

Gender differences in speed of advancement: An empirical examination of top executives in the fortune 100 firms

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Abstract

Research summary: We examine the advancement of women in executive roles in the ranks of the 10 highest executive positions in the Fortune 100 companies in 2001 and 2011. We find that women executives secured top executive positions faster than men, controlling for relevant individual attributes, and that the advantage of women with respect to men grew with the number of years they spent in the organization. The female advantage disappeared once companies had more than one high-ranking female executive. We make use of several tests to assess possible unobserved differences between men and women executives, including the case-control technique from epidemiology. Our results are consistent with institutional pressures accelerating women's advancement to top executive positions, but they also reveal the limited effectiveness of such pressures.

Managerial summary: Employers interested in increasing the diversity of their executive ranks should pay attention not only to who is in those jobs but also how long it took them to get there. In our study, women in top jobs got there faster not just because they were better but because they moved through previous positions faster and skipped steps in job ladders. This

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suggests how diversity at the top can be enhanced without having to wait for more diverse cohorts in lower-level jobs to slowly advance. The fact that faster advancement slowed once there were a few women in top jobs suggests that support for advancement was indeed a company choice, unfortunately one driven by public appearances.

KEYWORDS

career advancement, gender, institutionalism, promotions, top executives

1 | INTRODUCTION

Within the general topic of career success, an important question has been why the experiences of women have been so different from those of men. Voluminous research across different disciplines has documented that women fare worse than men in various aspects of career attainment. The biggest gaps—certainly the most visible—may be in leadership roles, especially in corporations, where women continue to be underrepresented (Mitchell, 2016). Women hold about 9% of the top management positions in the S&P 1500 firms (Dezsó, Ross, & Uribe, 2016). Our data below show that they occupy 15% of the 10 highest-ranking executive positions in Fortune 100 companies despite holding 47% of jobs in the United States overall (Bureau of Labor Statistics, 2017a). Arguably, the most common explanation for the low numbers of women in top executive roles remains the notion of a “glass ceiling,” that the process of appointments to senior positions is more discriminatory than that for lower-level positions. Women would therefore have more difficulty getting to the top jobs even when they get to the mid-level jobs (see, for example, Baxter & Wright, 2000, p. 276; Boyd, 2008; Petersen & Saporta, 2004, p. 855). As we note below, however, the evidence for this view is inconclusive.

In spite of women's underrepresentation in leadership positions, there is also emerging evidence of a “female premium” at the top of organizations (Leslie, Manchester, & Dahm, 2017, p. 402). Recent studies have shown that the typical gender gap may indeed reverse under certain circumstances, leading a small group of women to enjoy more favorable outcomes than their male counterparts: a pay premium (Gayle, Golan, & Miller, 2012; Hill, Upadhyay, & Beekun, 2015; Leslie et al., 2017) and a higher likelihood of promotion to certain top executive positions (Gayle et al., 2012; Petersen & Saporta, 2004; Powell & Butterfield, 1994; Spilerman & Petersen, 1999). These findings are contrary to the prevailing view that women always do worse than men in the workplace and call for researchers to gain a better understanding of the circumstances under which a female premium may emerge.

One explanation for the unexpected female premium is the pressures faced by organizations to achieve diversity goals. Companies may be willing to favor women over men in visible positions to ensure they comply with pressures to improve their diversity from different stakeholders such as the media, politicians, customers, and suppliers (Dobbin, Kim, & Kalev, 2011; Leslie et al., 2017; Robinson & Dechant, 1997; Spilerman & Petersen, 1999). At the same time, researchers have also warned that these pressures may have limited effects, affecting only a few

women; specifically, high potentials (Leslie et al., 2017) or those who got to the top management positions when there were no other women in those jobs (Dezsó et al., 2016). In general, more research is needed to better understand when and why such female premium emerges and whether it might reflect something about career advancement for women as well.

Most of the studies attempting to explain gender differences in career advancement began with a sample of employees, identified which ones were promoted, and then, controlling for other factors, examined the independent effect that gender had on explaining the promotion decision (e.g. Dezsó et al., 2016; Gayle et al., 2012; Petersen & Saporta, 2004). The difficult part of this exercise is identifying the pool of candidates from which executives are selected because employers routinely search for and hire candidates employed elsewhere to fill vacancies (Fernandez & Sosa, 2005). Executives stay with their employers less than an average of 4 years (Cappelli & Hamori, 2014); individuals in the United States of the age of senior executives, roughly 50, have changed employers 12 times (Bureau of Labor Statistics, 2017b). Without being able to identify the candidates that are being considered for a position, it is not possible to calculate promotion probabilities.

Furthermore, promotion probabilities are not the only aspect of career advancement, as US corporations discovered after WWII when corporate leaders were interested in getting graduates from engineering programs with new operations research skills into leadership positions in their manufacturing companies. They realized that even if such graduates secured every promotion available to them—that is, their promotion rate could be 100% for every available advancement opportunity—it would be 20 years or more before they advanced to real leadership positions. High-potential programs were created to speed up promotions for those graduates into leadership roles (Cappelli, 2010). Promotion probabilities alone uniquely determine the attributes of those in top jobs only if the steps in advancement are uniform and occur at a fixed time for everyone, that is, the members of an entering cohort who are promoted then all advance at exactly the same pace. That is not the case now as individuals can and do follow different job ladders or pathways to the top jobs, some skip over what had previously been seen as required steps, and others get promoted with less time in grade. Those differences mean that some individuals get to top jobs much faster than others. The speed of advancement that results has an effect independent from promotion rates in determining who holds the top jobs. The fact that it is not possible to compare promotion probabilities consistently across executives who come from different organizations and different career paths means that time to the top, which is comparable, becomes more meaningful.

In the United States, organizations interested in increasing diversity in their ranks cannot give preference to women in promotion decisions without facing legal challenges because men are also protected against discrimination in promotion actions (see, e.g., EEOC, 2020). Eliminating discrimination against women in those decisions would eventually increase the ranks of women in more senior roles, although it would take considerable time to get more women into roles that feed the top executive jobs. This is especially so if Helfat, Harris, and Wolfson's (2006) evidence that the ranks of management below the top have few women remains true.

There are many ways to help individual employees advance faster, however, from the choice of assignments given to them, the career paths to which they are directed, support and mentoring, and so forth. We might therefore expect that evidence of organizations trying to advance gender diversity would be easier to spot in faster advancement than in promotion rates. This is especially so if those efforts are aimed at a few key roles where diversity could be advanced by targeting a small number of individuals for faster advancement, as opposed to reforming promotion decisions across-the-board.

We consider speed of promotion into the executive suite and differences in it between men and women to examine employer interest in increasing gender diversity in those key roles. Specifically, we consider not only whether there is evidence that women advance more slowly than men into top corporate jobs but also whether institutional pressures to advance diversity contribute to the speed with which women are promoted to top positions as compared to their male counterparts. Faster advancement may also reflect deliberate corporate decisions to value or advance candidates with one set of attributes over others—possibly redefining what is included in “merit”—as with high-potential programs. Corporate decisions are likely to be at play when we see differences in speed of advancement for certain categories of employees.

Several authors have used speed to the top as an important feature of career advancement (Cappelli & Hamori, 2004, 2005; Custódio, Ferreira, & Matos, 2013; Falato, Li, & Milbourn, 2015; Schoar & Zhuo, Schoar & Zuo, 2011; Thomas & Gabarro, 1999). It is defined as how long it takes an individual from the beginning of their career to secure a top executive job (Falato et al., 2015). To our knowledge, this is the first use of this measure to examine gender differences. Identifying gender differences in the speed of advancement into top executive roles is relatively straightforward from an empirical perspective.

We examine differences in male and female advancement using data on the entire career histories of the top 10 executives in the largest corporations in the United States—the Fortune 100 companies—in 2001 and 2011. We consider whether bias against women led to slower advancement for them into executive roles or whether recent institutional pressures from external stakeholders such as national governments or customers to add women to corporate leadership positions had the opposite effect. There is a well-established research approach for examining questions like ours that has been developed in the context of studying gender-based wage discrimination: control for other relevant attributes of individuals and then see whether a statistically significant component of the variance in wages that remains is explained by gender differences (see Altonji & Blank, 1999, for an overview of the approach). Here, we use the same approach to see whether a significant amount of variance in speed of advancement is explained by gender, controlling for other relevant attributes.

We find that, after controlling for relevant human capital characteristics, incumbent female executives actually reached their top executive jobs faster than their male counterparts. Understanding why, that is, to what extent the women executives were simply better than their male counterparts and to what extent the difference reflects explicit action to increase diversity, is a considerable challenge, because individuals who advance faster may simply have higher quality. For example, CEOs with fast-track careers were found to be matched to bigger companies and to receive higher pay than those with a longer route to the CEO job (Falato et al., 2015).¹ The hypothesis that superior ability might be the explanation for the faster advancement of women is compelling because prior discrimination may mean that the fewer women who make it to the executive ranks may be better on some aspect of merit than their male counterparts.

We make use of several tests to assess possible unobserved differences between men and women executives, including the case-control technique from epidemiology. We conclude that some of the faster advancement of women was due to superior attributes. The remaining gap, however, is consistent with the notion that institutional pressures led their employers to advance their careers faster in order to diversify the top and most visible jobs in their corporations.

¹Faster advancement may also create a “halo” effect that leads to favorable evaluations for future promotions as well (e.g., Powell & Butterfield, 1994; Spilerman, 1986).

Overall, our findings contribute to the literature on the existence and drivers of a gender gap in the workplace, and specifically at the top of the organizational hierarchy. Going forward, efforts to understand differences in career advancement should examine both speed of advancement and promotion rates (e.g., Gorman & Kmec, 2009; Jones & Makepeace, 1996; Smith, Smith, & Verner, 2013; Yap & Konrad, 2009; Zeng, 2011). Our results also contribute to the literature that studied the effectiveness and limits of institutional pressures in reducing gender inequality in the workplace (Dezsó et al., 2016; Dobbin & Kalev, 2017; Gregorič, Oxelheim, Randøy, & Thomsen, 2017).

1.1 | Women's speed of advancement to the top executive ranks

Gender-based differences in career advancement to the top of the corporation, and in particular the difficulties faced by women, have received considerable attention in the academic literature. These difficulties appear to be driven, in part, by cognitive issues, such as the disposition toward categorical thinking, accompanied by assimilation biases (minimizing differences within categories) and contrast biases (maximizing differences among categories) that cause us to form stereotypes about different groups (Allport, 1954; Kimmel, 2013). When negative, these stereotypes create prejudice; when primed, they contribute to discriminatory actions. Because the traditional female gender role has been that of homemaker and not of a provider in the workplace, a generalized cultural belief about gender is that women are more communal and less competent, while men are agentic and more competent (e.g., Ridgeway & Correll, 2004). These stereotypes of women in particular do not align with the perceived requirements of managerial and executive roles. As a result, there may be bias against women in hiring and promotion standards (Foschi, 1989, 1996). For example, women may need to demonstrate more experience or achievements than their male counterparts to be considered apt for a promotion (Allport, 1954; Schein, 1975). We might expect that such bias may increase the time it takes for women to reach senior leadership roles even for the few who are in a position to get there.

Women may also face various forms of disadvantages regarding career advancement in the workplace because of in-group biases: that the men making decisions on promotion or hiring into the executive ranks prefer candidates who are similar to them, that is, other men (Kanter, 1977) and that male hiring managers offer jobs to those candidates who resemble them in ways that do not relate to the actual job requirements (Rivera, 2012, 2015). The resulting absence of women in top managerial roles, in turn, leads to other negative outcomes for women who aspire to executive roles, such as a lack of access to important social and informational networks and to mentors at work (Bell, 2005), both of which are crucial for helping women advance to the top (Ibarra, 1992). Overall, these studies sustain the existence of barriers for the advancement of women to the top of the corporation. They might also suggest that the advancement that does occur takes longer.

At the same time, employers face “institutionalized” pressures for increased gender diversity within their organizational ranks (Meyer & Rowan, 1977, p. 340). Organizations that comply with these pressures gain public appreciation and increase their legitimacy and reputation, independent of the immediate efficacy of the practices (Meyer & Rowan, 1977). Employers that do not respond to these pressures may invite public criticism, face a loss of reputation, and suffer reduced access to resources (Gregorič et al., 2017; Meyer & Rowan, 1977).

Specifically, the pressure on firms to strive for gender diversity originates from the values and expectations of their various stakeholders (Meyer & Rowan, 1977). A key stakeholder is the

US government, which enforces laws on equal opportunity. Companies doing business with the federal government are now required by the Office of Federal Contract Compliance to provide an affirmative action plan for women and minorities that, among other things, outlines the demographics of their current workforce and their plans for increasing the representation of women and minorities. A lack of diversity or lack of plans for improvement can disqualify companies from doing business with the government (Dobbin et al., 2011; Kim, Kalev, & Dobbin, 2012). An objective measure of government pressure against gender discrimination is the increase of formal charges against employers for such discrimination by the Equal Employment Opportunities Commission (EEOC), which rose from 21,000 in 1992 to 28,000 in 2011, the period we consider below (EEOC, 2017). The individuals holding senior jobs in regulatory agencies are themselves more diverse in terms of demographics than in the past (see, e.g., Macheel, 2016). Such governmental pressures for affirmative action starting in the 1970s motivated corporations to increase the representation of women in policy-making positions (Spilerman & Petersen, 1999). Accordingly, firms with more homogeneous workforces and greater regulatory oversight have been associated with greater use of diversity initiatives (Dobbin et al., 2011; Kim et al., 2012).

Another factor pushing for gender diversity is the notion that companies should look like their customers (who are proportionately less white male than corporate leaders), a component of “diversity marketing” (Robinson & Dechant, 1997). For example, Beckman and Phillips (2005) found that law firms whose clients had women in key leadership positions tended to promote women attorneys (Beckman & Phillips, 2005). Pressures for gender diversity may also come from institutional investors or public pension fund managers who are themselves exposed to greater scrutiny by other players (Dobbin & Jung, 2011; Mun & Jung, 2018); or from peers: firms that operate in industries where a higher proportion of players adopt diversity measures are more likely to adopt these measures themselves (Kim et al., 2012).

Pressures for diversity may be particularly relevant at the top of the organization, where women are the most underrepresented and also easiest to see: it is much easier to show diversity in a few top jobs than throughout an organization. Because of the visibility of these top positions, diversity in top jobs may be sufficient to satisfy the pressures of the key stakeholders. Several papers provide indirect evidence that institutional pressures may have pushed firms to promote women over men to leadership positions. Using data from one company, Petersen and Saporta (2004) and Spilerman and Petersen (1999) find that, after controlling for observable characteristics, women enjoyed a net advantage in promotion rates at higher levels compared to men. Petersen and Saporta (2004) specifically argue that the apparent advantage of senior women in their case company may have been an effort to overcome the serious image problem of the overwhelmingly white and male firm and to reduce the risk of discrimination-based lawsuits. In their sample of 1,000 US firms with the largest sales over a period of 14 years, Hillman, Shropshire, and Cannella (2007) show that larger firms had a greater likelihood of having women on their boards, supporting the argument that bigger firms usually experience the greatest pressure to conform to social expectations on gender diversity at the upper echelons because they are the most visible to the public and receive the most scrutiny from a variety of stakeholders including investors, customers, and communities.

Similarly, Dezsó et al. (2016) find that the S&P 1500 made public demonstrations of progress toward gender equity among the five highest-paid executives, in an effort to maintain legitimacy vis-à-vis internal and external stakeholders. However, the effort to appoint executive women stopped once there was already a woman in those roles. Similar findings apply outside the United States too. Mun and Jung (2018) find that investor pressures for corporate social

responsibility made Japanese firms push for gender diversity but only in the upper ranks of executives, those that were the most visible to investors, and not in lower positions. Overall, these findings suggest that institutional pressures can push companies to change the representation of women at the top of the organization and that they may have contributed to advancing women to the top faster than men in order to comply with the need to show diversity.

The efforts made by companies to ensure that they can promote women to the top faster may take different forms. They may proactively invest in the development and promotion of women at lower organizational levels, by making sure that there is a certain number of women in fast-track positions or that women have an organizational sponsor that helps the promotion happen. There are many policies like these in organizations: the corporation Salesforce recently introduced a “women surge” in its promotion practices; now, every applicant pool for executive positions must contain women candidates. Intel Corporation has mandated that women be paired with a sponsor tasked with opening doors and smoothing the path for their charge until she secures a vice-president role in the company (Waller & Lublin, 2015). W.L. Gore and associates have a similar program (Catalyst, 2018; Kelly & Dickson, 2012). Efforts to advance women fast to the top are particularly likely to be the case for the Fortune 100 companies, whose high visibility makes them more likely to be scrutinized by customers and the public in addition to being subject to the government’s regulatory oversight. Accordingly, we hypothesize:

Hypothesis 1 *Advancement for women incumbents into top executive positions is faster than for their male counterparts.*

1.2 | Women’s speed of advancement and intra-firm mobility

If institutional pressures for increasing the representation of women within the executive ranks of the firm are an important factor behind the faster advancement of women, we expect these pressures to particularly benefit women who advanced to the top through their firm’s internal career ladder. First, many of the efforts companies make to ensure that they can appoint women to the top focus on developing and promoting women internally. In comparison to outside hiring, such practices are more likely to obtain them the reputation of a preferred employer for women (Valet, 2018). Second, many of the most effective measures in counterbalancing gender inequity in organizations only apply to the incumbent women in the firm. They include compulsory identification of women for the high-potential pool (affirmative action programs), diversity taskforces or diversity managers, and also mentoring and networking programs (Dobbin et al., 2011; Kalev, Dobbin, & Kelly, 2006).

Accordingly, several empirical studies document that organizations rely on their internal promotion policies (as opposed to outside hiring) to respond to institutional pressures for gender diversity and counterbalance the overrepresentation of men in managerial and executive positions: In order to correct serious image problems, a large insurance company (Spilerman & Petersen, 1999) and a large service organization (Petersen & Saporta, 2004) promoted women at a higher rate than men at the upper rungs of the hierarchy. As women gained experience in these firms, they were rewarded with higher promotion rates for their loyalty than men. A Fortune 500 manufacturing firm responded to gender equity pressures by using restructurings to promote higher rates of women, especially at higher-status job levels (Dencker, 2008). A large tech company helped women overcome the disadvantages that they incurred when entering the firm by granting them atypical job moves that propelled them to higher organizational levels

than the men with similar moves (Leung, 2016). In general, executive women were more likely to be promoted inside S&P 1500 firms than their male counterparts, while there were no differences in the likelihood of external moves or demotions for men and women (Gayle et al., 2012).

Internal promotions may also benefit women because discriminatory treatment that is damaging to firms' reputation is easier to detect in internal promotion than in outside hiring decisions (Fernandez & Campero, 2017; Petersen & Saporta, 2004; Petersen, Saporta, & Seidel, 2000). While hiring provides an opportunity for highly subjective assessments (Petersen, Saporta, & Seidel, 2000) and makes anti-discrimination laws and regulations harder to enforce (Jencks, 1992, p. 53), promotion decisions are more transparent, because it is easier to document the relative qualifications of those promoted and those passed over and to compare them against the promotion rules of the organization. Such procedural fairness in promotion decisions, in particular structure to the decision-making process and record keeping, contributed to women's higher chances of getting into senior executive positions compared to men in the federal government (Powell & Butterfield, 1994). Overall, this evidence suggests that women who spent a higher proportion of their careers in the firm are more likely to have benefited from the aforementioned policies. Accordingly, we hypothesize:

Hypothesis 2 *Intra-firm mobility moderates the relationship between gender and speed of advancement such that the advantage of women in speed of advancement is greater for women who have spent a higher proportion of their careers within their current organizations.*

1.3 | Women's speed of advancement and the demography of the executive ranks

While firms can gain legitimacy from having women in their upper echelons, a small number of women may be sufficient to appease stakeholder pressures. If legitimacy is achieved with a low number of women, and if having more women creates disutility for the white-male majority in top management, companies may choose to meet only the minimum level of gender diversity (Dezsó et al., 2016; Oliver, 1991). This implies that companies may be willing to make some efforts to promote women faster but only as a symbolic gesture rather than a substantive change (Oliver, 1991; Westphal & Zajac, 1994; Zajac & Westphal, 1994).

We propose that the urgency that corporations attach to promoting women is related to the existing gender composition of their top executive ranks. Corporations will prefer to have at least some women in executive roles and, therefore, will attempt to adopt policies or tactics that enable them to advance women faster. However, these efforts will stop or even reverse if key stakeholders see a few women as proof of successful diversity goal achievement.

Related research argues that employers view having women in leadership roles as appropriate up to a given proportion but unnecessary or even detrimental above that point. It shows that there are implicit quotas for women in leadership roles that influence women's likelihood of being appointed to managerial jobs (Cohen, Broschak, & Haveman, 1998), top management teams (TMTs; Dezsó et al., 2016), and the board of directors (Farrell & Hersch, 2005; Tinsley, Wade, Main, & O'Reilly, 2017).

Here, we propose that organizations' symbolic conformity to institutional pressures via the number of women in their top ranks will also affect women's speed of ascent to top executive positions. Specifically, there is a negative moderation effect between women's speed of

advancement to their executive positions and the number of existing female executive incumbents. Employers' efforts to promote women faster may stop once they consider that they have an appropriate number of women at the top. This leads to the following hypothesis:

Hypothesis 3 *The number of incumbent women in the executive ranks moderates the relationship between gender and speed of advancement such that women's advantage in speed of advancement decreases with the number of incumbent women in the executive ranks.*

2 | METHODS

2.1 | Sample and empirical strategy

We use an objective measure of speed of advancement to investigate our main research question: other things being equal (demographic attributes, educational background, and career experiences) how long did it take women to secure a top executive job as opposed to men? Our approach is to begin by controlling for other factors that might affect speed of advancement and investigate whether gender is still a significant predictor of speed of advancement.² We interpret the difference as consistent with a relative advantage or disadvantage in getting there. As noted earlier, this measure says nothing about bias affecting how women get to be candidates, an issue we return to in the limitations section.

The data. We hand-collected information on the top executives from the Fortune 100 companies in 2001 and 2011. We focus on the Fortune 100 corporations because they all operate within the same legal framework, especially the same employment laws concerning gender and national-level institutional pressures (as opposed to cross-national samples); because they include the most important executive jobs in the United States and arguably in the world; and because they are models for many smaller companies. Because of their size and visibility, the companies in our sample may be particularly subject to institutional pressures. The year 2011 was the most recent when data collection for this project began. It was during an especially difficult period for business and for promotions, while the year 2001 was the opposite, the end of the strongest period of economic expansion since World War II.

We define "top executives" as those business leaders with fundamental influence over corporate-wide operations, the people who truly direct strategic decisions. They include the president, chief executive officer (CEO), and chair and vice-chair of the board of directors. The same individual sometimes will hold more than one of these titles, typically president and CEO or CEO and board chair. They also include the heads of functional or operating areas of the corporation: chief operating officer, executive vice presidents (EVPs) responsible for more than one area, senior vice presidents who direct a single area, and heads of specialty areas such as the chief financial officer, the chief marketing officer, or the chief accounting officer, among others. Finally, top executives also include vice presidents and group presidents, who typically head a

²A similar approach has been used by previous studies that looked at gender differences in other career outcomes at the top (e.g. Bertrand & Hallock, 2001; Gayle et al., 2012; Hill et al., 2015). To be clear, we are not claiming that speed of advancement captures the full range of possible differences between men and women in career advancement.

corporate division. Where operating divisions are very large, group vice presidents may also have responsibility for important strategic decisions.

We identify each firm's top executives by extracting information from its organizational chart. Previous studies identified top executives according to their pay (typically limited to the five highest-paid executives, because their pay needs to be reported in the proxy statements of public companies; see, for example, Bell, 2005, Bertrand & Hallock, 2001; Gayle et al., 2012). Organizational charts are not consistent across companies. For example, some do not use the EVP title, the use and position of "CIO/CTO" varies, others combine titles, and so on. Thus, we could not base our selection of 10 top executives strictly on a fixed set of job titles. Instead, we worked down the organizational chart in each company from the top job until we got to the tenth individual in the hierarchy. This simpler and more robust, nonparametric approach includes a more comprehensive body of key decision makers in the sample. Our cutoff at 10 reflects resource constraints in collecting data, but as a practical matter it seems to capture job titles that are identified with the top operating and functional roles in the corporate hierarchy.

The Dun & Bradstreet Reference Book of Corporate Managements (2001, 2011) lists the names and titles of each corporation's executives in hierarchical order (most often starting with the board chair and president) and includes biographical and career information on each executive. The information is far from complete, however, and so we complemented that data with information from a variety of printed and online sources: Standard & Poor's Register of Corporations, Directors and Executives (2001) and Who's Who in Finance and Industry (2002), the Hoover's Online and Lexis-Nexis electronic databases, the companies' proxy filings, and executives' resumes and biographical information available on company and other websites.

We hand-coded each executive's demographic attributes, educational background, and career history. Demographic attributes included sex and year of birth. Educational background included degrees earned (bachelor's, master's, and Ph.D. or equivalent, as well as the field of the degree), the name of the degree-granting institution, and the year of the degree. For each degree-granting institution, we recorded the country in which the institution is located and whether it is an Ivy League school. Career history information included data on executives' entry-level jobs and on each subsequent job up to their current executive positions. For each job, we recorded the year when the executive started that position, the job title, the function, and the name of the company. These measures include the standard human capital variables used in studying labor market discrimination and go beyond those to capture attributes reflecting requirements for advancement to executive roles (see, for example, Custódio, Ferreira, & Matos, 2013; Murphy & Zábojník, 2006). We were able to collect complete biographical and career information on 1,594 executives, about 80% of the initial sample. For the others, we had partial information and we used list-wise deletion of those with incomplete information.

2.2 | Variables

Dependent variable. We measure *speed of advancement* by the number of years between the year the executive entered the labor market and the year when she or he was appointed to the focal position. The year of labor market entry was obtained from executive biographies (the starting date of the individual's first job). When this information was not available, we used the year of graduation from the highest level of education obtained as the year of labor

market entry. Other things being equal, a smaller number of years indicate faster advancement.

Independent variables. *Female* was coded 1 if the executive was female and 0 otherwise. We capture intra-firm mobility with *company tenure* and measure it as the proportion of an executive's career spent in their focal organization before assuming their current executive position. To do so, we divide the number of years the executive spent in the current organization before being appointed to the focal position by her/his total years of work experience before appointment.

To investigate whether women's advantage over men is a function of the number of women executives currently in the executive ranks of the company, we examine the companies that were present in the Fortune 100 list in both 2001 and 2011 and perform within-company analyses using the *number of female executive incumbents* in the year 2001 as a proxy for whether there were women at the top.

Control variables. We use several individual variables to control for relevant attributes other than gender, though perhaps related to it, that may drive the speed to the top. These include *years of education*, as more highly educated individuals may get to the top of the corporation faster (they also start their work career later.) We also control for whether the executive holds an MBA degree, arguably a special advantage in business. In addition, we control for the status of the educational institutions that executives attended. We include an indicator variable that takes the value of 1 if the executive received his or her undergraduate degree from one of the eight Ivy League institutions³ (*Ivy League undergraduate*) and zero otherwise, and another indicator that takes the value of 1 if the executive received a graduate degree from an Ivy League institution (*Ivy League graduate*) and 0 otherwise. The Ivy League measures should capture aspects of selectivity that may proxy ability and social class differences that could influence career advancement decisions (Bartlett & Miller, 1985).

We also control for work experiences before the executive appointment, which may influence speed of advancement. To capture career variety, we measure the number of firms, industry sectors, and functional areas in which the executive had worked before appointment to the focal position (see Crossland, Zyung, Hiller, & Hambrick, 2014). We found a high correlation between the number of distinct firms and the number of industry sectors, indicating that most executives changed industry when they changed firms ($r = 0.75$). Because of that covariance, we include in our analyses the total number of distinct functions and industries but exclude the total number of employers. To take into account that executives with more jobs may have been more likely to have greater career variety, we created these measures by calculating the ratio between the total number of industries (or functions) in which an executive had worked, and the total number of jobs before promotion to her/his current executive position. These variables are called *diversity of functional experience* and *diversity of industry experience*.

To reflect executives' place in corporate hierarchies and to address the concern that women executives may be in less important executive roles, we classified them into three

³The list of Ivy League institutions includes Brown, Columbia, Cornell, Dartmouth, Harvard, University of Pennsylvania, Princeton, and Yale. We chose the Ivy League list (as opposed to other educational rankings) because it is a standard and constant list that reflects social status and is evaluated by various stakeholders in a similar way. Alternative rankings of colleges and universities have started more recently (e.g., the *US News and World Report* university rankings started in 1983), and 80% of our executives graduated before then.

different tiers: *Top tier* was coded as 1 if executives held positions that command the entire firm—CEO, president, chairperson, or vice-chair—and 0 otherwise. *Middle tier* included chief functional officers, EVPs, and senior VPs, and *bottom tier* included group VPs and VPs. Executives with multiple titles were coded according to the highest position they occupied (cf. Bertrand & Hallock, 2001). Following Guadalupe, Li, and Wulf (2014), we also control for the type of activities executives are responsible for, because executives with different roles may have different promotion prospects. *General managers* have responsibilities over a broad range of functions within their business units, for which they typically have profit-and-loss responsibility; corporate CEOs, presidents, and heads of divisions belong here. General management experience is often seen as a steppingstone to the highest executive roles and a prerequisite for the CEO job. *Functional managers* are responsible for corporate-wide activities in their specialized function. Like Guadalupe et al. (2014), we further classify functional managers into two groups according to their proximity to the product: marketing, research and development, sales, and manufacturing executives are *product functional managers*, while finance, law, human resources, information technology, strategy, and public relations executives are *administrative functional managers*.

2.3 | Analyses

Because we have several executives for the same company, and 67 companies appeared in the F100 rankings in both 2001 and 2011, we clustered the standard errors for each company-year pair in order to account for the potential correlation of observations within a company in a given year.⁴ We test H1 and H2 with company fixed effects OLS models to further control for unobserved fixed company characteristics that may have affected executives' speed of advancement.⁵ H3 is tested without company fixed effects because the independent variable we examine, *number of female executive incumbents*, does not vary across individual executives in the same company. Instead, we run these models with company-level controls: company age at the year of the data collection, industry (two-digit-SIC codes⁶), and size (log of number of employees), using company random effects models. Given that we measure *speed of advancement* by the number of years it took an executive to get to her/his current position from the moment she or he joined the labor market, a negative coefficient in our models signifies faster advancement to the top.⁷

⁴In an alternative specification, as a robustness test, we clustered the standard errors for each company. This specification did not alter our main results.

⁵We account for the nested structure of the data (multiple executives within the same company) in an alternative way using a mixed-effect model that permits the female variable coefficient to vary for each company in our models with the dependent variable speed of advancement. This model takes into account the fact that companies may advance women at different rates. We again find evidence that female executives have an advantage over men in speed of advancement.

⁶We also ran the analyses with four-digit SIC codes and the results remained the same.

⁷Because our dependent variable Speed of advancement is truncated on the left (it cannot take negative values), we rerun the models using Tobit models that correct for bias in the coefficient estimates due to truncation in the dependent variable. The results remain unchanged in magnitude and significance. Interpreting the results is less intuitive, however, which is why we rely on OLS estimates. Finally, we run the models using a duration model, a Cox specification, and again find that women got to their positions faster than men. These results are available on request.

3 | RESULTS

Table 1 provides descriptive results from the data. On average, executives took 26 years from entering the workforce to get to the executive position we observe. Female executives make up 15% of the sample (11% in 2001 and 18 in 2011), a remarkably low proportion of the executive population given their share of total employment. Executives in our sample average 17.8 years of education, indicating that the average executive holds a graduate degree (about 32% had earned an MBA). Ten percent hold an Ivy League undergraduate and 14% hold an Ivy League graduate degree, a very disproportionate outcome given the small percentage of students enrolled in those schools. The average executive had spent about half of her/his career (52% of her/his work experience) with the company in which we observe her/him.

Table S1 compares male and female executives' educational backgrounds and career histories. Women executives reached their current executive position in a considerably shorter time than did male executives: about 3.2 years earlier (23.3 and 26.5 years, respectively). Female executives have slightly more years of education and are slightly less likely to come from Ivy League undergraduate institutions. They show a higher ratio of industry variety over number of jobs than do men. Men are much more likely to be in top-tier executive positions than women (27 vs. 8%) and are more likely to hold general managerial or operating roles (46 vs. 19%). It seems that women are advancing faster but into lower-level positions, an issue we come back to in our analyses for potential alternative explanations. Women are more likely to be found in functional roles, both product functions (62 vs. 41%) and administrative functions (17 vs. 11%).

The company fixed effects OLS regression models shown in Table 2 test whether women show higher speed of advancement to the executive ranks. Models 1–3 estimate speed of advancement as a function of gender. We show the analyses controlling first for just job attributes—tier and type of managerial role (Model 1); adding educational background variables next (Model 2); and finally adding career history variables (Model 3).

Models 1–3 in Table 2 show that, with controls for equivalent observable attributes, women executives get into executive jobs significantly faster, by 2.14 years, than do their male counterparts. This difference remains high even after we introduce education (Model 2) and also career history controls (Model 3). Our results thus support Hypothesis 1.

The control variables also show some interesting relationships: both years of education and an MBA degree are associated with getting to the top faster, but holding an Ivy League degree has no impact. The coefficients of the career history variables show that the more industries and job functions executives had worked in, the faster they advanced. Having a greater fraction of their career spent with their current employer did not affect their advancement.

We further examine the magnitude of the relationship between speed of advancement and gender using a Blinder–Oaxaca decomposition analysis (see Table S2). The analysis begins by estimating separate equations for men and for women in our sample and then calculates how long it would take individuals with the attributes of women in the sample to get to the top if they were treated as men (imputing the female attributes into the male equation) as compared to how long it would take individuals with the attributes of men to get to the top if they were treated as women (imputing the male attributes into the female equation). On average, women get to the top 3.22 years faster than men, and the Blinder–Oaxaca decomposition shows that women would have taken only 1.87 years longer on average to get to their current executive position if they had had the same characteristics and were in the same type of executive jobs as

TABLE 1 Summary statistics

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1. Speed of advancement	26.03	7.12																		
2. Female	0.15	0.36	-0.18																	
3. Diversity of industry experience	0.24	0.15	-0.25	0.06																
4. Diversity of functional experience	0.41	0.16	-0.12	0.00	0.18															
5. Company tenure	0.52	0.42	0.11	-0.04	-0.60	0.03														
6. Years of education	17.78	1.77	-0.15	0.06	0.17	-0.06	-0.17													
7. MBA degree	0.33	0.47	-0.12	0.01	0.02	0.00	-0.06	0.27												
8. Ivy league undergraduate	0.10	0.30	-0.03	-0.06	0.07	-0.03	-0.09	0.13	0.07											
9. Ivy league graduate	0.14	0.35	-0.06	-0.04	0.07	-0.06	-0.13	0.26	0.23	0.34										
10. Top tier	0.24	0.43	0.26	-0.18	-0.18	-0.12	0.08	0.03	0.04	0.10	0.09									
11. Middle tier	0.70	0.46	-0.17	0.13	0.13	0.08	-0.08	-0.04	-0.03	-0.10	-0.10	-0.85								
12. Bottom tier	0.06	0.23	-0.13	0.08	0.08	0.06	0.00	0.03	-0.01	0.01	0.02	-0.15	-0.39							
13. General manager	0.43	0.49	0.18	-0.20	-0.25	-0.07	0.16	-0.03	0.03	0.05	0.04	0.59	-0.51	-0.08						
14. Administrative functional manager	0.12	0.33	-0.04	0.08	0.02	0.09	0.03	-0.07	-0.04	-0.07	-0.06	-0.21	0.15	0.08	-0.34					
15. Product functional manager	0.45	0.50	-0.15	0.14	0.24	0.01	-0.18	0.08	0.00	0.00	0.00	-0.45	0.41	0.02	-0.76	-0.35				
16. Company age	93.15	46.91	0.09	0.01	-0.12	-0.10	0.10	-0.01	0.02	0.01	0.05	0.00	-0.06	0.11	0.00	-0.05	0.03			
17. Company size ^a	64.90	124.19	-0.05	-0.07	-0.04	-0.02	0.11	-0.11	-0.04	-0.02	-0.02	-0.05	0.05	-0.01	0.04	0.07	-0.09	-0.04		
18. Number of female executive incumbents	1.35	1.49	-0.07	0.16	0.16	0.04	-0.19	-0.01	0.07	0.02	0.04	-0.04	0.04	-0.01	-0.05	0.03	0.03	0.11	-0.01	

^aDivided by 1,000.

TABLE 2 Results of OLS analyses for speed of advancement (Models 1–4)

	Model 1	Model 2	Model 3	Model 4
Female	−2.139 (.000)	−2.068 (.000)	−2.123 (.000)	−1.229 −.073
Middle tier	−3.55 (.000)	−3.741 (.000)	−3.424 (.000)	−3.398 (.000)
Bottom tier	−6.469 (.000)	−6.328 (.000)	−5.735 (.000)	−5.740 (.000)
Administrative functional manager	−0.018 (.977)	0.043 (.944)	0.180 (.766)	0.206 (.732)
Product functional manager	−0.763 (.121)	−0.577 (.218)	−0.484 (.311)	−0.480 (.314)
Years of education		−0.503 (.000)	−0.494 (.000)	−0.495 (.000)
MBA		−1.251 (.001)	−1.254 (.001)	−1.272 (.001)
Ivy league undergraduate		−0.356 (.631)	−0.194 (.790)	−0.177 (.808)
Ivy league graduate		0.073 (.908)	0.032 (.959)	0.036 (.954)
Diversity of functional experience			−3.184 (.003)	−3.105 (.004)
Diversity of industry experience			−4.309 (.019)	−4.335 (.018)
Company tenure			−0.736 (.228)	−0.463 (.474)
Female × company tenure				−1.779 (.090)
Company fixed effects	Yes	Yes	Yes	Yes
Constant	29.538 (.000)	38.935 (.000)	41.184 (.000)	41.007 (.000)
Observations	1,594	1,594	1,594	1,594
R-squared	0.106	0.136	0.149	0.15

Note: *p* values in parentheses. Models 5–7 are run only for executives employed by companies that were in the F100 in both 2001 and 2011. Models 5–7 control for two-digit industry fixed effects, company age and size and are estimated using company random effects.

men (*endowments*). The *coefficients* term = 2.13 quantifies the change in women's speed of advancement if we were to apply the men's coefficients to the women's characteristics. This decomposition suggests that about one-third of the advantage women have in speed of advancement comes from their stronger attributes, but about two-thirds may be due to preferential

treatment—faster advancement for the same attributes—toward women. Of course, unobservable differences between men and women could also contribute to this result, an issue we consider below.

We next investigate the relationship between intra-firm mobility and the gender gap in speed of advancement into executive roles. Model 4 in Table 2 includes the interaction term between *company tenure* and *female*. We find that the interaction term is negatively related to speed of advancement ($\beta = -1.78, p = .09$), which yields support for H2. Figure 1 shows the predicted marginal effects of female on speed of advancement by company tenure. It reveals that the differences in speed of advancement between women and men increase with company tenure. This result suggests that it is through intra-firm mobility that women advance faster to the top than their male counterparts.

To test Hypothesis 3 on the effect of top executive incumbent women on speed of advancement, we first introduce an interaction term between the number of female executive incumbents and the female indicator. Model 5 in Table 3 shows a positive interaction term ($\beta = 1.1, p = .008$), suggesting that the difference between women and men regarding speed of advancement to their current roles decreases with the number of women executives already in the organization. Figure 2 shows the predictive marginal effects of female on speed of advancement by number of female executive incumbents. It reveals that the difference in speed of advancement between women and men decreases with the number of female executive incumbents and becomes nonsignificant once there are already two women in the top. While Model 5 tests for a linear relationship, it is also interesting to see whether the relationship is nonlinear, as suggested by the mechanism leading to H3: the existence of implicit quotas. To further investigate this possibility, we create an indicator variable called *number of female executive incumbents* > 1 that takes the value of 1 if the number of female executive incumbents is greater than 1 and 0 otherwise. Model 6 introduces this indicator variable (instead of the continuous variable *number of female executive incumbents*) as well as its interaction with the female indicator variable. The model shows that when there is one or zero incumbent women, women get to the top faster than men ($\beta = -2.61, p = .001$). However, this difference disappears when there is more than one woman at the top ($\beta = 2.65, p = .033$).

While the analyses in Model 6 are informative about the existence of a floor, they say nothing about how the gender gap in speed of advancement varies as the number of female

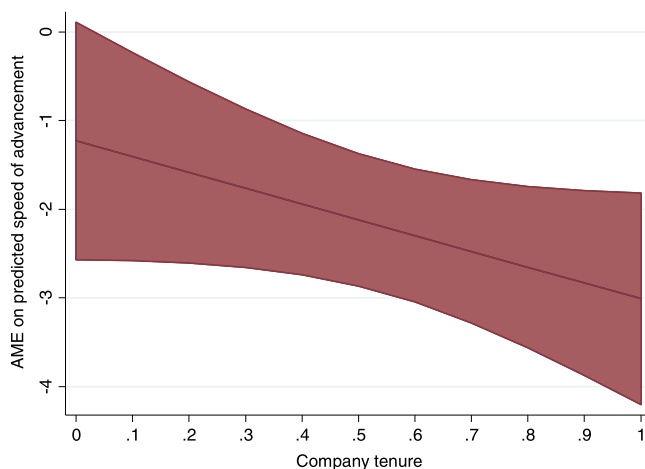


FIGURE 1 Predicted average marginal effects of female by company tenure

TABLE 3 Results of OLS analyses for speed of advancement (Models 5–8)

	Model 5	Model 6	Model 7	Model 8
Female	−3.148 (.000)	−2.61 (.001)	−2.622 (.017)	−1.489 (.011)
Middle tier	−4.097 (.000)	−4.156 (.000)	−4.220 (.000)	−3.990 (.000)
Bottom tier	−6.253 (.000)	−6.285 (.000)	−6.489 (.000)	−4.991 (.000)
Administrative functional manager	0.285 (.781)	0.428 (.672)	0.470 (.647)	0.734 (.348)
Product functional manager	0.433 (.599)	0.507 (.531)	0.599 (.473)	−0.605 (.333)
Years of education	−0.373 (.060)	−0.389 (.045)	−0.376 (.056)	−0.260 (.096)
MBA	−0.242 (.675)	−0.217 (.709)	−0.200 (.728)	−1.461 (.005)
Ivy league undergraduate	−0.429 (.656)	−0.532 (.585)	−0.444 (.644)	−0.913 (.247)
Ivy league graduate	0.256 (.828)	0.306 (.793)	0.221 (.851)	−0.010 (.990)
Diversity of functional experience	−4.762 (.087)	−4.674 (.092)	−4.578 (.095)	−6.639 (.009)
Diversity of industry experience	0.683 (.731)	0.514 (.798)	0.591 (.763)	−5.736 (.000)
Company tenure	−1.125 (.175)	−1.029 (.215)	−1.119 (.180)	−1.665 (.038)
Number of female executive incumbents	−0.304 (.057)			
Female × number of female executive incumbents	1.100 (.008)			
Number of female executive incumbents > 1 (indicator)		−0.499 (.407)		
Female × number of female executive incumbents > 1 (indicator)		2.650 (.033)		
Number of female executive incumbents < 1 (spline)			−0.863 (.165)	
Female × number of female executive incumbents < 1 (spline)			0.328 (.804)	
Number of female executive incumbents > 1 (spline)			−0.139 (.525)	

TABLE 3 (Continued)

	Model 5	Model 6	Model 7	Model 8
Female × number of female executive incumbents >1 (spline)			1.310 (.005)	
First job tenure				0.292 (.000)
Company fixed effects	No	No	No	Yes
Constant	38.501 (.000)	38.559 (.000)	38.498 (.000)	37.017 (.000)
Observations	471	471	471	1,014
R-squared	0.144	0.142	0.145	0.225

Note: *p* values in parentheses. Models 5–7 are run only for executives employed by companies that were in the F100 in both 2001 and 2011. Models 5–7 control for two-digit industry fixed effects, company age and size and are estimated using company random effects.

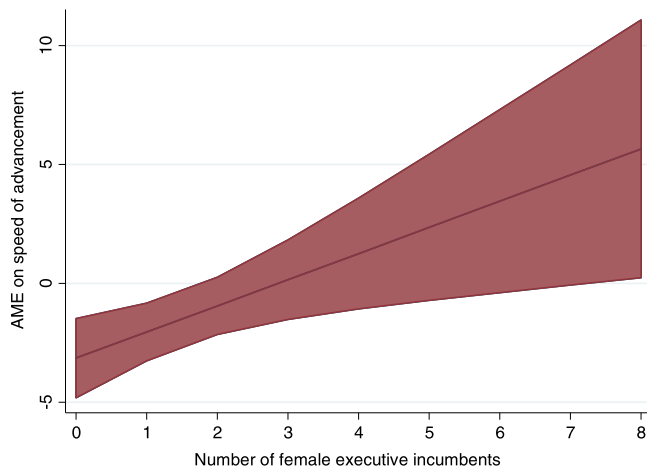


FIGURE 2 Predicted average marginal effects of female by number of female executive incumbents

executive incumbents increases beyond one woman. To explore this relationship, we use a piecewise regression model: specifically, we allow the coefficient of number of female executive incumbents and its interaction term with the dichotomous variable *female* to vary depending on whether the number of female executive incumbents is below or above one. Model 7 in Table 3 introduces two variables: number of female executive incumbents below one (*number of executive incumbents* < 1) and number of female executive incumbents above one (*number of executive incumbents* > 1). The positive coefficient of the interaction between *female* and *number of executive incumbents* > 1 ($\beta = 1.31$, $p = .005$) suggests that, once there is one woman in the top executive team, the gap between women and men's speed of advancement decreases. Probing the interaction further, we find that the marginal effect of *female* becomes positive (i.e., men got ahead faster than women) once there are four or more women at the top. The

three different specifications seem to suggest the existence of quotas.⁸ Below a given threshold (one woman), women get to the top faster than men. Beyond that threshold, however, the advantage decreases and reverses in favor of men once there are several women at the top.⁹

3.1 | Alternative mechanisms

Our main hypothesis explaining the difference in speed of advancement is that institutional pressures to increase diversity led women who made it to the executive suite to get there sooner than their male colleagues. The alternative explanation for our finding that women executives got to the executive suite faster is unobserved ability, specifically that the women were more qualified in ways that our observed education and career experience characteristics could not capture. Discrimination at lower levels might produce a smaller pool of female candidates who were nevertheless more motivated and ultimately more qualified than the men (Ferree & Purkayastha, 2000; Yap & Konrad, 2009), attributes that would propel them faster to the top of the corporate hierarchy.

We test the possibility that the women executives may have higher quality than their male colleagues with several approaches. The first is by examining the experience of the men and women in our sample in the first job, a point at which discrimination and bias in promotion have yet to play out systematically. Advancing faster from those first jobs is therefore likely to reflect superior ability and performance. Research on mechanisms such as cumulative advantage (Merton, 1973) suggests that initial success not only may be a proxy for abilities that contribute to later success but that initial success may create halo effects that contribute to later success.

Our descriptive data show that those who got to the top faster tended to move through all their previous roles faster and that women executives moved out of their first job faster (6.59 years vs. 8.29 for men). Model 8 of Table 3 shows that tenure in the first job is significantly related to speed of advancement in the expected way ($\beta = 0.292$; $p = 0.000$), but that a speed advantage exists independent from attributes captured by that early experience.

Our most important test of the alternative explanation that the women executives we observe get to the top faster only because of unobserved ability uses a technique from epidemiology to study very low probability events, such as a corporate employee becoming a top-ten executive. Efforts to study the causes of rare diseases in epidemiology suffer from difficulty in securing a control group. Some cancers, for example, occur in one of 100,000 individuals, so to create a traditional control group of individuals who could have had the disease would

⁸We also explored whether women presented higher rates of departure in companies that already had a quota, another expected outcome of institutional pressures. We collected data on the departure date of all top executives in the 2001 dataset and analyzed whether female executives' time to departure was negatively related to the number of female executives at the top in 2001. We focused on the subsample of executives who were either in the middle or the bottom tiers of the executive hierarchy (and not in the top tier), because these were the executives for whom there could still be promotion opportunities within the organization. After excluding those executives who passed away or retired, our final sample for these analyses was 237 executives. Although consistent with the expectation that women would leave earlier when there are other women at the top, the interaction term between the variables *female* and *number of female executive incumbents* had a negative sign on the DV (executives' time to departure from the company), the coefficient was not statistically significant.

⁹The percentage of executives working in companies with four or more female executives is small—4.25%—but the absolute number is still large enough to specify the equation appropriately.

require following millions of individuals over time to identify enough victims of the disease and then the differences in who contracts the disease to be viable, a logistics challenge that overwhelms most studies. Instead, researchers create a control group after the fact—the “case–control” method—from a random draw of individuals who could have contracted the disease but did not.¹⁰

Our context is similar in that the probability of any individual becoming a top 10 executive in a Fortune 100 corporation is extremely small, given the millions of employees who could have conceivably been in the running for them. As noted earlier, the decline of promotion-from-within and the rise of outside hiring now means that we cannot identify the pool of potential candidates being considered for all these roles.

Wacholder, Silverman, McLaughlin, and Mandel (1992) outline the criteria and concerns for selecting a good control group, which includes the possibility that they could have had the “treatment,” which in our case is “made it to these top 1,000 corporate jobs.” For our purposes, the main issue is the choice at the one extreme of individuals who we have good reason to believe could have been top 10 executives (e.g., those who held senior business jobs). The drawback then is that the control group would have been subject to the same kind of discriminatory selection effects earlier in their career such that only the best performers survived. The other extreme is simply to pick individuals at random in the population, irrespective of their life experiences, which could capture any of the discrimination and selection bias that might have kept individuals out of the business world and out of management roles. The downside of the latter approach is that such a sample would need to be prohibitively large to capture enough individuals with business career attributes measured by our independent variables to use in the analysis.

We chose an intermediate path that first selected individuals whose age is consistent with the years of experience necessary to hold a top executive role, age 46–61 in 2011, the range for our top executives. Next, we chose individuals who have had at least some corporate experience in prominent corporations. We drew a random sample of about 500 individuals of that age range who are not top executives in the Fortune 100 companies but who had some experience working in a Fortune 500 company.¹¹ We then hand-coded all the information for the individual background variables used above for the individuals in this control group.

The case–control method allows us to examine more carefully the probability that women are selected into these top executive roles. The analysis here is the equivalent of asking whether men or women are more likely to have a particular disease. A simple odds-ratio in Table S3 confirms what we would expect: the odds of being a woman are much lower among

¹⁰This is not the same as a synthetic control group, which involves choosing observations to act as controls that are matched to be similar to the treatment group (see Borgan et al., 2018; Breslow & Day, 1980). Case control draws a random sample of all those who could have been exposed to the treatment before the treatment event happened.

¹¹Specifically, we used a random number generator to assign a number to each of the Fortune 500 companies in year 2011, the last one of our study years. We use this number to rank order the list of companies. We generated a list of names from each company using LinkedIn to look for individuals who had worked at each company at some point in their career and were of the appropriate age. Our aim was to select a control sample of 500 individuals. In part, this choice was driven by the time and effort required to draw individual names at random across the entire Fortune 500. We then generated a random number (from 1 to 9) for each company to establish how many individuals we would draw from the list generated by LinkedIn. Our final control sample consisted of 502 individuals who belonged to 201 different Fortune 500 firms.

the “case-patients” (i.e., top 1,000 jobs) than among the “control-patients” (i.e., the nontop 1,000 jobs). In other words, women are significantly less likely than men to secure these top roles. The disadvantage of women in securing top jobs is also found when we run a logistic model that includes controls for the attributes of individuals. Holding everything else constant, the odds of being in a top 1,000 job for females over the odds for males is 0.388 (see Table S4).

The question we want to examine, of course, is speed of advancement for those who do get to the executive suite. The way to consider this question with the case-control method is to ask whether women advance faster, *conditional* on making it to the executive suite. The analysis, therefore, is equivalent to Heckman's (1979) classic analysis of wages conditional on having a job: the first equation estimates having a job, and the second then estimates speed to the top conditional on having a top job. This analysis should capture those unobserved attributes that differentiate women in the top executive ranks from those of an equivalent cohort in business who did not make it to the top rank. The results of the Heckman selection model are presented in Table 4 and show that women top executives still advance faster. The inverse mills ratio here does not appear to be related to speed to the top ($\beta = 1.025$, $p = .261$), which indicates that making the analysis contingent on getting into the top ranks does not improve the prediction.¹²

Arguably, the best evidence that the results we find on speed of advancement are not driven solely by unobserved ability comes from the earlier results showing that the net advantage that women have in speed to the top disappears once there is at least one woman in the organization. It is difficult to imagine how superior ability would stop mattering after there was more than one woman in a top job.

Are women promoted to worse jobs? Another alternative explanation for our finding that women get to the top faster than their male counterparts is that they may have ended up in organizations with lower financial performance, for which the requirements to get to the top may be less strict. According to the “glass cliff” notion, women are more likely to be promoted to leadership positions in organizations that are “struggling, in crisis, or at risk to fail” (Cook & Glass, 2014, p. 1081; Ryan & Haslam, 2005, p. 81); and women get these less attractive roles because, via discrimination, men get the better ones. Women may be more willing to accept such positions and downplay the significance of glass cliffs in order to avoid being seen as a victim or being criticized by male power groups (Ryan & Haslam, 2007).

To test whether women disproportionately held jobs in companies that were lower performers, we explore two alternative dependent variables. *Female appointment* takes the value of 1 if the firm appointed a woman executive, but no men, in a given year, and 0 otherwise. Because we identified several cases in which companies appointed multiple male and female executives to their top 10 jobs in the same year (205 out of the total 294 female appointments),

¹²Heckman models typically involve an exclusion restriction that in our context requires a measure related to getting to the top (selection) and not speed to the top (our dependent variable). No measure available to us met that criterion effectively. We therefore estimated the model using the non-linearity inherent in the inverse Mills ratio. This approach produces unbiased estimates if the data are distributed in a bivariate normal manner. We estimated the model using full maximum likelihood estimation, which reduces the concern that this distributional assumption is violated (see Wolfolds & Siegel, 2019 for a discussion).

	Model 1	
Female	-0.886 (.050)	TABLE 4 Results of OLS analysis for speed of advancement after controlling for selection: Heckman correction
Middle tier	-2.533 (.002)	
Bottom tier	-4.866 (.000)	
Administrative functional manager	-0.086 (.891)	
Product functional manager	-0.686 (.320)	
Years of education	-0.331 (.014)	
MBA	0.070 (.865)	
Ivy league undergraduate	0.372 (.657)	
Ivy league graduate	1.366 (.029)	
Diversity of functional experience	-33.539 (.000)	
Diversity of industry experience	-70.860 (.000)	
Company tenure	-2.070 (.002)	
Constant	43.688 (.000)	
Observations	732	
R-squared	0.434	

Note: *p* values in parentheses.

we created an alternative measure, *proportion of female appointments*, which is the proportion of all appointments that are female in the year the company makes the focal female appointment. We examine whether an appointment goes to a female or a male using logit estimation and fractional logit models respectively for each of the described dependent variables. We measure companies' *financial performance*, specifically return on assets, return on equity, and shareholder return, 1 year before the appointment and as 2-year and 3-year averages before the appointment. We collected financial performance data from the Compustat and CRSP (Center for Research in Security Prices) databases. Companies that were not public or had various divisions listed separately on the stock exchange were excluded because such information was not available.

Models 1–3 in Table S5 show the results of the logit model estimation and Models 4–6 show the results of the fractional logit analyses using the different time spans. In all the models, we control for industry affiliation at the two-digit level, year, and firm size (log of employees and log of assets). We also control for the year of the executive's appointment.¹³ The results in Table S5 contradict the glass cliff hypothesis. Indeed, we find that firms that are doing better financially were more likely to appoint women to top executive roles.¹⁴

Is the female speed of advancement advantage consistent across the different positions at the top? Our descriptive statistics shown in Table 1 and Table S1 reveal that women tend to be overwhelmingly considered for lower-level executive positions (tiers 2 and 3). We further investigate whether the female advantage holds across the three tiers or whether it is observed only in certain tiers. Table S6 shows the results of the regression analyses separately for the different hierarchical tiers. Because there were very few observations in tier 3 (80), we combined tiers 2 and 3 to perform these analyses. The results reveal that the female speed advantage is observed for tiers 1 as well as 2 and 3. This suggests that the women who made it to very top jobs enjoyed advantages in speed of advancement compared to men across all tiers.

4 | DISCUSSION

Advancement into executive jobs is one of the most visible outcomes in assessing gender workplace inequities in the business world. We explore that advancement by comparing male and female incumbents' speed of appointment to executive roles. We find that the few executive women who made it to the top in the Fortune 100 firms experienced considerably faster ascent into top executive roles than did top executive men. Although female executives are disproportionately represented in lower-ranking top executive positions, such as heads of division or functions, their advantage in speed of advancement cannot be explained by their distribution across job titles. Neither do we find evidence for the glass cliff hypothesis, that women would obtain this advantage by being assigned to worse jobs. On the contrary, the women in our sample were disproportionately appointed to companies that had been performing well. Overall, our results are consistent with the descriptive statistics shown by some earlier studies on other populations where female top executives were younger than their male counterparts (Bell, 2005; Bertrand & Hallock, 2001; Gayle et al., 2012).

Our results complement prior studies that showed other types of career benefits, such as higher pay and lower likelihood of exit for the few women who made it to the top, compared to their male counterparts (Hill et al., 2015; Leslie et al., 2017). These studies also worked on the premise that having a few women at the top helps companies appease stakeholder pressures for gender diversity: due to the paucity of female top executives, the women minorities who attain such positions help firms achieve organizational diversity goals, and companies are willing to reward such unique, rare, and valuable resources to help maintain those goals (Hill et al., 2015;

¹³To ensure that our results are not driven by omitted firm characteristics, we ran the models again with company fixed effects and also found a positive relationship between firm performance and female appointments.

¹⁴One potential problem given the nature of our data is the possibility that we may not observe appointments if an executive had been appointed and left the organization before the reference year of our data collection (2001 or 2011). To address this and as a robustness test, we re-estimated the same models using a restricted sample of appointments—only those made in the last 5 years—as they are typically all captured in our data. We find a positive relationship between past firm performance and female appointment to top executive jobs here as well (results not shown but available upon request).

Leslie et al., 2017). We propose that the effect of institutional pressures starts working even before these women get to reach their executive jobs, affecting their experiences in getting to the top in a way that is systematically different from those of men.

Our study also reveals that women's advantage in speed of advancement compared to men's holds only under certain circumstances, and identifies the boundary conditions that determine a female premium in speed of advancement to the top of the corporation. First, we find that women's advantage in speed to the top can partly be explained by the fact that they had at least some qualifications that were better than those of their male counterparts: they had more years of education, were promoted faster out of their first job, and had greater industry variety in their resume than their male counterparts. Still, after controlling for observable differences in the qualifications of the men and women in our sample, there remains the advantage of women in speed of advancement. The Oaxaca decomposition reveals that even if women had the same observable attributes as men, they would still get ahead almost 2 years faster. In addition, analyses using a control sample of individuals who were of similar age to our top executives and had worked at prominent organizations suggest that the results on speed to the top are not due only to differences in unobserved ability between men and women top executives. While the case-control analysis suggested that being a woman reduced the odds of being in the case sample (i.e., being in the top jobs), we still found an advantage, although considerably smaller, of women versus men in speed to the top after correcting for selection. These results suggest that the top executive women in our sample appear to have received a special push through the existence of institutional pressures, but they also signal the limitation of these pressures to root out inequality because a substantial amount of the advantage in speed of advancement comes from the greater ability of women who make it to these positions compared to men.

Another boundary condition of the female premium on speed we observe is that executive women need to have been promoted from within to secure it. We find that female executives who have spent a larger fraction of their career in the firm in which they occupy their current position advanced faster than their counterparts with less company tenure, suggesting that the specific policies to advance diversity are applicable to internal candidates and again highlighting the limited effect of institutional pressures.

Finally, we find that women got to the top faster than men when there was no, or only one woman, in top executive roles, but this advantage disappeared once there was more than one woman there already. This suggests that institutional pressures are more powerful when there is no diversity at the top. It resonates with Dezső et al.'s (2016) finding that the likelihood that a woman occupies a position in the TMT decreases once there is already a woman there. It implies that many corporate diversity initiatives are merely "window dressing" that aim to enforce the minimum standards regarding the presence of women at the top to appease stakeholders (Oliver, 1991) but have only a limited effect on increasing gender equality in leadership positions.¹⁵ More generally, our finding complements the papers that looked at the effectiveness of institutional pressures to reduce gender inequality in the top executive ranks. These papers showed that diversity innovations had limited effectiveness

¹⁵An alternative explanation for this finding may be that women are promoted to the top faster as long as the proportion of suitable female candidates for a job is larger than the proportion of incumbent female executives, but that men and women's speed of advancement to the top should converge once women are proportionally represented at the top. When women are over-represented compared to suitable female candidates, we should expect men to advance faster than women. While this could be a plausible explanation for our findings, such explanation would imply that what constitutes "proportionate" representation is quite low, as women in this population represent only 10% of the suitable candidates.

either because corporations unknowingly used ineffective practices (Dobbin & Kalev, 2017) or intentionally adopted “symbolic” innovations with very limited effects (Dezsó et al., 2016; Farrell & Hersch, 2005; Tinsley et al., 2017). In accordance with these studies, we also show that actions to demonstrate gender diversity in the top executive ranks are often symbolic because they stop after a woman gains access to these top positions; they are only effective for those promoted internally, and they are often granted to women who are of higher ability than their male counterparts.

The findings contribute to the strategic leadership literature and more specifically, the research that has looked at the antecedents of TMT composition, by revealing that institutional pressures are another force that shapes the characteristics of TMTs. Such pressures not only affect the gender composition of the TMT, but they may also account for differences in the attributes (e.g., years of work experience and quality) of female and male TMT members. The effect of institutional pressures on the top echelons has remained a relatively underexplored aspect of the literatures on executive succession and the TMT, most of which has focused either on how the strategic imperatives and business conditions such as firm financial performance, environmental complexity, or industry munificence (see Hutzschenreuter, Kleindienst, & Greger, 2012) or the organizational sociopolitical factors such as power relations between the CEO and incumbent executives and the board of directors (Shen & Cannella, 2002) determine the composition of the TMT (e.g., Carpenter, Geletkanycz, & Sanders, 2004; Finkelstein, Hambrick, & Cannella, 2009).

4.1 | Limitations and future research directions

We recognize that speed of advancement is only one aspect of career outcomes and that we cannot answer the more fundamental question of how one gets to be an executive, specifically whether those experiences are different for men and women. One aspect of that question is how one does get to be in the pool to be considered for advancement, and the second concerns the specific promotion or advancement decision of individuals into an executive role. Previous studies on the glass ceiling (e.g., Gorman & Kmec, 2009; Smith et al., 2013; Yap & Konrad, 2009) examined the second question—the likelihood of advancement—with mixed results. Such studies typically examined an individual organization where the assumption was that all advancement came from within the organization (or from within the same industry as in the case of Gorman & Kmec, 2009), which made it possible to know the denominator for determining the rate of promotion (e.g., Jones & Makepeace, 1996; Yap & Konrad, 2009). Our interest in examining the question across jobs and across the economy requires a different approach, which is, did those few women who make it to the executive roles reach their positions at a different speed than men?

The analyses include the most visible jobs in corporate hierarchies: the 10 highest-ranking positions. The results may not generalize to the incumbents of lower-level positions, jobs that are subject to weaker institutional pressures. Similarly, the results here may not generalize to companies outside the Fortune 100 or to companies outside the United States. It may be that smaller, less visible organizations are not subject to the same pressures to show diversity. Further research that includes a larger and more heterogeneous sample of firms may look at whether these results are confirmed in other types of firms. The companies we study have outsized influence on the business community and on society as a whole, though, so results concerning them are important in their own right.

There is clearly a range of executive attributes, such as personality and leadership traits, that we cannot examine and that may be correlated with gender. Whether the findings we observe would disappear with data on those attributes is an important question for future research. We do have very detailed data on observable executive attributes, however, including several measures of education and a variety of work experiences that include executives' experience in job functions, industries, and organizations throughout their career.

Possible explanations for the speed of advancement and differences in that speed between men and women specifically would be interesting and important to study in future research. Obvious examples that have been studied in other contexts include the extent to which legal pressure in the form of sexual discrimination actions across companies might explain cross-company differences in advancement rates (Petersen & Saporta, 2004). Measuring such action is complex, though, as there are private lawsuits not easily identified, both state and Federal legal actions, as well as important cases that settle without charges ever being filed. Whether employers are more likely to change their practices if there is a legal challenge but they win it, or only if they lose a major case, are big questions that require separate studies to examine.

Many of the analyses here could be replicated using the demographics of the board of directors to investigate advancement to the board, another separate study area given the differences in director appointment processes and careers.

Of course, time to the top is only one measure of bias or preferences associated with executive jobs, and there may be other ways to measure the difficulty of career advancement besides time to the top. These include the number of self-reported career barriers by female and male executives (Lyness & Thompson, 2000) or the number and frequency of promotions male and female executives experienced during a given time (Metz & Tharenou, 2001). Our measure of speed of advancement offers complementary results to these other studies.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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