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Is Gender Diversity Profitable? Evidence from a Global Survey

Marcus Noland, Tyler Moran, and Barbara Kotschwar

Abstract

Analysis of a global survey of 21,980 firms from 91 countries suggests that the presence of women in corporate leadership positions may improve firm performance. This correlation could reflect either the payoff to nondiscrimination or the fact that women increase a firm's skill diversity. Women's presence in corporate leadership is positively correlated with firm characteristics such as size as well as national characteristics such as girls' math scores, the absence of discriminatory attitudes toward female executives, and the availability of paternal leave. The results find no impact of board gender quotas on firm performance, but they suggest that the payoffs of policies that facilitate women rising through the corporate ranks more broadly could be significant.

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Marcus Noland is executive vice president and director of studies at the Peterson Institute for International Economics and a nonresident senior fellow at the East-West Center. **Tyler Moran** is a research analyst at the Peterson Institute. **Barbara Kotschwar** is adjunct professor of Latin American studies and economics at Georgetown University. She was research fellow at the Peterson Institute for International Economics.

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Peterson Institute for International Economics

1750 Massachusetts Avenue, NW Washington, DC 20036-1903
Tel: (202) 328-9000 Fax: (202) 328-5432 www.piie.com

Women do not participate in the global economy to the same extent as men do. Implicit is a normative question of why this is the case and a positive question of what would be the economic impact if women were to participate more fully in economic life. The McKinsey Global Institute (2015) estimates that a scenario in which women achieved complete gender parity with men could increase global output by more than one-quarter relative to a business-as-usual scenario.

The role of women is particularly salient for countries with rapidly aging populations. Emblematic of the exigency of making fuller use of women in the economy has been the Japanese Diet's passage of the Act Concerning the Promotion of Women's Career Activities and the entry of the term *womenomics* into Japanese economic discourse. In South Korea President Park Geun-hye has pledged to boost women's workforce participation by making public funds available to encourage companies to offer more flexible schedules and subsidize childcare.

The relative dearth of women in corporate leadership positions is an emerging political issue. A number of countries, including France, Finland, Iceland, Norway, and Spain, have gone so far as to mandate female representation on corporate boards, and other countries are considering following suit. Several Asian countries are adopting similar policy responses, setting workforce gender balance targets, quotas on corporate boards and political leadership roles, or expanding family-focused policies.

This paper addresses the relative absence of women on corporate executive boards and at the upper levels of management globally. It is based on a 2014 sample of 21,980 firms headquartered in 91 countries. Nearly 60 percent of these firms have no female board members, just over half have no female "C-suite" executives (a firm's most senior executives and members of corporate boards), and less than 5 percent have a female chief executive officer (CEO).

The presence of women in corporate leadership is positively correlated with some firm characteristics, such as size, as well as some national characteristics, such as girls' performance on math assessments, the relative absence of discriminatory attitudes toward female executives, and the availability of paternal leave, among others. The data reveal considerable variation in female representation across regions and countries as well as sectors of the economy.

Past evidence on the impact of female leadership on corporate performance, typically derived from research undertaken in a single country, has been mixed. Examining the economic performance of large US firms, Erhardt, Werbel, and Shrader (2003) and Carter et al. (2007) find that greater gender balance among corporate leaders is associated with higher stock values and greater profitability. Other research on US firms finds that mixed-gender boards outperform all-male boards (McKinsey 2012b) and that the Fortune 500 companies with the highest proportion of women on their boards performed significantly better than firms with the lowest proportion (Catalyst 2011). Accounting firm Rothstein Kass (2012) finds that hedge funds headed by women outperform hedge funds headed by men. More diverse boards have also been found to contribute positively to firm performance in Latin America (McKinsey 2013) and

Spain (Campbell and Mínguez-Vera 2008). Some studies find greater gender balance gains in particular sectors and circumstances.[1]

However, even Carter et al. (2007), in their generally positive assessment of the impact of diversity on corporate performance, observe that the process through which diversity affects board performance is complex and that while some board functions may benefit from greater gender or racial diversity, others may not.[2] Perhaps not surprisingly, some studies conclude that greater balance has a neutral or even negative impact. In a study of German companies, Lindstädt, Wolff, and Fehre (2011) find no overall relationship between female board membership and stock performance. In their study of 2,000 firms, O'Reilly and Main (2008) find no evidence that adding women to boards enhances corporate performance and conclude that such appointments are generally undertaken for normative rather than profit-seeking motives.

This paper uses a global dataset of nearly 22,000 firms to examine the impact of gender diversity on corporate performance. It then analyzes the correlates with diversity. Caution should be exercised in interpreting the statistical results, which are the product of a single snapshot. The dearth of cross-national evidence on these issues justifies taking this first cut.

The results suggest that the presence of women in corporate leadership positions may improve firm performance and that the magnitudes of the correlations are not small. The largest gains are for the proportion of female executives, followed by the proportion of female board members; the presence of female CEOs has no noticeable effect on firm performance. This pattern underscores the importance of creating a pipeline of female managers and not simply getting lone women to the top.

The positive correlation between the proportion of women in corporate leadership and firm profitability could reflect the existence of discrimination against women executives (which gives nondiscriminating firms an edge) or the fact that the presence of women contributes to skill diversity (to the benefit of the firm). There is no evidence that the female board quotas enacted by some countries have had an impact, for good or ill, though the statistical analysis may be too crude to detect such effects.

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1. Dezso and Gaddis Ross (2011) find that adding women leaders improves performance in innovation-oriented firms. Lindstädt, Wolff, and Fehre (2011) find positive results from increasing female leadership in consumer-oriented companies. They also find that companies that have a large female workforce benefit from having female leaders. Jurkus, Park, and Woodard (2011) find that increased gender equity can be beneficial in firms with weak external governance. The Credit Suisse Research Institute (2012) finds that companies with women on their boards perform better than companies with all-male boards in challenging markets. Following the 2008 global economic crisis, for example, net income growth for companies with women on their boards averaged 14 percent, compared with 10 percent for companies with all-male boards.

2. One channel for these gains is a more supportive work environment brought about by greater gender balance. Dezso and Gaddis Ross (2011) find that female representation in top management brings informational and social diversity benefits, improves the performance of other managers, and helps motivate women in middle management. Adding women may also lead to better board behavior. Adams and Ferreira (2009) find that female directors have a positive impact on board inputs (attendance at meetings, participation on committees) and firm outcomes. They find that more gender-balanced firms devote more time to monitoring and tend to hold CEOs more accountable for poor stock performance.

GENDER BALANCE IN CORPORATE LEADERSHIP

We compiled a global dataset from Reuters profiles of publicly traded firms in late 2014. The Reuters data did not explicitly provide identifying information about a firm's home country, top leadership, or the gender identity of corporate leaders (defined here as members of corporate boards and firms' most senior executives). Appendix A describes the techniques used to obtain these data.

This dataset differs from other firm-level studies on gender balance among corporate leaders in its size and scope, spanning 21,980 firms headquartered in 91 countries.[3] Its main shortcoming is that it is limited to a single year (2014). Constructing a panel dataset is a task for future research.

Low levels of female participation are evident on both corporate boards and in executive ranks. Nearly 60 percent of the sample (13,017 firms) recorded no female board members. Just over 50 percent (11,802 firms) have no female executives. Of the remaining half, 57 percent have only one female executive. Only 945 firms—less than 5 percent of the sample—have a female CEO. Appendix table A.1 reveals the gender distribution of the 21,954 firms surveyed (all firms less the 26 that could not be linked to a specific country).

The vertical axis of figure 1 sorts firms by the share of women on their boards; the horizontal axis shows the share of women on the executive committee.[4] At firms directly above the horizontal axis, women hold 0–5 percent of board positions. At firms in the leftmost column, women hold 0–5 percent of executive positions. The intersection of this row and this column is a single cell (the cell at the bottom left), which covers firms with less than 5 percent female executives and less than 5 percent female board members. This cell is by far the densest, containing 7,859 firms, or roughly one-third of all observations.

The opposite case, in which all executives and all board members are women, counts 11 firms.[5] The vast majority of firms (about 17,000) fill less than 30 percent of executive positions and less than 30 percent of board seats with women.

Only 11 percent of the nearly 130,000 corporate board members in the database and 659 of more than 17,000 board chairs (3.8 percent) are women. Women represent 14 percent of the 144,000 executives in the sample and 4.5 percent of the CEOs of the roughly 22,000 firms. If one accepts the

3. The 91st "country" comprises 26 firms that could not be linked to a particular country and were therefore not included in the analysis. Most of the Korean data could not be used, because of difficulties identifying the gender of corporate leaders (Korean names are notoriously gender-neutral, a well-documented challenge for research of this type; see Yoon et al. 2008).

4. The number of firms is about 600 short of the total because a firm must have had both a nonzero number of executives and a nonzero number of board members identified as male or female to be sorted. About 600 firms did not.

5. For all but the very largest firms, having 0–5 percent of executives and board members be women is equivalent to employing no such women. For a firm to have women make up less than 5 percent of executives while still employing a nonzero number of female executives, there would have to be 21 or more executives in total. Such firms represent far less than 1 percent of the total.

premise that equally educated women in a workforce are as capable as men of moving into management, this low number is a puzzle worth pursuing.

The broad averages obscure considerable cross-country and cross-sectoral variation. Figures 2 and 3, which illustrate women's representation on corporate boards and C-level positions for all countries in which 10 or more firms in the dataset are headquartered, highlight the cross-country differences (see also appendix tables A.1 and A.2). As these maps make clear, although there is some relationship between gender balance and per capita income, the correlation is far from perfect. In East Asia, for example, where per capita income is relatively high, women hold only 6 percent of board positions and just 3 percent of board chairs. Intraregional variation is significant, however, with the share of female executives ranging from 2.5 percent in Japan to 13.5 percent in China.

A number of countries have implemented quotas for women on corporate boards (table 1). Norway is the best known, with a 40 percent gender quota for state-owned and, as of 2008, public limited companies. Denmark and Finland impose quotas on female representation for boards of majority state-owned enterprises.[6] To date only Norway and Iceland have applied their complete quota instrument to publicly listed companies.[7] The two countries have the highest female board representation, at 40 and 51 percent, respectively. France implemented a 20 percent quota in 2014, half of the 40 percent quota that will become binding in 2017.

Similar, if less dramatic, variation in outcomes is evident across sectors, with the financial, healthcare, utilities, and telecommunications sectors exhibiting the largest shares of female executive and board representation and basic materials, technology, energy, and industrials exhibiting the smallest (figure 4). Research by McKinsey (2012a) has shown that different sectors create different trajectories for women. In finance, men and women take entry-level positions in roughly equal numbers, but the number of women shrinks by about half by the middle-management level, leaving fewer female candidates to select for leadership positions. In contrast, in sectors that traditionally hire fewer women, such as transport, logistics, and energy, women who are hired have a better chance of promotion to middle management and beyond. It may also be the case that relatively low scores in certain natural resource–based sectors may reflect the location of those assets in countries predisposed toward low representation of women in leadership ranks.

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6. The first country to set quotas was Norway, whose Gender Equality Act of 1981 stipulated a requirement of at least 40 percent of each gender on publicly appointed boards, councils, and committees. The law was extended to boards of publicly owned enterprises in 2004 and to larger joint stock companies in 2006. Quotas for state-owned enterprises have been in force in Denmark since 2000 and in Finland since 2005.

7. State-owned companies may be listed publicly, with the government as a major shareholder, but not all publicly listed companies have the government as a shareholder.

DOES GENDER BALANCE AFFECT FIRM PERFORMANCE?

There is no unambiguous theoretical presumption with respect to the impact of gender diversity on corporate performance. The standard argument is that as firms are value maximizing, if anything could be gained by adding women to corporate leadership positions, they would do so; attempts to force change (by mandating female representation on boards, for example) could be counterproductive (Demsetz and Lehn 1985). This negative outcome might be particularly likely if the new board members (or executives) were less experienced or of lower quality than men or if, because of the scarcity of qualified women, the small pool was stretched across too many boards (the "golden skirt" phenomenon). In the case of the Norwegian board quota, there is empirical research on this point, as discussed below.

The opposite view is that the relative scarcity of women in corporate leadership reflects discrimination and that firms that do not discriminate will exhibit superior performance, particularly if women possess unique or different skill mixes. Indeed, it has been argued (by Iriyama 2015, for example) that although skill diversity generally contributes to corporate performance, demographic or gender diversity per se does not. In their examination of US publicly traded firms, Kim and Starks (2015) find that functional diversity contributes to firm performance and that women bring specific functional expertise to boards of US firms, thereby enhancing performance.

Finally, the functioning of boards and senior management teams reflects complex small group dynamics. Depending on circumstances, introducing women into the mix could either boost or detract from leadership and, by extension, firm performance.

Given such ambiguity, it is perhaps not surprising that empirical evidence on these issues is mixed. Erhardt, Werbal, and Shrader (2003) find a positive relationship between the diversity of executive boards and returns on assets and on investments among 112 Fortune-listed US companies. Carter, Simkins, and Simpson (2003) find that Fortune-listed US firms with at least two women on their boards exhibit higher Tobin's Q ratios (a measure of firm assets in relation to a firm's market value) than firms with lower female representation.

In contrast, after examining nearly 2,000 firms appearing in various S&P indices, Adams and Ferreira (2009) find that gender-diverse boards allocate more effort to monitoring management performance and that as a consequence, CEO turnover is more sensitive to stock performance. Directors also receive more equity-based compensation in more gender-diverse boards. They conclude that gender diversity has a negative impact on firm performance on average (firms with more gender-diverse boards have fewer takeover defenses), though for a subset of firms with weak governance, diversity adds value. Smith, Smith, and Verner (2006) and Rose (2007) obtain mixed evidence on the impact of women on boards on firm performance in Denmark.

The data examined here both are more extensive and cover a vastly more diverse set of economies than the data used in previous studies. Tables 2 and 3 report multivariate regressions on female leadership and gross and net margins. (The gross margin is revenue less cost of goods as a share of revenue; the net margin is gross profit less overhead and other expenses as a share of revenue.) Because these figures are expressed as deviations from sectoral averages, they take positive and negative values dispersed around zero, and simple ordinary least square (OLS) estimation is adequate.

The two tables share a common format, with the included regressors consisting of the share of female board members; the share of female C-level executives; the share of both female C-level executives and female board members (all ranging from 0 to 1); the number of individuals on the board; the log of total revenue (as a scale variable); and the product of a dummy variable taking the value 1 if the firm is headquartered in a country with a quota for female board representation and the firm's share of female board members.[8] We also include country and industry dummies. In addition to the results reported, we estimated alternate regressions on a binary variable indicating whether a firm had a female CEO.

This analysis revealed that the CEO's gender does not have a significant impact on firm profitability, when controlling for gender balance elsewhere in the firm, and those results are not reported in the interest of brevity. The results thus do not suggest that female CEOs tend to outperform their male counterparts. Instead, the benefits of female leadership participation appear to be driven by the fact that, for the reasons noted above, a more diverse leadership team tends to deliver better outcomes on average.

Five alternative specifications are reported in each table. In the first the shares of female board and executives are entered separately. In the second the board quota variable is added. In the third the total female share in corporate leadership replaces the separate female board and executive shares. The fourth and fifth specifications reproduce the first and third specifications, respectively, restricting the sample to profitable firms.

The evidence on the impact of female board membership on firm performance is not robust. The female board share is significantly correlated with gross revenue in the full sample, but the correlation becomes statistically insignificant when the sample is limited to profitable firms or net margins are used as the dependent variable.

Consistent with other research, there is no evidence that board quotas have any significant impact, positive or negative, on company performance.[9] One concern about the quota system is that in a system

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8. This variable is equal to the firm's share of female board members when the firm's country of residence has a quota in place and equal to zero otherwise.

9. This finding is consistent with earlier research. Dale-Olsen, Schøne, and Verner (2014) find the impact of the Norwegian board quota policy "negligible." In their study of 130 publicly traded firms, Ahern and Dittmar (2012) find that the Norwegian reform led to "value losses of upwards of 20 percent for the firms with [no previous female members]," which they attribute to the formation of younger, less experienced boards; increases in leverage and acquisitions; and deterioration of operating

with few qualified women, a small number of women will be invited to sit on the boards of many companies, a phenomenon known as the "golden skirt" effect, and their overcommitment will have a negative impact on monitoring activities. In fact, the data indicate that "golden skirts" are no more prevalent than "golden pants" (figure 5): 13 percent of male board members sit on two boards, compared with 12 percent of women board members, 3 percent of each gender sit on three boards at the same time, and 1 percent of male and 0.8 percent of female board members sit on four or more boards.

The evidence on the impact of female executives is more robust. In five of the six specifications that include this variable, the coefficient is positive and statistically significant—that is, the presence of female executives is associated with unusually strong firm performance. Total female corporate leadership share is estimated with a statistically significant positive coefficient in all four of the regressions in which it appears.

As a further check on robustness, we reestimated the regressions excluding small firms, defined as firms with annual revenues of less than $1 million, boards with fewer than five members, or executive ranks with fewer than five members. The results, reported in table 4, reconfirm the results obtained originally: The evidence on the positive correlation between the share of female board members and firm performance is not robust, but the positive correlation between firm performance and the share of women in upper management is.

Taken together, the pattern of results reported in tables 2–4 suggests a kind of "pipeline" interpretation of the effect of gender diversity. There is no statistically observable impact of having a female CEO, and the impact of women's presence on the board is not statistically robust. However, the correlation between women at the C-suite level and firm profitability is demonstrated repeatedly, and the magnitude of the estimated effects is not small. For example, a profitable firm at which 30 percent of leaders are women could expect to add more than 1 percentage point to its net margin compared with an otherwise similar firm with no female leaders. By way of comparison, the typical profitable firm in our sample had a net profit margin of 6.4 percent, so a 1 percentage point increase represents a 15 percent

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performance, though they admit that some of these effects might be transitory. They also find that the negative impact of the Norwegian law was even greater on other Scandinavian countries, suggesting that some common shock (such as the business cycle), not the Norwegian reform, drove the results. Eckbo, Nygaard, and Thorburn (2015) fail to find evidence of a statistically significant change in the market values of domestic firms listed on the Oslo Stock Exchange that may be attributable to the quota law. They find instead that the value loss cited by Ahern and Dittmar was driven not by the gender quota law but by the superior ability of a small set of large government-owned firms to withstand the negative liquidity shock caused by the 2008–09 financial crisis. Studies by Matsa and Miller (2013) and Nygaard (2011) reach opposing conclusions: Matsa and Miller (2013) find that short-term profit reductions came from fewer workforce reductions compared with other firms and that this effect was particularly strong for firms that had previously had no female board members. Nygaard (2011) finds that investors were more likely to accept new female directors at firms that had less information asymmetry between firm insiders and outsiders. These firms experienced positive and significant cumulative abnormal returns (CAR) after introduction of the quota; firms with high information asymmetry saw negative but insignificant CAR.

boost to profitability. When considering a broader set of firms, both profitable and unprofitable, the result is even more striking. For the sample as a whole, the firm with more women can expect a 6 percentage point increase in net profit, while overall median net profit was just over 3 percent. One wonders if similar results would be obtained if one analyzed the organizational ranks below the C-suite.

These results, together with the finding that quotas do not appear to have a significant impact on firm performance, suggest that although the boards of publicly traded firms are an easy target for legislators, the payoffs for policies that facilitate women rising through the corporate ranks more broadly might be larger. More women on corporate boards might be a way of promoting that outcome: Statistically, there is a correlation between the presence of women on boards and the presence of women in executive ranks. A more gender-balanced board might show greater interest in encouraging a more balanced executive team. Certain firm and national characteristics are robustly correlated with the presence of women not only on boards but also in upper management more generally.

WOMEN'S PRESENCE IN CORPORATE LEADERSHIP

Given the relatively large dispersion of cross-country outcomes (figures 2 and 3) relative to the less dispersed cross-sectoral results (figure 4), one might expect that country characteristics are driving the observed outcomes. Table 5, which reports an analysis of variance (ANOVA) on both the women's share of board and executive positions, confirms this hypothesis. For both corporate boards and executives, all three groupings (country-specific, sector-specific, and country/sector-specific categorical variables) explain a significant degree of variation in women's representation, but country variation accounts for the largest shares. These factors alone do not explain the majority of the variation across firms, but the results justify additional focus on national characteristics in explaining women's representation in corporate leadership.

The observed outcomes are presumably a function of individual characteristics intermediated by national institutional structures broadly defined. Educational credentials and work experience are the key attributes. A 2015 survey of international professional leaders revealed that more than 80 percent had university degrees and 38 percent held advanced degrees (British Council 2015). To lead a company it is also helpful to have worked in the industry; the business literature finds significant returns to years of experience (see Pande and Ford 2011). If women were not obtaining the relevant educational credentials or participating in the workforce, it would be unsurprising that they were not moving up the corporate ladder.

Social attitudes, corporate practices, and national laws may be conditioning outcomes. They could range from cultural attitudes that discourage women's advancement in the commercial sphere to outright gender discrimination to corporate practices (such as low turnover on boards), which would slow the

integration of new, and potentially demographically different, board members to policies such as quotas that mandate a certain level of participation.[10]

Table 6 presents some simple cross-national correlations between the female leadership variables and indicators of or proxies for these effects. It includes three indicators of educational attainment: the tertiary enrollment rate relative to men; the female share of social science, business, and law graduates; and girls' score on the OECD Program for International Student Assessment (PISA) relative to boys'. In this sample women make up 12 percent more of tertiary degree recipients than men on average, with the gap reaching 21 percentage points in the top 10 countries (appendix table A.2). Women also represent 58 percent of all graduates in social sciences, law, and business (64 percent for the top 10 countries). In the United States, 4 out of every 10 MBA graduates are women (AACSB 2014).

All three of the indicators are positively correlated with the share of board seats held by women. The female share of social science, business, and law graduates and girls' versus boys' PISA scores are correlated with the female executive share. The PISA score correlations with both the female board and executive shares are particularly strong, both significant at the 0.001 level.

Of course, a simple cross-section may mask a cohort effect: Women in 2014 may be graduating at rates equal as men, but these young graduates are not the people who are currently competing for management positions. Figure 6 compares 2014 data with graduation rates in the late 1990s, the period in which current leadership candidates could have been expected to graduate. It shows a clear connection.[11] The trend is upward sloping: As women's share of social science, business, and law graduates increases, women tend to increase their share among executive ranks. More tellingly, however, is the difference in the scale of the axes and the fact that only six data points sit below the equity line for graduates. Women represent at least half of graduates in social science, business, and law in nearly all countries in the sample in both time periods, implying that education is not the main obstacle to leadership success. The logjam lies further downstream.

Table 6 reports correlations between various indicators and the share of women in corporate leadership positions. Both the female share of board members and the share of women in C-level positions are positively correlated with the share of women doing professional work (countries with more women in the professional/technical workforce have more female executives). Overall, women in the professional workforce are not in short supply, although female labor force participation remains an issue

10. A survey of 17,000 American and 2,800 non-American middle and high school students suggests that attitudes toward female leadership may be ingrained early on: Both boys and girls expressed preferences for male leaders, even as leadership pathways for girls are increasingly clear (Weissbourd 2015).

11. The average age in the sample is 50 for female executives and 55 for female board members. These women would have graduated from business school in the late 1980s through the 1990s. Data on too few countries are available for the years before 1999.

for some countries in the sample. The gap in male versus female participation in the labor force is almost three times as great in the 10 least gender-balanced countries in the sample as it is in the 10 most gender-balanced countries (see appendix table A.2). On average, however, the male-female gap in the professional workforce is low, –1 for the sample as a whole and –10 for the bottom 10 countries. In the United States, for example, 40 percent of managers are women (US BLS 2014). Labor force participation can thus not explain the consistently low numbers of female leaders.

Table 6 also reports three indicators of the institutional environment. The first two—the widely cited World Economic Forum's Global Gender Gap Index, which aims to capture society's willingness to allow women to participate in education, the labor force, and public life, and the share of respondents disagreeing with the statement "On the whole, men make better business executives than women do" in the World Values Survey—directly address the local status of women.[12] The former is positively correlated with both indicators of female leadership, but the index is an output-based measure, and a number of its underlying components (the tertiary enrollment share, the female labor force participation and professional work shares, and the shares of women in parliament or in ministerial positions) overlap with indicators reported in table 6; the additional explanatory power of this index is thus unclear. The pure discrimination indicator from the World Values Survey is uncorrelated with the shares of women on boards or in the executive ranks. The third indicator, inward foreign direct investment (FDI) as a share of GDP, is included because it may be that exposure to foreign business practices alters prevailing local norms toward greater tolerance of nontraditional approaches, including a greater role for women in management (Noland 2005). As in the case of the pure discrimination question, this variable appears uncorrelated with women's representation in executive leadership.

If women are as educated as men in relevant fields and participate as much in the professional/technical workforce, why are they not moving up to management levels at the same rate as men? Could it be that women are simply not as ambitious as men? A number of recent studies address this variable. A 2004 Catalyst survey finds that 55 percent of businesswomen and 57 percent of businessmen aspired to the senior-most leadership position at their firm. Ely, Stone, and Ammerman (2014) surveyed more than 25,000 Harvard Business School graduates. They find that male and female graduates' ambitions are similar.

Bertrand, Goldin, and Katz (2010) provide some insight into a variable that may be at play. They show that female graduates of the University of Chicago's Booth School of Business who entered the labor force at the same time and at a similar rate of pay as their male cohorts are 12 percent less likely to be

12. The most recent survey did not include either Canada or the United Kingdom. Values for these countries were set equal to that of the United States, under the assumption that the three countries are generally similar in their views toward women in business. In the previous World Values Survey results, about 80 percent of respondents in all three countries disagreed with the assertion that men were generally better business leaders.

working nine years later. The business literature finds significant returns to years of experience (see Pande and Ford 2011). Fewer years of experience could lead to a smaller pool of qualified women to advance up the leadership chain. Bertrand, Goldin, and Katz conclude that "the greater career discontinuity and shorter work hours for female MBAs are largely associated with motherhood" (p. 228).

Table 6 includes two indicators of social policy: paternity leave and maternity leave. In most societies, to varying degrees, women are more likely than men to take on the double burden of work and family—and to be expected to do so. Indicative of the lower priority put on paternity leave, it is reported in days whereas maternity leave is reported in weeks.

Table 7 lists the family leave policies of the top and bottom performers in the corporate leadership gender balance dataset, as reported by the International Labor Organization (2014). The most gender-balanced countries offer maternity leave but on slightly less generous terms (in time and compensation) than the average or bottom countries. Paternity leave is significantly greater in the most gender-balanced host countries, with the top 10 countries offering 11 times more paternity leave days than the bottom 10.

Even in societies that do not suffer from cultural biases against women's participation in the technical and professional workforce, women by and large assume a greater share of child care and household responsibilities. An oft-cited reason for women not reaching the top of the corporate ladder is the so-called mommy track—the diminished career opportunities faced by women who bear or might bear children. As women take maternity leave and require more flexible hours to care for their children, they are unable—or perceived as unable—to undertake the level of commitment required to become corporate leaders. Firms may be loath to groom or promote as leaders individuals they expect may take extensive leave and who may derail mid-career.

The evidence that having children leads women to opt out of the labor force is weak. In the United States about 10 percent of women leave the workforce to raise children (Kanter and Roessner 2003; Ely, Stone, and Ammerman 2014). Women may ramp down their career ambitions to devote more time to family care—and may be expected to do so more than men: The survey by Ely, Stone, and Ammerman finds that even among men and women who are equally successful and ambitious at the time of graduation, men's career advancement is valued over women's. In a longitudinal study of Denmark, Pertold-Gebicka, Pertold, and Gupta (2016) find that women exhibit a higher propensity to leave the private sector for the public sector and a lower propensity to exit public sector employment around the time of the birth of their first child.

Parental leave policies are a proxy for support for policies directed at childcare. Although an imperfect proxy—a more robust indicator would also take into account workplace flexibility, access to affordable daycare, and other forms of childcare support—they provide information regarding attitudes toward

childcare in a society and the childcare means available to parents during the early and most labor-intensive months (or years).

Perhaps surprisingly, mandated maternity leave is not correlated with female corporate leadership shares, though paternity leave is strongly correlated with the female share of board seats, significant at the 0.001 level. This issue is worthy of further consideration. One might have expected to find a significant and positive result for maternity leave—that is, countries that provide mothers with more generous terms for caring for their babies and toddlers should have larger shares of female leaders—but the data do not find this to be the case. If these correlations are interpreted causally, one could argue that countries in which fathers have access to more leave have significantly more women on corporate boards. It stands to reason that policies that allow childcare needs to be met but do not place the burden of care explicitly on women increase the chances that women can build the business acumen and professional contacts necessary to qualify for a corporate board. More gender-neutral family leave (and more supportive childcare institutions more generally) would also cut off the expectation by employers that young men will necessarily provide greater returns to training and mentoring than young women.[13] This interpretation of this result suggests that policies that place a disproportionate burden of childcare on women are one barrier to female corporate advancement.

It is possible that the demonstration effect of seeing women as political leaders could have an impact, paving the way for women to break into corporate leadership. Female political leaders may also be more likely to promulgate policies that encourage gender equity. Table 6 includes two indicators of female political influence, the share of female parliamentarians and the share of female cabinet ministers, both part of the World Economic Forum's Global Gender Gap Index. Neither is strongly correlated with female corporate leadership, consistent with the conclusion of Pande and Ford (2011) that there is very little evidence of spillovers from gender advances in the sphere of political leadership to corporate leadership.

Multivariate regressions are reported on the female share of board members (tables 8 and 10), C-suite executives (tables 9 and 10), and CEOs and board chairs (table 11). In tables 8 to 10, Tobit estimation is used in light of the degree of truncation in the data displayed in figure 1 revealing large numbers of zero-valued left-hand-side observations. Probits are reported in table 11, where the left-hand-side variable is binary.

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13. If both men and women are eligible for family leave, firm calculations on which individuals to groom for leadership would take gender into account less. As Josh Levs explains, in an interview regarding his book, *All In: How Our Culture Fails Dads, Families, and Businesses—And How We Can Fix It Together* (2015), "As long as you're pushing men to stay at work [by not granting them paternity leave], you're pushing women to stay home." Brigid Schulte, "CNN Journalist Josh Levs Forced His Employer to Give New Dads More Time off. Now He Wants Others to Speak Up, Too," *Washington Post*, June 15, 2015, www.washingtonpost.com/news/inspired-life/wp/2015/06/15/as-a-new-father-cnn-journalist-josh-levs-forced-his-employer-to-give-dads-more-time-off-now-he-wants-others-to-speak-up-too/?hpid=z7 (accessed on June 15, 2015).

In tables 8 and 9, the specifications on the left include only firm-specific control variables for the presence of a female CEO, the number of individuals on the firm's board, and the log of its 2013 revenue, as well as vectors of country and industry dummies. For the remaining specifications, country-specific variables are added panel by panel, as in table 6, and the country dummies are dropped (except for Norway).[14, 15] The cross-national pattern of women's representation in corporate leadership is correlated with per capita income, which is added as a control, along with the indicators reported in table 6. Sample coverage for some of these variables is incomplete (hence the variation in reported sample size across specifications).

In the six specifications reported in table 8, the presence of a female CEO, the size of the board, and the size of the firm as measured by revenue are all positively correlated with the share of women on the board. In terms of country characteristics, in specification (2) each of the educational indicators is positively associated with the share of female board members at the 0.001 level, though the inclusion of these variables reduces the sample size considerably. In specification (3) female labor participation and the ratio of female to male income are positively correlated with the share of women on boards, but in contrast to table 6, the share of female professional workers is not. In specification (4), variables relating to the institutional environment are added. In contrast to the results obtained in table 6, when one controls for per capita income and firm characteristics, all three variables—responses to the World Values Survey question regarding the preferability of male managers, the Global Gender Gap Index, and inward FDI—are all significant at the 0.001 level, with the expected signs. Both of the female political representation variables are significant at the 0.001 level in specification (5). In the interest of parsimony, the paternity and maternity leave data are expressed as a ratio in specification (6). The coefficient is positive, significant at the 0.001 level.

Similar results are obtained for the female executive share in table 9. The coefficients on the firm characteristics are all statistically significant, with the expected signs. In specification (2) the math scores and shares of social science/business/law graduates are statistically significant, but the overall tertiary enrollment rate is not. In specification (3) the income gap is statistically significant, but in contrast to specification (3) in table 8, the female labor force participation is not whereas the female share of professional and technical workers has a strong impact. In specifications (4), (5), and (6) in table 9, all of the institutional, political, and social policy variables are significant at the 0.001 level, as was the case in table 8.

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14. All "share" and "ratio" variables use the same scale, on both the left- and right-hand sides of the equation. The values for parity are 1 for ratios and 0.5 for shares.

15. The Norway dummy is retained to capture the impact of the board quota, which appears to be binding. The female board share is 40 percent in Norway, 23 percent in Finland, 22 percent in Sweden, and 18 percent in Denmark.

Issues with sample coverage mean that inclusion of some variables alone or in combination can have a substantial impact on sample size. Table 10 reports eight regressions in which the variables from table 6 are combined, four for each dependent variable, with the specifications arranged in increasing order of sample truncation. Some of the correlations are very robust, others less so. All of the firm characteristics—the presence of a female CEO, the size of the board, and the size of the firm—are robustly and positively correlated with the female corporate leadership shares. Girls' relative performance on the PISA in math is positively and robustly correlated with the female share of corporate boards and C-level executive ranks, though inclusion of this variable, available only for OECD countries and a few select nonmembers, reduces the sample size considerably. The ratio of female to male income is statistically significant in five of eight specifications. Most of the coefficients on attitudes toward female executives, the ratio of paternity to maternity leave, and the extent of inward FDI are statistically significant, with the expected sign, but in each case one instance is estimated with a statistically significant unexpected sign.

Table 11 reports probit regressions on the presence of women as CEOs or board chairs. The probability of having a female CEO is strongly and positively associated with the presence of women on the board and weakly negatively associated with firm size. As noted previously, however, if the board chair is female, there must be at least one woman on the board. So in specification (3), the simple female board share is dropped from the specification and replaced with a count that excludes the chair herself. The female board share excluding the chairwoman is still positively and significantly correlated with the presence of a female board chair, but firm size now exhibits a weak positive correlation.

Specifications (4) and (5) include variables relating to national characteristics. As might be expected given that the ascent of a single individual to the pinnacle is being modeled, virtually no national characteristics are significantly correlated with these outcomes.

CONCLUSION

A global survey of nearly 22,000 firms reveals the relative dearth of women in high leadership positions. Almost 60 percent of these firms have no female board members, just over half have no female "C-suite" executives, and roughly one-third of the sample has no women in either C-level or board positions. There is evidence of both cross-sectoral and cross-country variation in these patterns, with the cross-country dispersion much larger.

The survey represents a snapshot; the results should therefore be interpreted cautiously. Collection of additional data to construct a panel would help distinguish causality from mere correlation. Nevertheless, given that previous studies have been generally limited to one or several OECD economies, the sheer size and breadth of the dataset, including firms headquartered in 91 countries, justifies a careful examination of the data.

The results suggest that the presence of women on corporate boards and in the C-suite may contribute to firm performance. The impact is greatest for female executive shares, followed by female board shares; the presence of female CEOs has no noticeable effect. This pattern underscores the importance of creating a pipeline of female managers and not simply getting women to the very top.

The estimated magnitudes of these correlations are not small: For profitable firms, a move from no female leaders to 30 percent representation is associated with a 15 percent increase in the net revenue margin. This estimate, derived from a cross-section, may well diminish if reestimated in a panel setting and is surely subject to diminishing returns. Nevertheless, the robustness of this result from a global dataset warrants further study.

The positive correlation between the presence of women in corporate leadership and profitability could reflect the existence of discrimination against women executives, which gives nondiscriminating firms an edge. Alternatively, it could be that the presence of women contributes to superior performance via functional diversity.

What explains the relative scarcity of women in corporate leadership? The statistical results suggest that at the firm level, the size of the company and the size of the board are robustly correlated with the presence of women on boards and in the C-suite (though not as CEOs). The results also suggest that a set of national characteristics—including high scores on math assessments, concentrations in degree programs associated with management, and the ratio of female to male income, which could be interpreted as indicators of institutional openness to women's success—is robustly correlated with these outcomes. The results also point to other correlates that could be overlooked, including discriminatory societal attitudes, the importance of paternity as well as maternity leave, and openness to foreign investment, which could be interpreted as greater tolerance for new ways of doing business.

The analysis uncovered no evidence of significant effects of the female board quotas some countries have imposed. The statistical analysis may be too crude to discern such effects if they exist, however. Moreover, if increased gender diversity in corporate leadership contributes to firm performance, if quotas have negligible costs, and if the presence of women in the C-suite enhances the pipeline effect by encouraging more women to pursue these positions, as is often claimed, then some kind of quota system may warrant consideration, particularly if the dearth of women in these positions at least in part reflects pure discrimination. As Eckbo, Nygaard, and Thorburn (2015) observe, "Nomination of new board members may be limited by existing networks and a biased search process."[16] Mandating a percentage of women on boards for a set number of years, for example, could mitigate such biases.

16. Agarwal et al. (2015) find that a woman's likelihood of serving on the board of a publicly traded company in Singapore more than doubles if she plays golf, suggesting that the impact of social networks in even apparently trivial settings is significant.

The effectiveness of a quota could turn on women's status further down the corporate ladder. If women face a glass ceiling just below the top leadership level, a quota should be relatively painless, even in the short run. In contrast, if women struggle to reach upper management, a quota would carry heavier short-run costs. In this case it might be better to pursue policies that help women in the middle of their careers before directly addressing board membership. Indeed, the results suggest that the real economic payoffs are to increasing gender diversity in the C-suite, not on boards. To the extent that there is a correlation between the presence of women on boards and the presence of women in executive ranks, a board quota might facilitate diversity more broadly, which should be the ultimate goal.

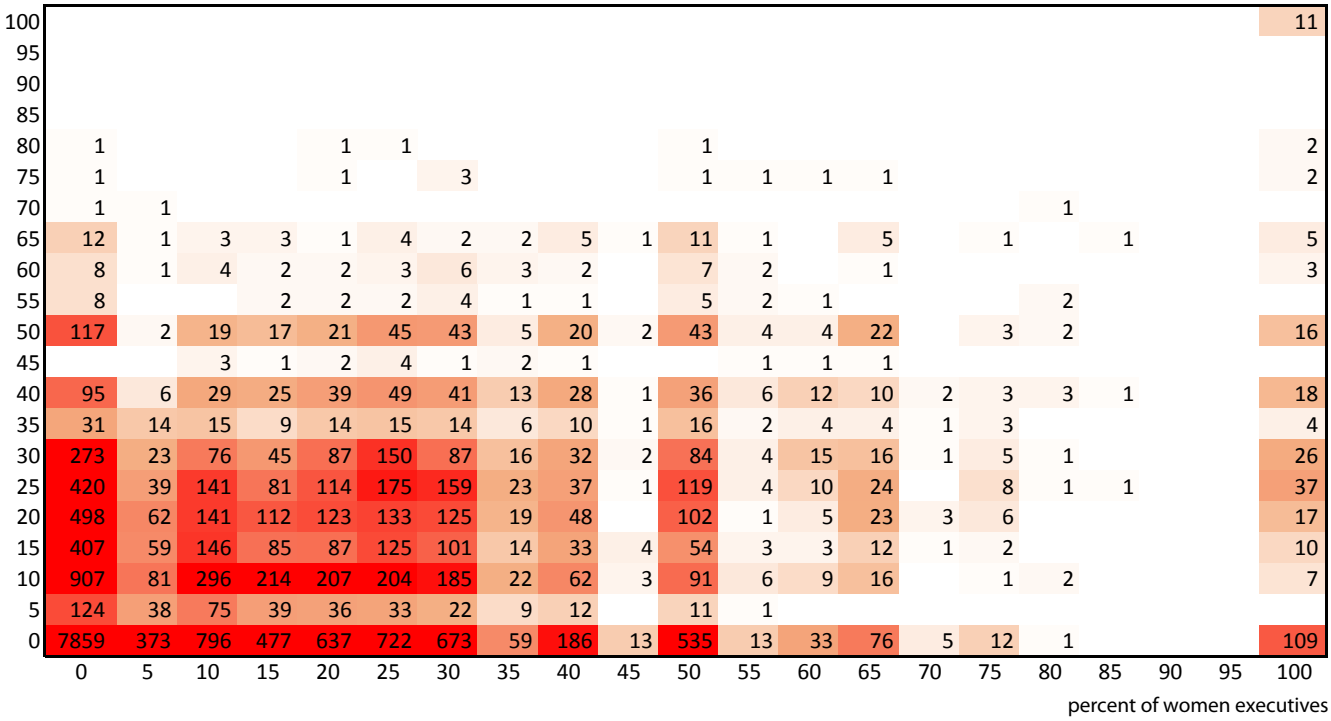
A number of measures could mitigate potential negative effects of quotas. The Netherlands' quota system has an expiration data, included in order to test the effects of the policy. Having an expiration for a legislative quota would be akin to infant industry protection in the trade theory literature: It would allow the underrepresented group a period of time to build up experience and network mechanisms, put in place training mechanisms for following cohorts, and allow exposure to female corporate leaders. Once these mechanisms are in place long enough that a cadre of women prepared for leadership exists, the quota could be removed.

Another option—expanding the board to add more women but not at the expense of qualified men—comes from the world of sports. The International Triathlon Union, the governing body of the sport, mandates that a certain percent of leadership be women but allows for the addition of an extra board seat for every extra woman brought on board.

An alternative to the legislated quota would be voluntary programs to address the gender imbalance in corporate leadership. If at least some of the dearth of women in the upper ranks of corporate leadership reflects pure discrimination, proactive nondiscriminating firms will outperform their discriminating rivals and expand at their expense. One recent example is Daimler Corporation, which in 2006 pledged to fill 20 percent of management positions with women by 2020. A number of grassroots corporate movements have emerged calling on companies to foster greater female representation on their boards. A US campaign, 2020 Women on Boards, is working to raise the share to at least 20 percent by 2020. In the United Kingdom, a group called the 30% Club aims for women to make up 30 percent of the boards of firms in the FTSE.

Further work will be needed to tease out the precise channels of causality latent in these results and inform how vigorously such initiatives should be pursued, if at all. At a minimum the results from this global survey suggest promising directions for understanding both the impact of gender diversity on firm performance and the underlying drivers of diversity itself.

Figure 1 Distribution of firms by female share of leadership



Source: See text.

Table 1 Terms and outcomes of gender equity quotas, by country

Country	Quota (percent)	Type of company covered[a]	Year in force	Penalty for noncompliance	Number of firms covered in data	Share of women (percent)			
						Board members	Executives	Board chairs	CEOs
Obligatory									
Austria	25	State owned	2013	n.a.	60	4	13	2	2
	35		2018	n.a.					
Belgium	33	Public	2018	Loss of benefits by board members until quota law is complied with	98	14	13	4	2
Denmark	varies	Large firms	2013	n.a.	48	18	17	9	2
Finland	40	State owned	2005	Appointment rendered invalid if it does not meet criteria	101	23	18	6	1
France	20	Public	2014	Post stays open until woman found	565	19	16	6	4
	40		2017						
Germany	30	Large Public	2016	Post stays open until woman found	521	6	14	4	3
Iceland	40	Public	2013	Fine	9	51	21	38	0
India	At least 1 woman	Public	2015	Fine	1286	9	13	5	5
Israel	50	State owned	2010	n.a.	332	16	23	2	8
Italy	33	Public	2015	Warning, fine, voiding of board actions	196	24	16	10	10
Kenya	33	State owned	2010	n.a.	31	21	21	15	9
Malaysia	30	Large Public	2016	n.a.	560	10	29	4	4
Norway	40	Public	2008	Official warning, fines, delisting and dissolution	132	40	20	9	3
Spain	40	Large Public	2015	No penalties, but compliant firms have potential priority for government contracts	96	14	13	5	3

(table continues)

Table 1 Terms and outcomes of gender equity quotas, by country

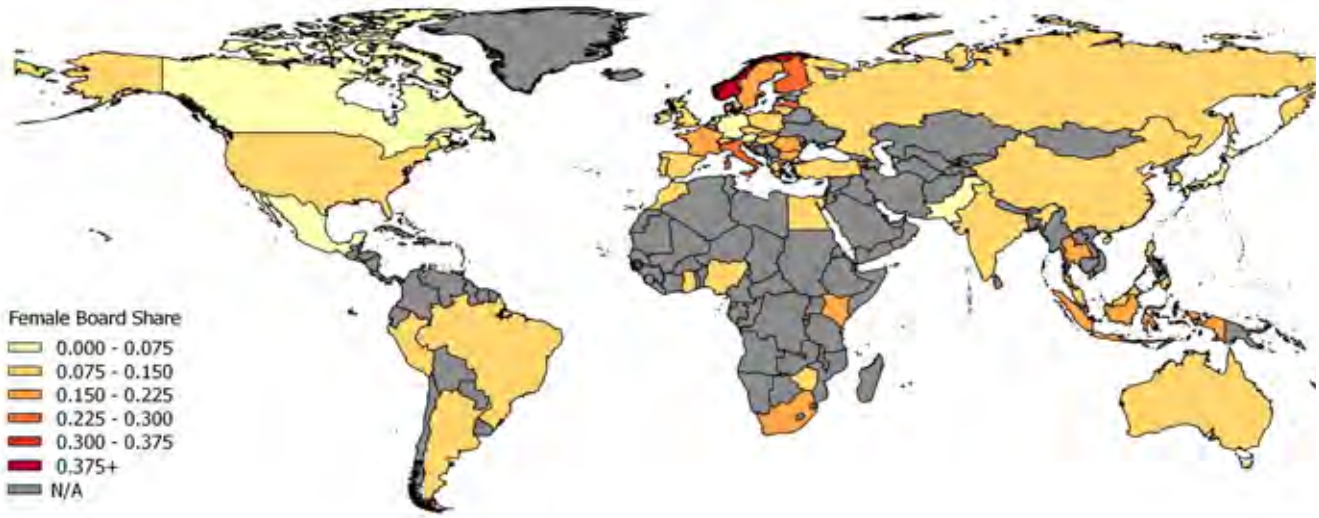
Country	Quota (percent)	Type of company covered[a]	Year in force	Penalty for noncompliance	Number of firms covered in data	Share of women (percent)			
						Board members	Executives	Board chairs	CEOs
Obligatory									
Switzerland	30	State owned	2011	n.a.	207	9	8	3	4
Voluntary									
Netherlands	30	Public	2013, expires 2016	Failure to meet quota must be reported in annual report	98	6	12	0	1
United Kingdom	25	Public	2015	n.a.	1,115	12	13	3	3
Proposed									
Brazil	40	State owned	2022	n.a.	265	9	9	3	4
European Union	40	Public	2020	n.a.					

n.a. = not available

a. Characterization of companies included is broad; many quotas include specifiers according to size or other characteristics.

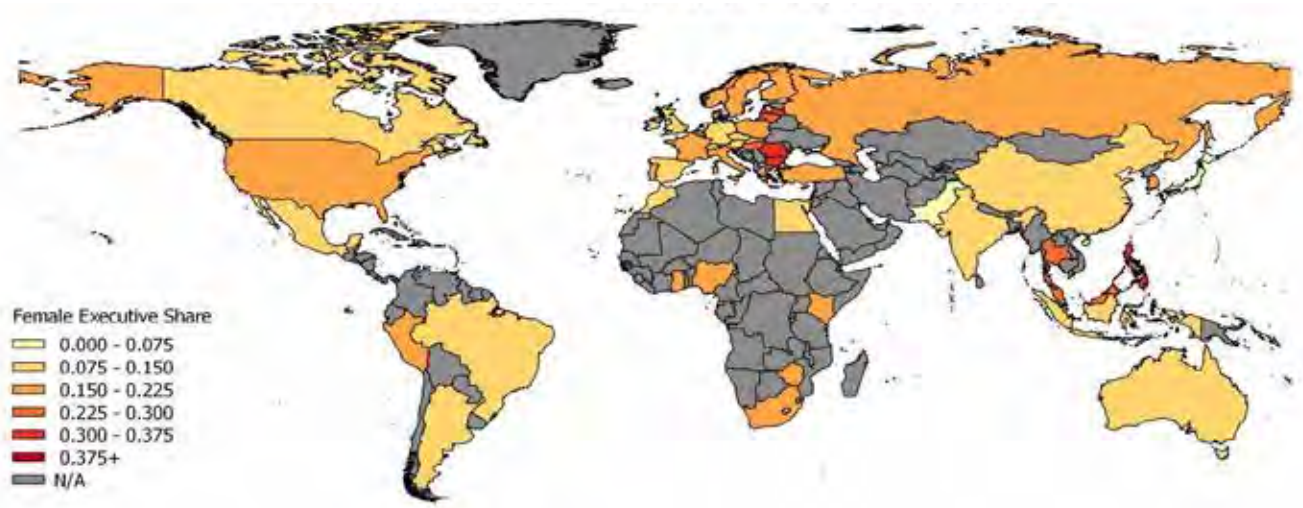
Source: Catalyst (2013).

Figure 2 Global representation of women on corporate boards



Source: See text.

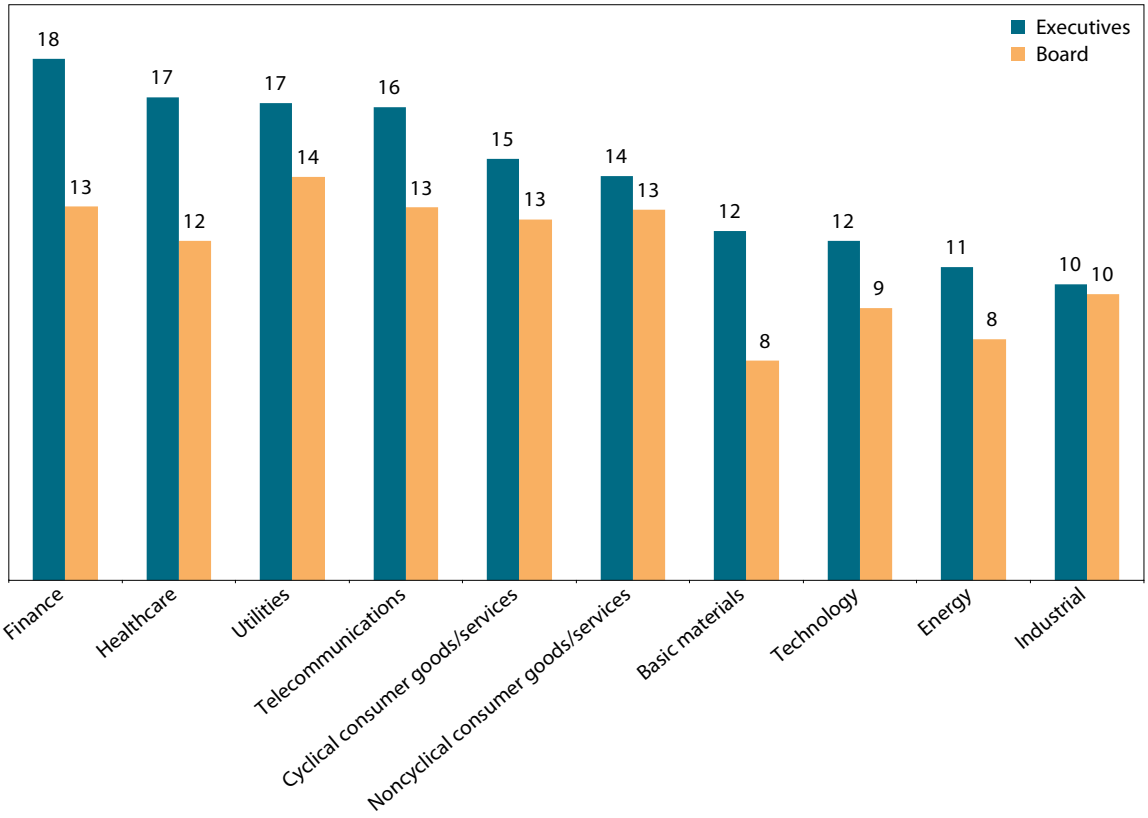
Figure 3 Global representation of women among corporate executives



Source: See text.

Figure 4 Share of female executives and board members, by industry

percent of women



Source: See text.

Table 2 Regression results on female leadership and firm gross margin

	All firms			Profitable firms only	
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
FemBoard	0.05**	0.05**		0.02	
FemExec	0.03	0.03*		0.03**	
BoardSize	0.01***	0.01***	0.00***	0.01***	0.01***
LogRev	0	0	0	–0.03***	–0.02***
quota_Board		0.05			
FemTot			0.11***		0.08***
Cty Dummies	Yes	Yes	Yes	Yes	Yes
Ind Dummies	Yes	Yes	Yes	Yes	Yes
N	16,213	16,213	16,616	15,599	15,984
R^2	0.062	0.062	0.061	0.18	0.181

Note: For definitions of variables, see appendix table A.3.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculations.

Table 3 Regression results on female leadership and firm net margin

	All firms			Profitable firms only	
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
FemBoard	0.07	0.07		–0.01	
FemExec	0.10*	0.11*		0.04***	
BoardSize	–0.04***	–0.04***	–0.04***	0.00***	0
LogRev	0.19***	0.19***	0.18***	–0.03***	–0.03***
quota_Board		0.11			
FemTot			0.21**		0.04**
Cty Dummies	Yes	Yes	Yes	Yes	Yes
Ind Dummies	Yes	Yes	Yes	Yes	Yes
N	17,770	17,770	18,235	12,721	13,092
R^2	0.207	0.207	0.203	0.554	0.536

Note: Table excludes firms with net margin of less than –10 (–1000%). For definitions of variables, see appendix table A.3.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculations.

Figure 5 Participation on multiple corporate boards by men and women

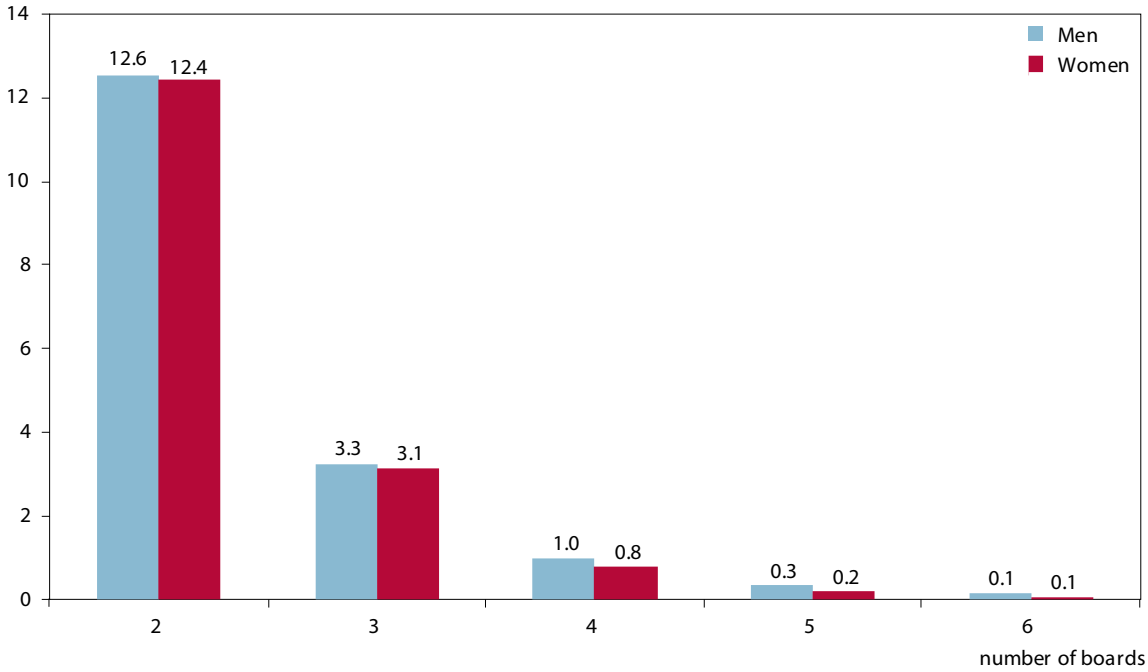


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Table 4 Size robustness of regression results: Results for firms with annual revenue of more than $1 million, more than four board members, and more than four executives

	Net margin			Gross margin		
Variable	(1)	(2)	(3) (profitable firms only)	(4)	(5)	(6) (profitable firms only)
FemBoard	0.07		0	0.07**		0.06*
FemExec	0.19***		0.06***	0.08***		0.05**
BoardSize	–0.02***	–0.02***	0.00***	0.01***	0.01***	0.01***
LogRev	0.10***	0.10***	–0.02***	–0.02***	–0.02***	–0.03***
FemTot		0.28***			0.16***	
Cty Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ind Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8,447	8,447	6,641	7,720	7,720	7,574
R^2	0.124	0.124	0.629	0.12	0.121	0.181

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: For definitions of variables, see appendix table A.3.

Source: Authors' calculations.

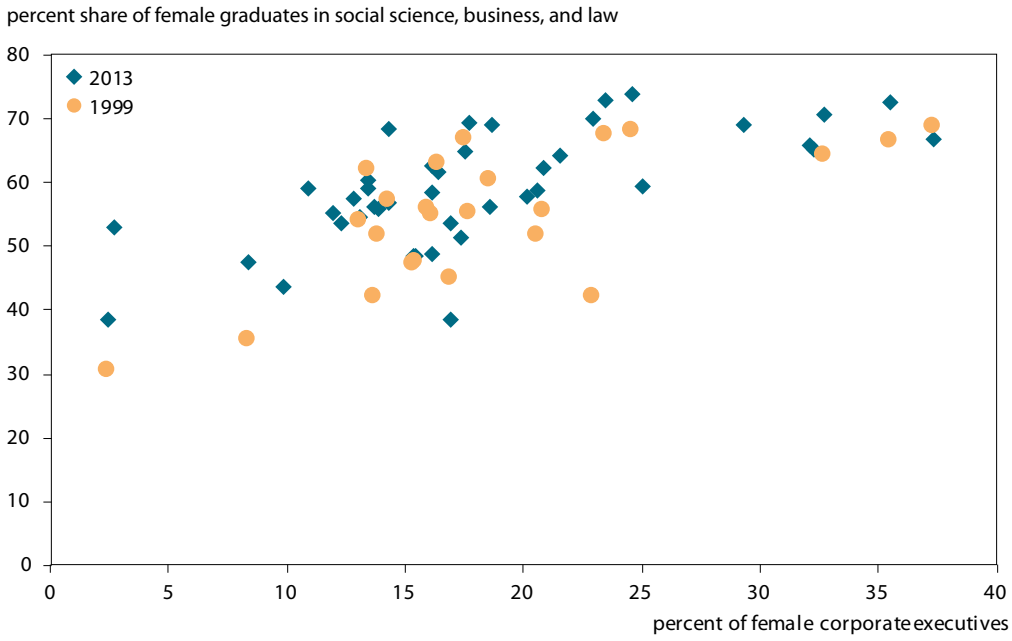
Table 5 ANOVA analysis of women's representation on corporate boards and in C-suites

	Partial sum of squares		*F*-statistic	
Variable	Board members	Executives	Board members	Executives
Sector/country	17	19.7	1.9	1.3
Sector	1	1.6	5.5	5.2
Country	19	26.6	12.4	10.4

ANOVA = Analysis of Variance

Source: Authors' calculations.

Figure 6 Correlation between share of female graduates in selected subject areas and share of female executives



Source: Author's calculations based on data from World Bank, *World Development Indicators*.

Table 6 Correlation between various indicators and share of women in executive leadership positions (percent except where otherwise indicated)

Variable	Number of board seats held by women	Number of female executives
Board seats	1	0.55***
Executives	0.55***	1
Women's educational attainment		
Tertiary enrollment	0.34**	0.2
Share of social science/business/law graduates	0.35*	0.57***
PISA math scores of girls relative to boys	0.63***	0.68***
Women's labor force outcomes		
Labor force	0.31*	0.22
Professional work	0.32**	0.62***
Ratio of women's to men's average income	0.37**	0.38**
Institutional environment		
World Economic Forum's Global Gender Gap Index score	0.47***	0.23*
Perception of female executives in World Values Survey	0.13	0.08
Stock of inward foreign direct investment (percent of GDP)	–0.028	0.14
Women's role in political leadership		
Share of parliamentarians	0.25*	0
Share of government ministers	0.23	–0.06
Social policy		
Paternity leave (days)	0.52***	0.2
Maternity leave (weeks)	0.15	0.04

PISA = Program for International Student Assessment

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: Authors' calculations.

Table 7 Social policies in most and least gender-balanced countries

Country	Share of female board members (percent)	Share of female executives (percent)	Maternity leave (weeks)	Maternity leave coverage (percent of salary)	Paternity leave (days)	Parental leave
Norway	40	20	35	100	14	49 weeks at 100% coverage or 59 weeks at 80% coverage (14 weeks for mothers, and 14 weeks for fathers)
Latvia	25	36	16	80	10	78 weeks over several years following childbirth (each parent)
Italy	24	16	22	80	1	26 weeks (each parent)
Finland	23	18	18	70	54	26 weeks (either parent)
Bulgaria	22	37	32	90	15	26 weeks (either parent)
Slovenia	22	33	15	100	90	37 weeks (either parent)
Sweden	22	21	14	80	10	80 weeks (shared by parents)
Kenya	21	21	13	100	14	0
France	19	16	16	100	11	156 weeks, 26 paid for first child (each parent)
Thailand	19	28	13	50–100	0	0
Argentina	8	10	13	100	2	0
Australia	8	14	52	18 weeks at minimum wage	14	52 weeks, 18 paid for either parent
Canada	7	14	17	55	0	37 weeks, 35 paid (either parent)
Pakistan	7	5	12	100	0	0
Germany	6	14	14	100	0	156 weeks, 52 paid (either parent)
Netherlands	6	12	16	100	2	26 weeks (each parent)
Kuwait	5	7	10	100	0	17 weeks (mothers only)
Austria	4	3	16	100	0	104 weeks (either parent)
Mexico	4	11	12	100	0	0
Japan	2	3	14	67	0	52 weeks (each parent)
Top 10	24	25	20	89	22	
Average	11	17	18	91	7	
Bottom 10	6	10	18	93	2	

Source: ILO (2014).

Table 8 Tobit regressions on female share of corporate boards

Variable	(1)	(2)	(3)	(4)	(5)	(6)
FemCEO	0.23***	0.22***	0.26***	0.25***	0.26***	0.27***
BoardSize	0.02***	0.02***	0.03***	0.02***	0.03***	0.03***
LogRev	0.01***	0.01***	0.01***	0.01***	0.01***	0.00***
Log GDP/Capita		–0.01	–0.05***	–0.07***	–0.04***	–0.02***
Social/Biz/Law Grads		0.01***				
Tertiary Enrollment		0.07**				
PISA Math Scores		1.26***				
i.Norway		0.40***	0.47***		0.36***	0.49***
Prof/Tech Workers			0.03			
Income Gap			0.17***			
Lab Participation			0.25***			
Female Exec Perception				0.24***		
GGI (Gender Gap Index)				0.81***		
FDI, Share of GDP				0.05***		
Female Parliamentarians					0.21***	
Female Ministers					0.14***	
LeaveGap						0.60***
Cty Dummies	Yes	No	No	No	No	No
Ind Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	18,451	10,788	15,649	15,486	16,202	17,942
Pseudo R^2	0.281	0.309	0.177	0.23	0.194	0.164

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: For definitions of variables, see appendix table A.3.

Source: Authors' calculations.

Table 9 Tobit regressions on female share of corporate executives

Variable	(1)	(2)	(3)	(4)	(5)	(6)
FemCEO	0.37***	0.34***	0.37***	0.40***	0.40***	0.41***
BoardSize	0.00**	0.00***	0.01***	0.01***	0.01***	0.01***
LogRev	0.01***	0.01***	0.00**	0.00***	0	–0.00*
Log GDP/capita		–0.01	–0.05***	–0.08***	–0.04***	–0.02***
Social/Biz/Law Grads		0.01***				
Tertiary Enrollment		0				
PISA Math Scores		1.40***				
Prof/Tech Workers			0.18***			
Income Gap			0.32***			
Lab Participation			–0.04			
Female Exec Perception				0.14***		
GGI (Gender Gap Index)				1.40***		
FDI, Share of GDP				0.10***		
Female Parliamentarian					0.32***	
Female Ministers					0.05***	
LeaveGap						0.49***
Cty Dummies	Yes	No	No	No	No	No
Ind Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	18,459	10,784	15,702	15,437	16,230	17,956
Pseudo R^2	0.228	0.244	0.15	0.158	0.122	0.108

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: For definitions of variables, see appendix table A.3.

Source: Authors' calculations.

Table 10 Tobit regressions on female share of corporate board members and executives

	Share of women on board				Share of female executives			
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FemCEO	0.25***	0.22***	0.23***	0.22***	0.39***	0.34***	0.36***	0.34***
BoardSize	0.02***	0.03***	0.03***	0.02***	0.01***	0.00***	0.01***	0.00***
LogRev	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
Log GDP/capita	–0.07***	0.01	–0.02**	–0.10***	–0.08***	0.01	0.01	0
Female Exec Perception	0.37***		0.17***	0.23***	0.31***		–0.14***	–0.06
LeaveGap	0.21***	0.20***	0.17**	0.13*	0.12*	–0.05	–0.15**	–0.05
FDI, Share of GDP	0.04***	0.02	0.04**	0.25***	0.10***	–0.03*	0	0
Income Gap	0.06**	–0.05	0.01	0.13***	0.25***	0.05	0.10**	0.11**
i.Norway		0.41***						
Social/Biz/Law Grads		0.01***	0.01***	0		0.01***	0.02***	0.01***
PISA Math Scores		1.51***		5.43***		1.69***		2.32***
Ind Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15,199	11,023	10,104	9,406	15,157	11,020	10,084	9,412
Pseudo R^2	0.227	0.3	0.276	0.31	0.158	0.241	0.212	0.229

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: For definitions of variables, see appendix table A.3.

Source: Authors' calculations.

Table 11 Probit regressions on female share of CEOs and board chairs

	Female CEO	Female board chair	Female board chair, alternate specification[a]	Female CEO including national characteristics	Female board chair including national characteristics[a]
Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
FemBoard	2.29***	3.98***		2.37***	
BoardSize	–0.01	0.01	–0.01	0.02	–0.01
LogRev	–0.02*	0	0.02*	–0.03*	0.02
FemBoard2			0.22**		0.27*
Log GDP/Capita				–0.07	–0.03
Female Exec Perception				0.5	0.4
Social/Biz/Law Grads				0.01	0.03***
LeaveGap				–0.31	0.1
FDI, Share of GDP				0.04	–0.11
Income Gap				0.29	0.01
Ind Dummies	Yes	Yes	Yes	Yes	Yes
N	18,119	17,799	17,718	10,104	10,076
Pseudo R^2	0.144	0.28	0.068	0.132	0.052

a. FemBoard2 (share of female nonchair board members) used as a regressor.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: For definitions of variables, see appendix table A.3.

Source: Authors' calculations.

APPENDIX A COMPILATION OF THE DATASET

Data from Reuters's publicly available stock profiles were used to create an index of available stocks using Reuters's Stock Screener function, after setting the parameters to capture all listings to the greatest extent possible.[17] The total number of stocks available was subject to fluctuation, although it was generally greater than 170,000 listings.[18] However, tens of thousands of the listings linked to "dead" profiles that contained no information or failed to link to anything at all. In addition, a substantial number of listings referred to the same firm traded across multiple exchanges (Communique Laboratory, for example, is listed seven times, in the United States, Canada, and Germany). Additional listings for the same firm do not add any information for the purpose of this analysis, as the leadership and financial status is identical across these listings. We therefore eliminated duplicates. The Stock Screener results were generated and displayed across nearly 9,000 pages. To collect all the results, we created a program using Selenium-WebDriver through Python. The program recursively saved the data from the table on each page before moving onto the next one. Removing stocks that led to dead links or stocks that had been saved multiple times left an index of more than 123,000 stocks, their sector, subsector, and a link to the Reuters profile page. The majority of these pages were duplicates, linking to identical profiles except for the specifics of stock price and history. Removing the "excess" listings left roughly 28,000 firm-specific listings.

In order to get a snapshot of the firm, we constructed a database from the Reuters "financials" section (principally performance ratios), the "people" section (which includes information on top corporate leaders), the financial statement, and the firm profile. All of these data were available for roughly 22,000 firms, the firms included in our database. An early concern was how to discern which country should be considered a firm's home. Reuters associates each listing with a country, but the country corresponds with the location of the index rather than the firm. Thus a single firm could be associated with several countries. To solve this issue, we used the address given by the Reuters company profile, which included a phone number and in most cases a fax number. We were able to associate almost all firms with a country based on the phone number.[19] In the (rare) case where a phone number was not given, was invalid, or was listed as non-country-specific 1-800 or similar number, the same method was applied to the fax number. Using this method, we identified home countries for all but about two dozen firms. Next we identified the role of the individuals listed on a firm's "People" page, based on the positions listed by Reuters. A program used an extensive list of titles associated with the top executive (presidents and CEOs) and board (chairs) positions. However, because titles are not uniform across countries, firm-specific consideration was

17. Stock Screener is available at http://stockscreener.us.reuters.com/Stock/US/Index?quickscreen=gaarp.

18. Reuters appears to have no data on some exchanges, most notably the Shenzhen Stock Exchange. Our dataset excludes firms listed only on a missing exchange.

19. The United States, Canada, and the Caribbean countries share the same country calling code (1). An additional step was needed to distinguish the nationality for firms in these countries. In the process we also assigned a state or province to US and Canadian firms based on the area code.

required. British companies, for example, often designate their top executive as the "managing director," a title that indicates a position below the CEO in other countries. Germany's corporate structure is different in more fundamental ways.[20] To get around this problem, we did not consider titles that were awarded to multiple individuals in a given firm as the top position, with some exceptions.[21] The program was able to categorize individuals for each firm as being a president/CEO, chair of the board, board member, or executive. Board chairs were counted as board members, and CEOs were counted as executives. Individuals could, and often did, appear as both an executive and a director, if they held titles consistent with both roles. We did not double count any individual holding multiple titles consistent with a specific role. For example, an individual holding the titles "President" and "Chief Executive Officer" would not be counted twice as a top-level executive (or an executive in general).

The program identified more than 135,000 board members, 18,000 board chairs, 150,000 executives, and 22,000 top-level executives. Not all firms reported a board of directors. Some firms were relatively small, and in some jurisdictions (most notably Japan) many firms followed a corporate structure that did not designate a clear equivalent position. With that categorization complete, we next attempted to discern the gender of each individual. The first step in this regard was to defer to Reuters. The "People" page often contained brief bios of listed individuals. If those bios used a gendered pronoun or referred to an individual as "Mrs.", "Ms.", or "Mr.", we assumed that Reuters had correctly identified the gender of the individual in question. This method allowed us to identify the gender of two-thirds of individuals. The gender of the remaining 100,000 individuals had to be identified by other means. To do so, we relied on a database that categorizes first names as strongly male/female, weakly male/female, or neutral.[22] For example, "Barbara" is strongly female, "Tyler" is weakly male, and "Skyler" is neutral. To test the accuracy of this method, we compared the gender indicated by the program with the gender given by Reuters. The program returned the incorrect gender in just 1.6 percent of cases (3,325 of the roughly 206,000 individuals in the database). Based on these criteria, we identified the gender breakdown of a firm's board and top executives and aggregated those data into sector, subsector, country, and regional groups.[23] Tables A.1 and A.2 display the results. Table A.3 defines the variables used in the analysis.

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20. For Germany the chairs of the supervisory and management boards were taken as equivalent to the chair of the board of director and the CEO, respectively.

21. Two individuals holding the title "co-president" would both be considered top executives, for example.

22. The database was created for a C program called genderReader (available at https://github.com/cstuder/genderReader/blob/master/gender.c/nam_dict.txt). Although it contains nearly 50,000 entries, some given names are not included. The program was relatively weak in South Korea, where gender-neutral first names are common. The database therefore contains very little information on South Korea, despite its large number of firms. Other researchers, such Yoon et al. (2008), have attempted to devise methods for determining the gender of Korean names. Their solution required context not available to us and was less accurate than our methodology for non-Korean names.

23. Regions are based on the UN Geoscheme classification. In some cases UN regions were aggregated.

Table A.1 Number and share of female corporate leaders, by region

Region	Number of firms	Female board member		Female board chair		Female executive		Female CEO or equivalent	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
East Asia	3,992	1,338	6	59	3	1,910	5	109	3
Eastern Europe/Central Asia	1,042	902	15	75	8	1,424	22	79	8
Europe	3,996	3,536	15	180	5	4,327	16	154	4
Latin America	551	274	8	15	3	553	12	16	3
Middle East and North Africa	952	601	12	34	4	1,123	16	57	7
North America	6,149	4,367	11	128	3	5,805	15	274	4
Oceania	1,426	525	8	32	2	782	14	48	4
Southeast Asia	1,973	1,524	13	59	5	2,992	25	140	8
Southern Asia	1,486	639	8	51	5	624	12	59	5
Sub-Saharan Africa	387	502	16	25	8	447	18	16	5

Source: See text.

Table A.2 Most and least gender-balanced countries (percent, except where otherwise indicated)

Rank	Country	Number of firms in sample	Share female				Social science, business, and law graduates	World Economic Forum Gender Gap Index	Female-male gap		
			Board members	Board chair	Executives	CEO			Tertiary enrollment	Overall labor force	Professional and technical workers
Most gender-balanced countries											
1	Norway	132	40	9	20	3	58	0.84	33	–5	–4
2	Latvia	25	25	9	36	5	73	0.77	27	–5	26
3	Italy	196	24	10	16	10	58	0.7	22	–21	–8
4	Finland	101	23	6	18	1	65	0.85	18	–4	4
6	Slovenia	36	22	11	33	16	71	0.74	34	–7	14
5	Bulgaria	198	22	15	37	15	67	0.74	16	–8	22
7	Sweden	311	22	4	21	6	62	0.82	31	–4	4
8	Kenya	31	21	15	21	9	n.a.	0.73	–2	–10	—
9	Thailand	410	19	6	28	13	n.a.	0.7	15	–15	12
10	France	565	19	6	16	4	62	0.76	13	–9	–5
Least gender-balanced countries											
10	Australia	1,330	8	2	14	4	56	0.74	28	–13	2
9	Argentina	67	8	3	10	0	44	0.73	34	–27	6
8	Pakistan	200	7	3	5	4	n.a.	0.55	–1	–61	–56
7	Canada	2,074	7	2	14	3	n.a.	0.75	17	–8	14
6	Germany	521	6	4	14	3	56	0.78	3	–11	–2
5	Netherlands	98	6	0	12	1	54	0.77	7	–10	–5
4	Kuwait	48	5	0	7	2	n.a.	0.65	16	–40	–32
3	Austria	60	4	2	13	2	58	0.73	13	–11	–6
2	Mexico	66	4	2	11	0	59	0.69	–2	–35	–10
1	Japan	2,642	2	1	2	1	39	0.66	–7	–20	–6
	Top 10	201	24	9	25	8	64	0.76	21	–9	7
	Average	383	13	5	17	5	58	0.71	12	–18	–1
	Bottom 10	711	6	2	10	2	52	0.7	11	–24	–10

n.a. = not available

Source: See text.

Table A.3 Definition of variables

Variable	Definition
BoardSize	Number of individuals on a firm's board
FemExec	Share of female executives (range of 0–1)
FemBoard	Share of women on board (range of 0–1)
quota_FemBrd	Equal to FemBoard if country has a quota, 0 otherwise
FemTot	Share of both women on board and female executives (range of 0–1)
FemBoard2	Female share of board, excluding the chair
FemCEO	1 if firm has female CEO, 0 otherwise
FemChr	1 if firm has female board chair, 0 otherwise
LogRev	Log of total revenue
GrossMargin (GM)	Revenue less cost of goods sold as share of revenue
NetMargin (NM)	Gross profit less overhead and other expenses as share of revenue
Log GDP/Capita	Log of GDP per capita
Social/Biz/Law Grads	Female share of social science, business, and law graduates (0.5 implies parity)
Tertiary Enrollment	Ratio of female to male tertiary enrollment rates (1 implies parity)
PISA Math Scores	Ratio of girls' to boys' scores on PISA mathematics test (1 implies parity)
Prof/Tech Workers	Female share of professional and technical workers (0.5 implies parity)
IncomeGap	Ratio of female to male earned income (in World Economic Forum database) (1 implies parity)
Lab Participation	Ratio of female to male labor force participation (1 implies parity)
LeaveGap	Ratio of mandatory paternity leave to mandatory maternity leave (1 implies parity)
Female Exec Perception	Percent of respondents in World Values Survey that does not believe men are better executives than women
GGI	Gender Gap Index
FDI, Share of GDP	Inward foreign direct investment as share of GDP (100 percent = 1)
Female Parliament	Female share of members of parliament (0.5 implies parity)
Female Ministers	Female share of government ministers (0.5 implies parity)

PISA = Program for International Student Assessment

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