors. All standard errors are clustered at the bank level. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Bank-level Specifications.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: %Male as dependent variable</i>								
Male-Male (MM) Connection Index _{t-1}	-0.0235** (0.0111)	-0.0128 (0.0117)	0.0118** (0.00462)	0.00349 (0.00568)	-0.0171 (0.0125)	-0.00719 (0.0114)	0.0114** (0.00507)	0.00425 (0.00576)
MM Connection Index _{t-1} * Big Bank _{t-1}					-0.0434 (0.0575)	-0.0663 (0.0554)	-0.0167 (0.0271)	-0.0222 (0.0239)
Observations	18,887	14,963	18,866	14,963	16,849	14,963	16,849	14,963
R-squared	0.626	0.668	0.625	0.668	0.630	0.669	0.629	0.668
<i>Panel B: %Female as dependent variable</i>								
Female-Female (FF) Connection Index _{t-1}	0.125*** (0.0106)	0.155*** (0.0104)	0.0758*** (0.0101)	0.0839*** (0.0130)	0.135*** (0.0112)	0.162*** (0.0104)	0.0783*** (0.0120)	0.0931*** (0.0152)
FF Connection Index _{t-1} * Big Bank _{t-1}					-0.0411 (0.0394)	-0.0730** (0.0334)	-0.0338* (0.0185)	-0.0534*** (0.0197)
Observations	18,887	14,963	18,887	14,963	16,849	14,963	16,849	14,963
R-squared	0.660	0.721	0.649	0.698	0.667	0.722	0.652	0.700
<i>Panel C: Difference in coefficients</i>								
FF Connections – MM Connections	0.148*** (0.0169)	0.168*** (0.0169)	0.0639*** (0.0112)	0.0804*** (0.0140)	0.153*** (0.0185)	0.170*** (0.0162)	0.0669*** (0.0130)	0.0888*** (0.0161)
FF– MM (At large banks)					0.155** (0.0784)	0.163** (0.0746)	0.0499 (0.0310)	0.0576** (0.0274)
Weighted by Connection Length			X	X			X	X
Bank Controls		X		X		X		X
Year & Bank FE	X	X	X	X	X	X	X	X

Notes: Table 5 shows bank-level specifications. Panel C estimates the difference in coefficients between the Female-Female and Male-Male Connections Index. In columns 5-8, the first row shows the difference at big banks and the second row shows the difference at small banks. Bank controls include *Average Age*, *Average Current Boards*, *Average Board Tenure*, *Board Size*, $\ln(\text{Total Assets})$, and the *Capital to Assets Ratio*. Bank-quarters with no women on the board are excluded. All independent variables are lagged by one quarter. Standard errors are clustered at the bank level. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Director-level Compensation.

VARIABLES	Ln(Salary)				Ln(Total Compensation)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male Connection Dummy		0.163** (0.0669)	0.162** (0.0681)	0.167** (0.0700)		0.167** (0.0682)	0.167** (0.0694)	0.172** (0.0714)
Female Connection Dummy		0.0941 (0.115)	0.0949 (0.116)	0.0908 (0.124)		0.0962 (0.115)	0.0975 (0.116)	0.0926 (0.124)
Female Dummy	-0.128* (0.0648)	-0.146** (0.0704)	-0.111 (0.0700)	-0.106 (0.116)	-0.133** (0.0659)	-0.150** (0.0715)	-0.116 (0.0713)	-0.112 (0.118)
Female Dummy * Male Conn. Dummy				-0.0338 (0.157)				-0.0339 (0.158)
Female Dummy * Fem. Conn. Dummy				0.0168 (0.147)				0.0214 (0.147)
Age			-0.000771 (0.00417)	-0.000717 (0.00418)			-0.00123 (0.00434)	-0.00118 (0.00435)
Current Boards			0.0202 (0.0144)	0.0203 (0.0143)			0.0196 (0.0146)	0.0198 (0.0145)
Board Tenure			0.0182*** (0.00642)	0.0182*** (0.00645)			0.0182*** (0.00643)	0.0182*** (0.00646)
Return on Assets			-0.00320 (0.00285)	-0.00320 (0.00286)			-0.00318 (0.00283)	-0.00318 (0.00285)
Observations	905	887	875	875	905	887	875	875
R-squared	0.549	0.557	0.571	0.571	0.538	0.547	0.560	0.560
Year & Bank FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Table 6 shows director-level specifications. Total compensation is defined as salary plus bonus. The sample is restricted to the quarter of appointment. The coefficient on the *Male Connection Dummy* measures the difference in compensation between directors connected to (at least) one male director and directors not connected to any male directors. The coefficient on the *Female Connection Dummy* measures the difference in compensation between directors connected to (at least) one female director and directors not connected to any female directors. All standard errors clustered at the bank level. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A1. Summary Statistics for Estimation Sample.

VARIABLES	N	Mean	SD	Min	p25	p50	p75	Max
<i>Director Level Connection Variables</i>								
Director Connection Index	7,017	0.479	0.401	0	0	0.467	0.889	1
Director Female Connection Index	6,579	0.255	0.412	0	0	0	0.500	1
CEO Dummy	5,979	0.588	0.492	0	0	1	1	1
Female CEO Dummy	5,979	0.0174	0.131	0	0	0	0	1
Executive Dummy	6,414	0.719	0.450	0	0	1	1	1
Female Executive Dummy	6,414	0.137	0.343	0	0	0	0	1
Male Connection Dummy	6,579	0.435	0.496	0	0	0	1	1
Female Connection Dummy	6,579	0.297	0.457	0	0	0	1	1
Director Bank Connection Index	7,017	0.456	0.409	0	0	0.400	0.889	1
Director Non-Bank Connection Index	7,017	0.0420	0.145	0	0	0	0	1
<i>Weighted Director Level Connection Variables</i>								
Director Connection Index	7,017	5.787	6.114	0	0	4.293	9.115	25.77
Director Female Connection Index	7,017	0.576	1.168	0	0	0	0.715	5.525
CEO Dummy	5,979	1.011	1.278	0	0	0.857	1.500	12.48
Female CEO Dummy	5,979	0.0309	0.278	0	0	0	0	6.400
Executive Dummy	6,413	2.864	3.260	0	0	2	4.079	26.83
Female Executive Dummy	6,413	0.122	0.319	0	0	0	0	1
Director Bank Connection Index	7,017	0.673	0.738	0	0	0.517	1.072	7.354
Director Non-Bank Connection Index	7,017	0.0589	0.229	0	0	0	0	3.333
<i>Director Characteristics</i>								
Ln(Salary)	905	3.151	1.006	0	2.639	3.219	3.738	7.313
Ln(Total Compensation)	905	3.155	1.020	0	2.639	3.219	3.738	7.650
Age	4,436	57.70	8.521	40	52	58	64	81
Current Boards	5,233	2.472	1.642	0	1	2	3	9
Board Tenure	8,005	4.458	5.956	0.300	0.600	1.300	6	30.30
<i>Bank Level Connection Variables</i>								
Board Connection Index	20,304	0.533	0.372	0	0.167	0.536	0.955	1
Male-Male Index	20,304	0.580	0.382	0	0.200	0.643	1	1
Female-Female Index	20,304	0.136	0.271	0	0	0	0	1
<i>Weighted Bank Level Connection Variables</i>								
Board Connection Index	20,304	5.821	4.966	0	1.695	4.781	8.745	25.60
Male-Male Index	19,391	0.534	0.528	0	0.0416	0.387	0.924	3.618
Female-Female Index	20,304	0.117	0.294	0	0	0	0	2.763
<i>Bank Characteristics</i>								
Percent Female	19,391	0.187	0.0909	0.0435	0.125	0.167	0.250	0.667
Percent Male	19,391	0.813	0.0909	0.333	0.750	0.833	0.875	0.957
Big Bank Dummy	27,981	0.0687	0.253	0	0	0	0	1
Average Age	17,452	61.35	4.200	40	58.83	61.40	64	78
Average Current Boards	18,902	2.424	1.014	0	2	2.375	2.933	9
Average Board Tenure	20,296	8.676	3.967	0.300	5.927	8.444	11.08	28.03
Board Size	20,304	9.214	3.492	2	7	9	11	30
Ln(Total Assets)	27,981	14.43	1.827	8.771	13.23	14.10	15.38	21.31
Capital / Assets	27,981	2.586	0.223	2.121	2.438	2.548	2.680	3.541
Return on Assets	27,981	19.40	31.10	-174.6	16.32	25.04	32.19	73.68

Notes: Appendix Table A1 shows summary statistics for the estimation sample. Director-level variables are restricted to the quarter of appointment. Bank-level variables are restricted to bank-quarters with at least one female director on the board.