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Abstract

Izumi, Shigeoka, and Yagasaki (2023) document the existence of CEO gender homophily in firm-to-firm transactions, where CEOs of the same gender are more likely to trade more than those of the opposite gender, putting female CEOs at a disadvantage in a male-dominated business landscape. In this paper, we examine whether informal networking tools, in particular playing golf as a hobby, mitigate this disadvantage for female CEOs. Using a unique dataset that includes both CEO hobbies and detailed inter-firm networks, we show that playing golf does not benefit female CEOs in finding male business partners, while for male CEOs playing golf is associated with a higher share of trading with male CEOs. These findings suggest the existence of barriers that prevent female CEOs from socializing with male CEOs.

Keywords: Gender; Homophily; CEO; Firm-to-Firm Transactions; Hobby; Golf; TSR data; Diversity and Inclusion
JEL codes: D22, J16, L14, Z13

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1 Introduction

It is well known that women are under-represented as CEOs compared to men, with women making up only 14% of CEOs in Japan, the setting of this study.[1] This disparity could be due to several factors, including differences in the likelihood of promotion between men and women within companies (Bronson and Thoursie, 2019), as well as a lower likelihood of women starting their own businesses compared to men (Halabisky and Shymanski, 2023). However, our understanding of the specific challenges women face as CEOs compared to their male counterparts remains limited. Indeed, it has been observed that firms led by women tend to underperform in terms of profits, sales, and overall size compared to those led by men (Fairlie and Robb, 2009).

In Izumi, Shigeoka, and Yagasaki (2023) (hereafter, ISY), we examine the formation of CEO business networks as a potential explanation for the female CEO disadvantage. Using the data from a major credit reporting company in Japan that covers 1 million Japanese firms with roughly 3 million supplier-buyer links per year over the period 2008–2020, we analyzed the impact of CEO gender on the formation of inter-firm transactions and found that transactions are more likely to occur between CEOs of the same gender, a phenomenon we term *CEO gender homophily.* This tendency puts female CEOs at a disadvantage in a male-dominated business landscape. The question then arises: how can such a female CEO disadvantage resulting from CEO gender homophily be addressed?

In this paper, we examine whether CEO participation in traditionally male-dominated activities can mitigate this disadvantage for female CEOs. Specifically, we focus on golf, a sport considered an effective networking tool in the business world and historically dominated by men. For example, Sygenta (2016) reports that men account for more than three-quarters of all golfers in both the U.S. and Japan.

These unique characteristics of golf provide a rare opportunity to examine the question above. On the one hand, women who play golf can access male-dominated networks and improve their business opportunities with men as effectively as their male counterparts (e.g., Agarwal et al., 2016). On the other hand, the effectiveness of golf for women in accessing male networks is not guaranteed. For example, research shows that women who behave counter-stereotypically can be judged more negatively than those who behave stereotypically (e.g., Heilman et al., 2004; Rudman and Phelan, 2008). Furthermore, golf is exclusive and less accessible to women, inherently favoring male network formation as a typical "old boys' club" (e.g., Michelman et al., 2022; Cullen and Perez-Truglia, 2023;

[1] Authors' calculation from TSR data.

Biggerstaff et al., 2023).

Thus, the question of whether female CEOs can effectively expand their networks with male CEOs by playing golf is ultimately an empirical question. This study addresses this question by exploiting a highly unique feature of the dataset used in ISY: it contains comprehensive information on supplier-buyer linkages as well as detailed data on CEOs' *hobbies*. This unusual dataset allows us to specifically investigate the role of golfing in the formation of business networks.

2 Data and Statistics

The data used in this study is provided by Tokyo Shoko Research Ltd. (TSR), a leading credit research firm in Japan, which contains extensive information on Japanese firms. The TSR dataset includes fundamental firm attributes such as sales, number of employees, firm age, credit scores, industry classification, and location, among others. In addition, two key features of the dataset make it ideal for our analysis. First, it contains detailed data on supplier-buyer linkages between firms, a feature that has been exploited in previous economic studies, including our main paper.[2] Second, in addition to basic information such as the CEO's gender, age, name, education, and prefecture of origin, it includes details about the CEO's *hobby*, which allows us to identify whether the CEO plays golf.

We restrict our analysis to a sample of small firms, where CEOs are expected to play an important role in the occurrence of inter-firm transactions.[3] Indeed, in ISY we confirm the substantial involvement of small firm CEOs in transactions through CEO surveys[4], and we find that the smaller the firm, the more pronounced the evidence of CEO gender homophily. Additionally, the analysis in this paper focuses on suppliers that are trading with at least one buyer as the unit of analysis.

Figure 1 shows the distribution of CEO hobbies by gender.[5] The hobbies are ranked from top to bottom according to their popularity among male CEOs. Several observations can be made from this figure. First, a significant proportion of male CEOs list golf

[2]Other studies using this linkage data include, for example, Miyauchi (2018), Bernard et al. (2019), and Carvalho et al. (2021).

[3]In Japan, small firms are defined as those with 5 or fewer employees in trade and services, and with 20 or fewer employees in manufacturing and other industries.

[4]More specifically, about 60% of small firm CEOs report being involved in *all transactions*, compared to about 25% for medium firms and less than 10% for large firms, according to Izumi, Shigeoka, and Yagasaki (2023).

[5]Each CEO reports up to three hobbies. The figure represents the distribution of all reported hobbies, so the sum for each gender exceeds 100%.

as a hobby, indicating its overwhelming popularity. Second, while golf remains a popular hobby among female CEOs, there is a notable gender gap in the proportion (45% for men vs. 14% for women). This finding is consistent with what we noted in the introduction that golf is a male-dominated activity, even when looking at the subset of individuals who hold the title of CEO.

Table 1 presents summary statistics for our working sample of suppliers, categorized by the gender of the CEO and whether or not they play golf as a hobby. Interestingly, regardless of gender, firms led by CEOs who play golf show higher metrics in sales, number of employees, and credit score than those led by non-golfing CEOs. However, in terms of the number of buyers they trade with, female CEOs who golf have fewer buyers compared to non-golfers, while male CEOs who golf have more.

3 Analysis

In this section, following the ISY framework, we analyze the impact of a CEO's participation in golf on the gender composition of the CEOs of their business partners. We note that the analysis below is descriptive in nature, as we have no exogenous variation in CEO hobbies. Therefore, although we control for an unusually rich set of confounding factors, the evidence is, at best, suggestive.

The basic idea is as follows: Imagine two suppliers, called Supplier A and Supplier B. Suppose they are comparable in terms of basic firm characteristics such as firm size, industry, location, etc., and that they are entering the same "market." Since Suppliers A and B are entering the same market, they face the same set of potential buyers. Under these conditions, if Supplier A's transaction formation exhibits a gender bias *relative* to Supplier B — skewed toward either male or female buyers — then it logically follows that Supplier A's share of transactions with male-led or female-led buyers in that market would exceed that of Supplier B's. Formally, following ISY, we define a market, denoted $k \in K$, as two-digit (≈ 100) industry pairs of suppliers and buyers and define the set of suppliers S^k in market k as the set of firms that are observed to trade as suppliers at least once in market k. The same holds for the set of buyers B^k.

Let $T^k_{i,M}$ denote the share of male-led buyers among all the buyers transacting with supplier $i \in S^k$ in market k. Namely,

$$T^k_{i,M} \equiv \frac{\sum_{j \in B^k_M} Y_{ij}}{\sum_{j \in B^k} Y_{ij}}, \tag{1}$$

where Y_{ij} is a dummy variable that takes one when there is a transaction where i is

a supplier and j is a buyer, and B_M^k is the set of male-led buyers in market k. The denominator on the right-hand side of (1) represents the number of buyers the supplier i trades with in market k, while the numerator represents the number of transactions with male-led buyers.

Figure 2 shows a binned scatterplot of the *observed* means of $T_{i,M}^k$ (y-axis) against the share of *potential* male CEO buyers in each market (x-axis) by supplier CEO gender and golf participation.[6] Unsurprisingly, the share of transactions with male-led buyers in all categories tends to increase as the share of potential male-led buyers in the market increases. The following is a step-by-step approach to understanding this figure.

First, we examine the differences by gender of CEOs. As the figure clearly shows, female CEOs have a relatively lower proportion of transactions with male CEO-led buyers compared to male CEOs, regardless of whether they play golf. Both two fitted lines for female CEOs ("female CEOs who golf", and "female CEOs who do not golf") lie always below the corresponding two lines for male CEOs ("male CEOs who golf", and "male CEOs who do not golf") at every market (i.e., any values on the x-axis). This indicates the presence of CEO gender homophily, where CEOs of the same gender are more likely to form transactions than those of the opposite gender.[7] This is consistent with the findings of ISY, and the result is robust even in our subsample, which is limited to data on small firms with information on CEO hobbies available.

Second, what happens when we compare the magnitude of CEO gender homophily between CEOs who play golf and those who do not? The figure suggests that playing golf, a common (male-dominated) hobby, actually increases the magnitude of CEO gender homophily. For male CEOs, the line for "male CEOs who golf" (solid blue line) is *above* the line for "male CEOs who do not golf" (dashed blue line), suggesting that male CEOs who golf are more likely to do business with other male CEOs than those who do not golf. This is consistent with the anecdotal evidence that golf is used as a networking tool with men in business.

Surprisingly, however, this increase in transactions with male CEOs is not observed for female CEOs. In fact, female CEOs who golf show a decrease in transactions with male CEOs compared to those who don't golf. Quite the opposite of the finding for male CEOs, the line for "female CEOs who golf" (solid red line) is *below* the line for "female CEOs who do not golf" (dashed red line). This finding suggests that for female CEOs,

[6] We use markets with at least ten suppliers and ten buyers. We also exclude data on trade between firms with the same CEO, identified by CEO name.

[7] The measure of homophily used in this paper is always a *relative* sense, called *relative* homophily (Zeltzer, 2020; Izumi, Shigeoka, and Yagasaki, 2023). A more common measure of homophily measure in sociological literature is *inbreeding* homophily (e.g., Coleman, 1958; Currarini et al., 2009).

golf does not seem to serve as a networking tool with male CEOs, but rather increases the likelihood of doing business with other female CEOs.

The above graphical evidence is formally confirmed using the regression analysis in Table 2. The dependent variable is T_{iM}^{k}, the share of transactions with male CEO buyers. All specifications include a rich set of firm characteristics such as the log of the number of employees, firm age, credit score, as well as year fixed effects (FE), year $\times$ market FE, industry FE (four-digit), and firm prefecture FE. We also control for CEO characteristics, namely, the CEO's age and education level and the CEO's birth prefecture FE.

Column (1) shows that having a male CEO is associated with a 0.43 percentage point increase in transactions with male-led buyers compared to female CEOs, confirming the existence of CEO gender homophily in ISY. Column (2) adds a dummy variable indicating whether the CEO plays golf. Being a golfer is associated with a 0.15 percentage point increase in the share of transactions with male-led buyers. This finding supports the notion that golf serves as a networking tool with men in business. In order to confirm that golf acts specifically as an indicator of networking potential in business and not merely as an indicator of athletic ability, column (3) controls for other major athletic hobbies (sports, skiing, baseball, and tennis). The results show that only golf has a statistically significant and positive coefficient, confirming its unique role as a networking tool in business.

Finally, and most importantly, we examine whether this networking aspect of golf differs by CEO gender. Specifically, column (4) adds an interaction term between male and golfer dummies to column (2). Consistent with Figure 2, we find that the estimate of playing golf in column (2) masks the competing gender difference between male and female CEOs. The single term for golf is -0.67, indicating that female CEOs who play golf are significantly *less* likely to do business with male buyers by 0.67 percentage points (p-value < 0.1). On the other hand, for male CEOs (the coefficient on Golf + Male CEO $\times$ Golf), male CEOs who play golf are 0.16 percentage points (p-value < 0.001) *more* likely to do business with male-led buyers than male CEOs who do not play golf.

4 Discussion and Conclusion

Our analysis suggests that female CEOs' participation in male-dominated activities does not necessarily facilitate networking with men and increase business opportunities with male CEOs. We tested this point using a unique Japanese dataset containing data on CEO hobbies and detailed data on firm-to-firm transactions. Using golf as a case, which is known to be an important networking tool in business interactions and is known to be

male-dominated, we show that male CEOs who play golf increase their share of business with men, while female CEOs rather decrease their share of business with men. As a result, CEO gender homophily is greater among golfing CEOs than among non-golfing CEOs.

Our results are suggestive at best, but there are at least two possible interpretations of our findings. First, female CEOs who play golf may not be perceived as favorably by male CEOs as when men play golf, possibly because they engage in behaviors that violate gender stereotypes. Second, there may be some barriers hindering men and women from playing golf together. For example, until recently many golf courses did not allow women to become members.[8] In addition, golf, like many other sports, is often played by members of the same sex, in part because of differences in physical characteristics between men and women.

Our data do not allow us to determine exactly which mechanism is at work. However, based on the two previous studies, including our own, we believe that the former mechanism above is not a major factor. First, the study by Agarwal et al. (2016) shows that women who play golf are more likely to become board members, especially at large firms in male-dominated industries, and the effect is larger than for male golfers. This suggests that women who play golf are not necessarily perceived negatively by upper management (e.g., CEOs) in companies, which tend to be male-dominated. In addition, in Izumi, Shigeoka, and Yagasaki (2023), we use a survey to investigate whether CEO gender homophily arises from "homophily in meeting" - a lack of encounters with the opposite gender- or "homophily in preference" - an aversion to the opposite gender conditional on meeting. The results suggest that while male CEOs tend to slightly prefer interactions with other male CEOs, there is a significant degree of "homophily in meeting" that cannot be explained by such preferences alone. Integrating these findings, we believe that rather than female CEOs who play golf are perceived unfavorably by male CEOs, there is some barrier (either institutional, physical, or other) that prevents playing golf from leading to new encounters and socialization between male and female CEOs.

Building on this, we argue that policies aimed at reducing social barriers that inhibit interactions between men and women and increasing opportunities for cross-gender networking are critical to improving business opportunities for female CEOs. Taking steps to close this gap will not only improve the business prospects for female CEOs but also promote diversity and inclusion throughout society.

[8] See Biggerstaff et al. (2023) for more details on this point.

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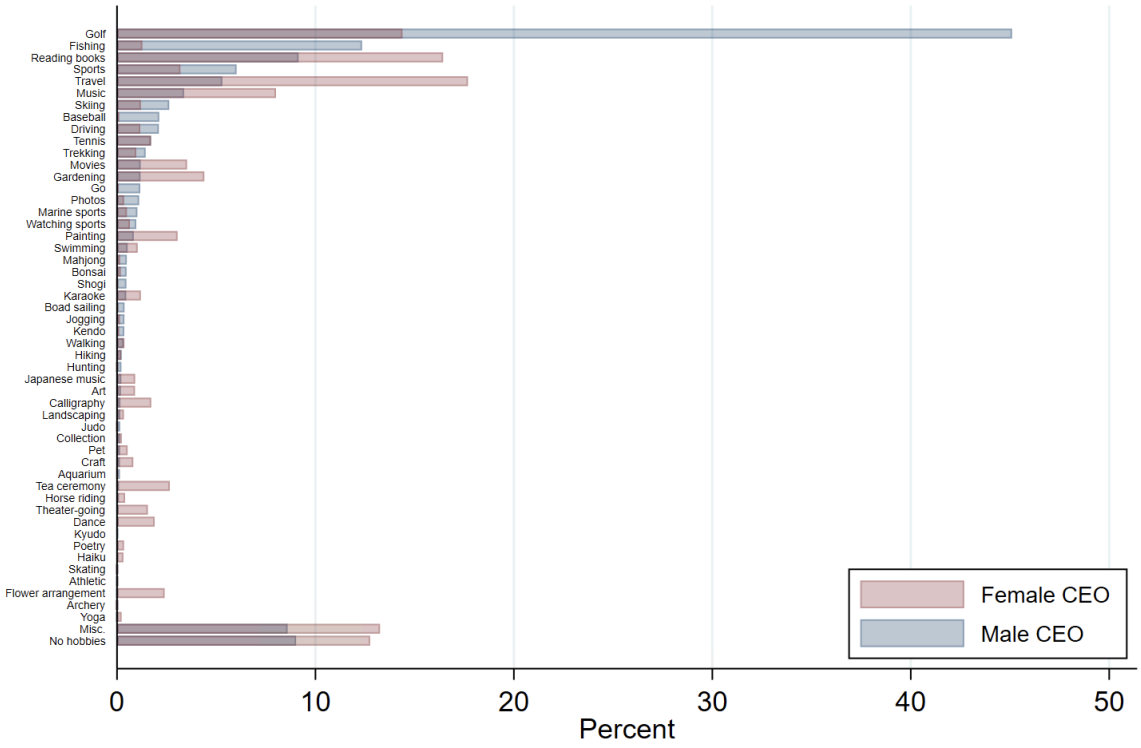
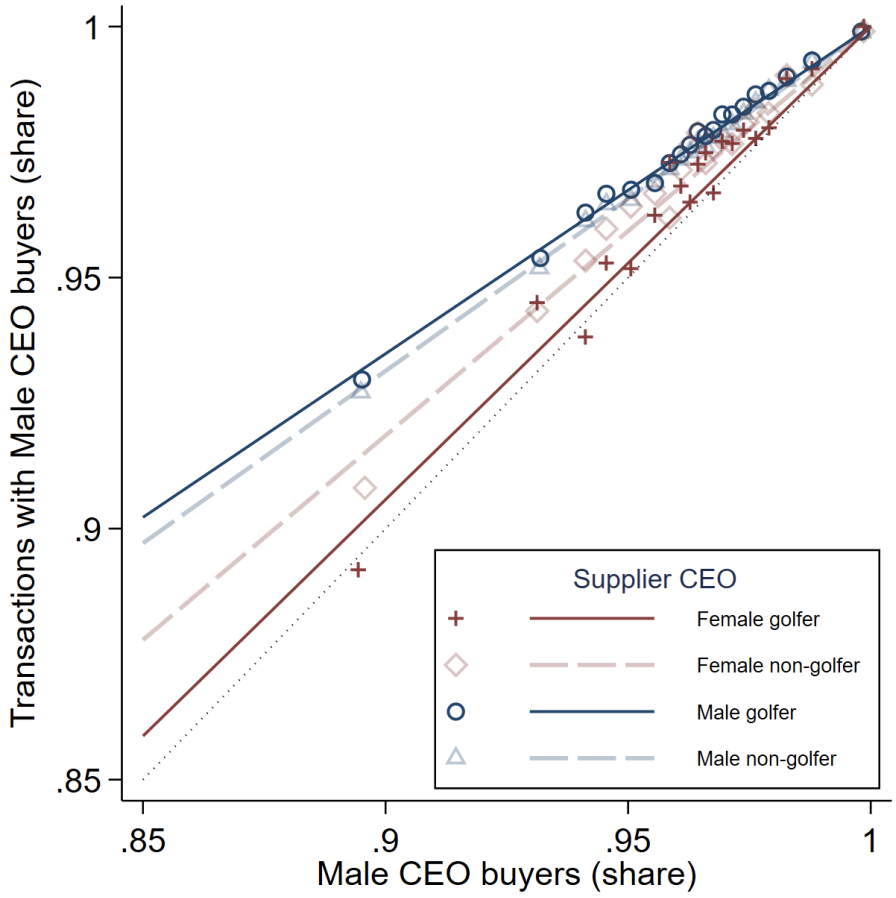
Figures

Figure 1: CEO Hobbies by Gender



Note: This figure presents the distribution of CEOs' hobbies by gender. Sample: small-sized suppliers, from 2008 to 2020. Each CEO provides up to three hobbies. The figure represents the distribution of all reported hobbies; thus, the sum for each gender exceeds 100%.

Figure 2: Share of Transactions with Male CEO Buyers: Golfer vs Non-Golfer



Note: This figure presents binned scatterplots, with the share of *potential* male CEO buyers in the market on the horizontal axis and the *observed* share of transactions with male CEO buyers, $T^k_{i,M}$, on the vertical axis. Markets are defined by two-digit industry pairs and years. The sample includes small-sized firms from 2008 to 2020.

Tables

Table 1: Summary Statistics

	Female CEO		Male CEO	
	Golfer (1)	Non-golfer (2)	Golfer (3)	Non-golfer (4)
Panel A. Firm characteristics				
Ln(sale)	13.842	13.545	14.033	13.714
	(1.288)	(1.394)	(1.267)	(1.265)
Ln(employee)	1.795	1.755	1.917	1.814
	(0.625)	(0.619)	(0.631)	(0.620)
Firm age	30.891	31.187	33.297	31.445
	(15.288)	(15.779)	(15.062)	(15.544)
Credit score	47.168	46.351	47.480	46.783
	(4.815)	(4.933)	(4.991)	(4.885)
Number of buyers	3.209	3.229	3.786	3.491
	(2.596)	(2.894)	(3.325)	(2.924)
Transactions with male CEO buyers (share)	0.956	0.963	0.974	0.973
	(0.165)	(0.150)	(0.115)	(0.120)
Panel B. CEO characteristics				
CEO age	62.927	64.223	63.346	62.079
	(10.297)	(11.606)	(9.951)	(10.877)
CEO college degree	0.248	0.222	0.416	0.387
	(0.432)	(0.416)	(0.493)	(0.487)
N	5,200	30,950	513,350	624,807

Notes: The table presents the sample mean and standard deviation (in parentheses) of selected variables for firm characteristics (Panel A) and CEO characteristics (Panel B) characteristics, by CEO gender and golf-playing status. The sample is restricted to small supplier firms from 2008 to 2020 and excludes any with missing values for the variables used in the analysis.

Table 2: Estimates of Golf Effect on Share of Transactions with Male CEO Buyers

Dependent variable	Transactions with male CEO buyers (share)			
	(1)	(2)	(3)	(4)
Male CEO	0.0043***	0.0039***	0.0039***	0.0026*
	(0.0013)	(0.0013)	(0.0013)	(0.0014)
Golf		0.0015***	0.0015***	-0.0067*
		(0.0004)	(0.0004)	(0.0040)
Male CEO × Golf				0.0083**
				(0.0040)
Sports			-0.0000	
			(0.0008)	
Skiing			-0.0009	
			(0.0012)	
Baseball			-0.0020	
			(0.0014)	
Tennis			0.0015	
			(0.0013)	
Controls	X	X	X	X
Year FE	X	X	X	X
Year × Marekt FE	X	X	X	X
Industry FE (4-digit)	X	X	X	X
Prefecture FE	X	X	X	X
CEO birth prefecture FE	X	X	X	X
Observations	2,650,079	2,650,079	2,650,079	2,650,079
Mean dependent variable	0.9749	0.9749	0.9749	0.9749
R-squared	0.041	0.041	0.041	0.041
p-value: Male CEO + Male CEO × Golf = 0				0.004
p-value: Golf + Male CEO × Golf = 0				0.000

Notes: The sample is derived from the TSR data for the period 2008 to 2020, and the level of observation is firm-market-year. Markets are defined by two-digit industry pairs and years. The dependent variable is $T^k_{i,M}$, the share of transactions with male CEO buyers in the market. Control variables include the number of employees (log), firm age, credit score, CEO's age, and CEO's education level. The standard errors clustered at the firm level are reported in parentheses. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.10.