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IZA DP No. 17295

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Women in Economics, Policy, and
Leadership**

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ABSTRACT

50 Years of Breakthroughs and Barriers: Women in Economics, Policy, and Leadership*

This paper provides an overview of what has happened over the past fifty years for women as they worked to break through professional barriers in economics, policy, and institutional leadership. We chart the progress of women in higher education at the college level and beyond and then go on to examine women's representation at the upper levels of academia, government, law, medicine, and management. We begin our description of trends in 1972 when Title IX was enacted, prohibiting sex-based discrimination in federally funded educational programs. The data paint a picture of considerable progress but also persistent inequities. We then go on to consider possible explanations for the continuing gender differences and some of the empirical evidence on the factors identified.

JEL Classification: J0, J01, J10, J16, J2, J21, J24, J7, J70

Keywords: labor economics, economics of gender, labor force trends, education, discrimination, women leadership

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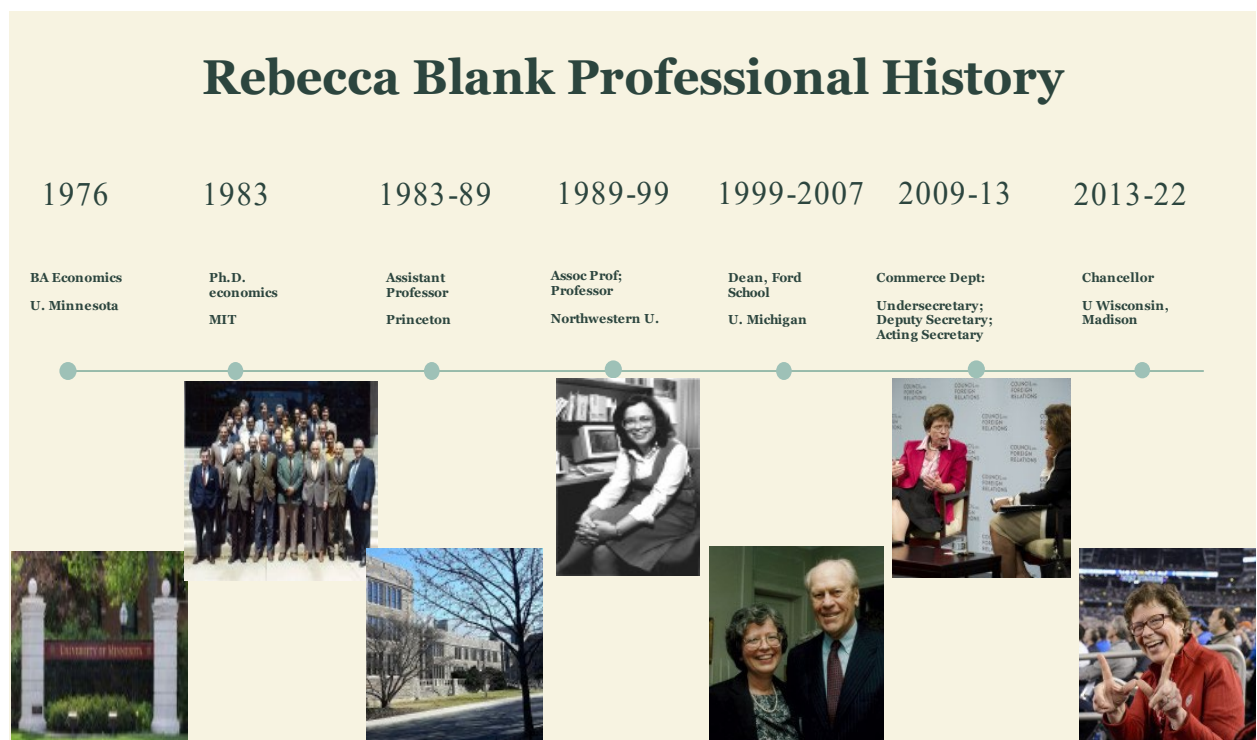
I. Introduction

In 1976 when Rebecca “Becky” Blank graduated college as an economics major from the University of Minnesota, despite being told after taking a career aptitude test that she “would make a great secretary,” she was part of a rising wave of women completing college in the United States. However, she showed her exceptionalism by choosing to major in economics in an era when only 12 percent of economics majors were women. She completed her Ph.D. in economics in 1983 when only 15 percent of doctoral degrees in economics were awarded to women. Her journey of breakthroughs and exceptionalism continued when she became an assistant professor at Princeton University when just 14 percent of assistant professors in economics were women. She moved to Northwestern University in 1989 where she received tenure at a time when less than 5 percent of full professors in economics were women. Her academic scholarship on determinants of labor supply, unemployment, the role of gender and race in labor markets (including an impactful review piece with Joseph Altonji in 1999), and inequality more broadly have changed how these issues are understood by academics and policymakers alike.

In 1997 she had the opportunity to put her knowledge into direct policy practice when she was nominated and then appointed a Member of President Clinton’s Council of Economic Advisors. It was no surprise to those who knew her when she was selected to become the inaugural Dean of the Ford School at the University of Michigan in 1999. This position leveraged her scholarly achievements and policy interests and allowed her to develop new skills in management and fundraising. In 2009 she returned to Washington, D.C. to work in the Commerce Department where she ultimately served as Acting Secretary of Commerce at a time when only about a third of cabinet positions were held by women. As Becky would later joke

the career aptitude test turned out to be right when she finally became a secretary - Secretary of Commerce.

In 2013, when only 18 percent of universities deemed as having “very high research activity” had a woman president, Becky Blank showed us again what it meant to be a breakthrough leader when she became Chancellor of the University of Wisconsin. The timeline below¹ provides a visual description of Blank’s professional career and many of the exceptional contributions that Becky made in economics, policy, and leadership in some of our most important institutions.



¹ U Minnesota photo https://en.wikipedia.org/wiki/Heller-Hurwicz_Economics_Institute; MIT photo <https://www.irwincollier.com/mit-department-economics-group-photo-1976/>; Princeton photo https://en.wikipedia.org/wiki/Princeton_University_Department_of_Economics#/media/File:Julis_Romo_Rabinowitz_Building.jpg; Northwestern photo from IPR <https://www.ipr.northwestern.edu/news/2023/rebecca-blank-in-memoriam-obituary.html>; Ford School U Michigan photo <https://fordschool.umich.edu/news/2023/remembering-former-ford-school-dean-rebecca-blank>; Commerce Department photo <https://obamawhitehouse.archives.gov/blog/author/former-acting-secretary-rebecca-blank>; Wisconsin photo from <https://rebeccablank.wisc.edu/>

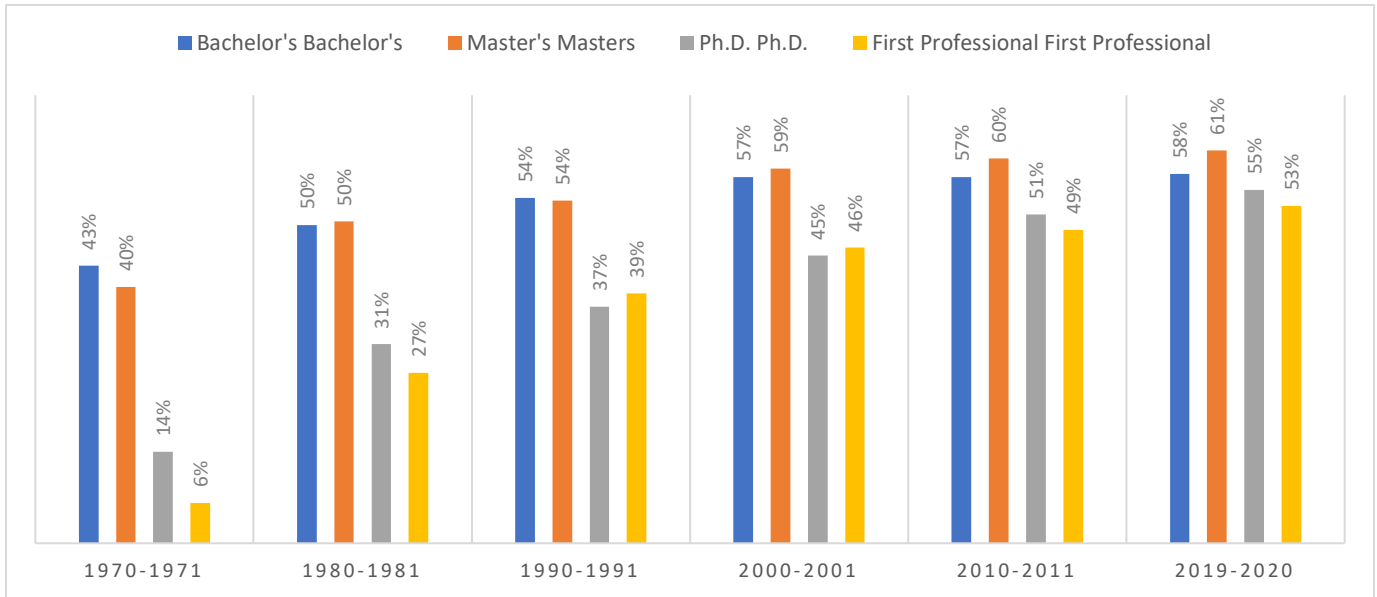
The remainder of this paper puts Rebecca Blank’s remarkable life into the context of what has happened over the past fifty years for women as they worked to break through professional barriers in economics, policy, and institutional leadership. We begin with measurement—something Becky advocated in her work. We chart the progress of women in higher education at the college level and beyond and then go on to examine women’s representation at the upper levels of academia, government, law, medicine, and management. We begin our description of trends in 1972 when Title IX was enacted prohibiting sex-based discrimination in federally funded educational programs. The data paint a picture of considerable progress but also persistent inequities. We then go on to consider possible explanations for the continuing gender differences and some of the empirical evidence on the factors identified.

II. Trends in Gender Differences in Educational Attainment and Leadership Positions

In her 2006 lecture “The Quiet Revolution That Transformed Women’s Employment, Education, and Family,” Claudia Goldin discusses how “Women’s increased involvement in the economy was the most significant change in labor markets during the past century.” She highlights the dramatic changes in women’s educational attainment that began in the 1970s that helped expand women’s horizons of what was possible to do and altered their identities such that they “could “make a name” for themselves before having to choose to change their name.”

Figure 1, using data compiled by Blau and Winkler (2022), shows the dramatic changes that have occurred in women’s educational attainment in the United States over the past fifty years. By 1980 women had achieved parity with men in receiving bachelor's and master's degrees, by 2010 parity was achieved for PhDs. Women are now more likely than men to achieve these degrees and by 2020 they had exceeded parity in receiving professional degrees such as law school and medicine.

Figure 1: Percentage of Degrees Awarded to Women by Type and Year

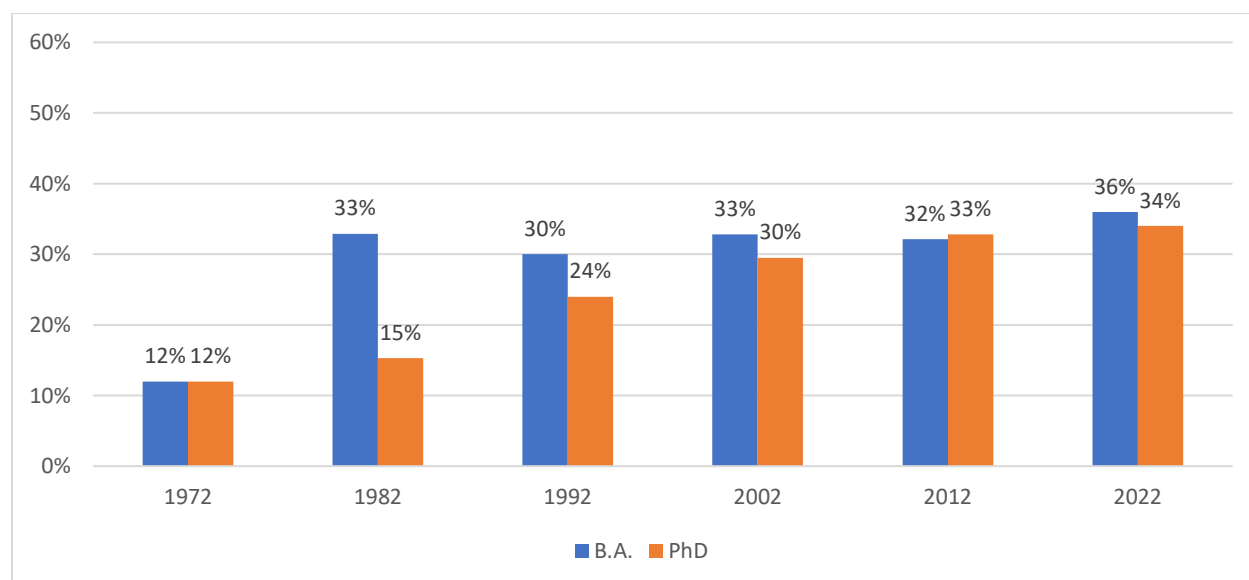


Source: Data are based on an updated version of Table 8-2 “Degrees Awarded to Women by Level, 1929-1930 to 2016-2017 (Selected Years),” Francine D. Blau and Anne E. Winkler, *The Economics of Women, Men, and Work*, ninth edition. (New York: Oxford University Press 2022), p.208 <https://global.oup.com/academic/product/the-economics-of-women-men-and-work-9780197606148?cc=us&lang=en&>.

While women have now exceeded parity in higher education attainment in the U.S. across all degree levels, parity has been more elusive in some undergraduate majors and graduate studies including economics. The National Science Foundation (2023) reports that in 2020 just 43 percent of undergraduate majors in the physical and earth sciences were women, and women were just 26 percent of majors in math and computer science, and 24 percent in engineering. Economics is another field where there has been progress over the last fifty years in the representation of women undergraduate majors, but the progress has fallen short, and, in this case, stalled. In Figure 2, using data from the American Economic Association’s Committee on the Status of Women in the Economics Profession annual survey of economics departments, we see a large increase in the percentage of women who chose economics as a major in college

between the 1970s and 1980s, but this quickly leveled off with women just 36% of economics majors in 2022. There has also been slow progress of women's representation at the doctoral level but again this has leveled off over the decade to just over 30 percent.

Figure 2: Percentage of Economics B.A. and Ph.D. Degrees Awarded to Women by Year

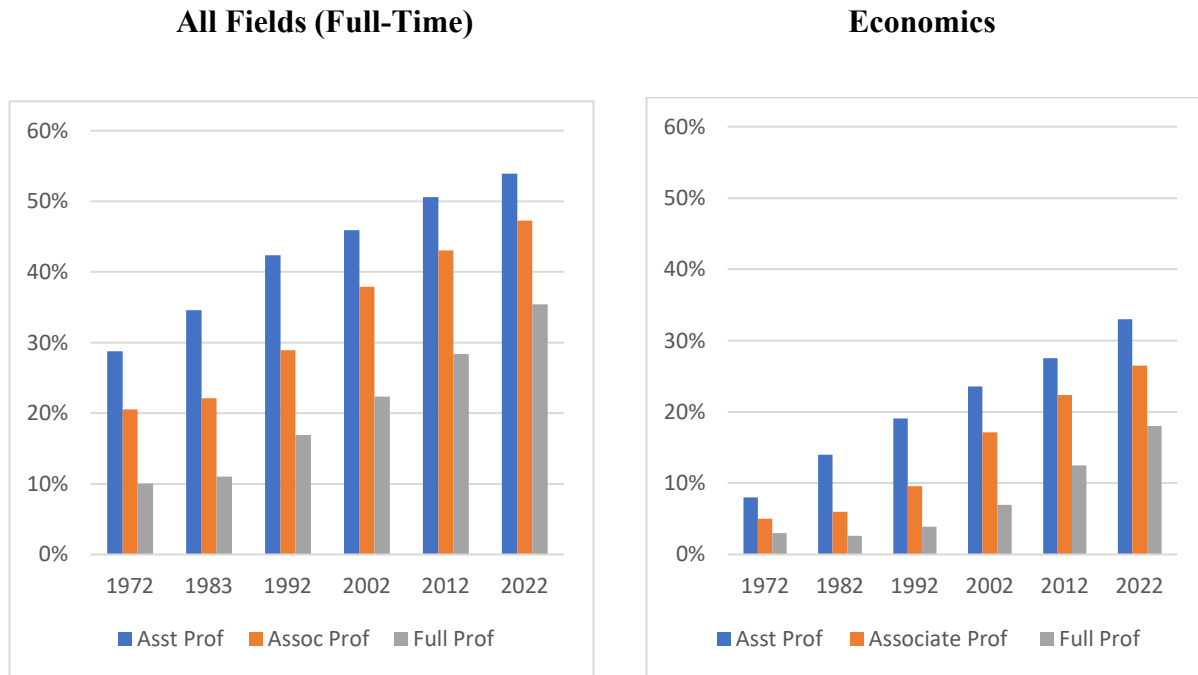


Source: Committee on the Status of Women in the Economics Profession (CSWEP) Annual Survey of U.S. Economics Departments, United States, 1994-2020, American Economic Association. 10.3886/ICPSR37118.v5, Inter-university Consortium for Political and Social Research [distributor] and for prior years. <https://www.aeaweb.org/about-aea/committees/cswep/about/survey/annual-reports>

With the increase in the share of women completing doctoral degrees shown in Figure 1, we have seen a steady increase in the percentage of faculty by rank who are women. Women achieved parity with men at the assistant professorship level in 2012 and are close to parity at the associate level in 2022. However, as shown in Figure 3, the percentage of women who are full professors is just 35% in 2022. In economics, the level of representation is much lower for women. The percentage of women full professors in economics did not rise to over 10 percent

until the 2010s, and in 2022 was just 18 percent even though women have been 30 percent or more of PhD graduates for the last 20 years.

Figure 3: Percentage of Faculty by Rank Who Are Women



Sources: For “All Fields” data – 1972 and 1983 data from the National Center of Education Statistics, and 1992, 2002, 2012, and 2022 data are from the American Association of University Professors, The Annual Report on the Economic Status of the Profession. For economics data -- the Committee on the Status of Women in the Economics Profession (CSWEP) Annual Survey of U.S. Economics Departments, United States, 1994-2020, American Economic Association. 10.3886/ICPSR37118.v5, Inter-university Consortium for Political and Social Research [distributor], and for prior years <https://www.aeaweb.org/about-aea/committees/cswep/about/survey/annual-reports>

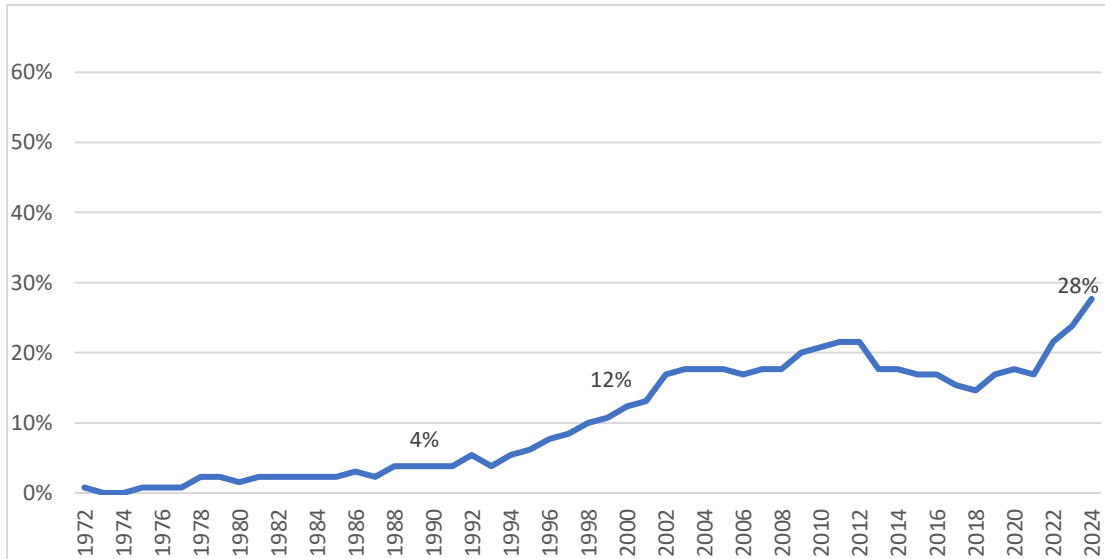
Faculty are key to the internal pipeline for senior leadership positions in colleges and universities because future presidents often start as faculty before being promoted to dean, provost, president, or chancellor. Progress in the representation of women in senior leadership positions in academia has followed the path of representation of women at the full professor level with a lag. However, women are still more likely to hold the least senior administrative

positions and are typically the lowest paid among higher education administrators. The situation is even worse for the representation of people of color among higher education administrators. Melissa Fuesting (2023), using data from the College and University Professional Association for Human Resources (CUPA-HR) survey of higher education administrators, finds that “in 2022, people of color were underrepresented among higher ed administrators in comparison to U.S. graduate degree holders, accounting for only 18% of higher ed administrators but 31% of U.S. graduate degree holders. To reach parity with U.S. graduate degree holders, the representation of people of color among higher ed administrators would need to increase by 69%.”

The 2022 CUPA-HR survey of higher education administrators, which covers over 800 colleges and universities in the U.S., finds that only 33 percent of all college and university presidents in the institutions surveyed were women, up from 21 percent in 2002. If one looks at trends for R1 universities (top-tiered institutions that provide doctoral education and have been designated by the Carnegie Classification System to provide a very high level of research activity), just 28 percent of presidents are women. These institutions represent less than 4 percent of all degree-granting institutions in the US but are looked to for advancing the frontiers of research and innovation, receive the bulk of federal research dollars, and are where most people who become professors have obtained their doctoral degrees.

Figure 4 plots the percentage of R1 University presidents who are women from 1972-2024. The 1990s saw a marked increase in the representation of women, from 4 percent in 1990 to 12 percent in 2000, but the trend leveled off around the time of the great recession in 2008, fell from 2013 to 2018, and has since risen sharply to 28 percent.

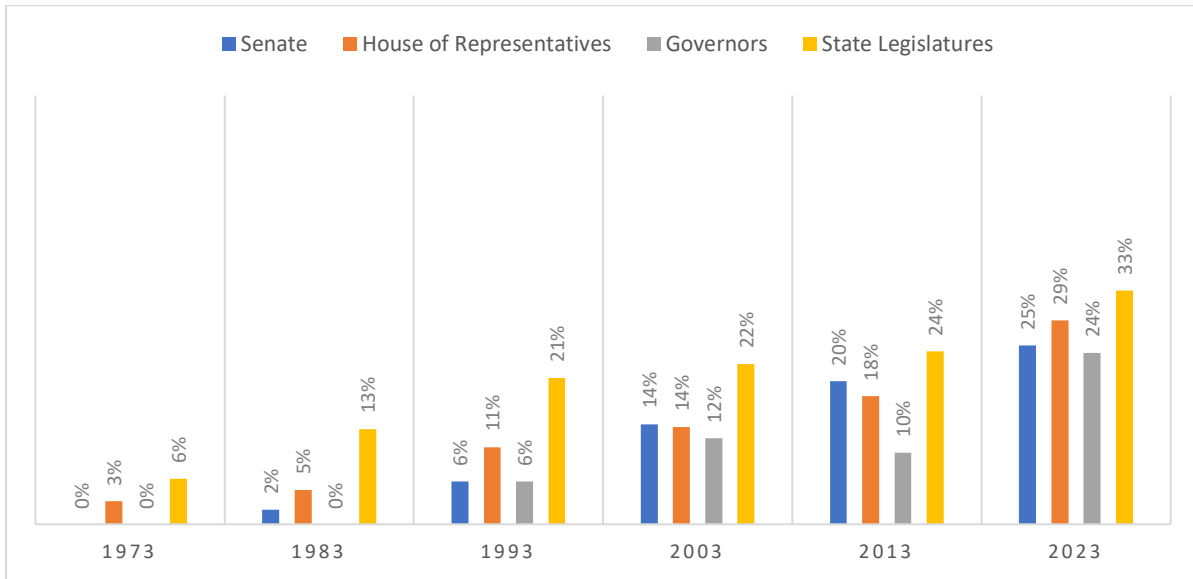
Figure 4: Percentage of R1 University Presidents Who Are Women



Compiled by Lisa Lynch using the 2018 list of Carnegie Doctoral Universities – Very High Research Activity (R1) using presidential histories on each university’s website. Note the University of Colorado Denver Medical School is deleted from the list for a total of 130 universities.

Moving from leadership in higher education to political leadership, we see that women's progress in the political arena has been slow and has yet to reach parity. Data compiled by the Pew Research Center shows a very gradual increase in the percentage of elected women at the state and federal levels over the past fifty years. As shown in Figure 5, in 1973, there were no women in the Senate or women Governors. By 2023, women’s share of state legislatures was just 33 percent, while women were 24 percent of Governors, 28 percent of House of Representative members, and a quarter of all US Senators. And let us not forget the presidency, where we have yet to see a female president, and the first female vice president only took office in 2021.

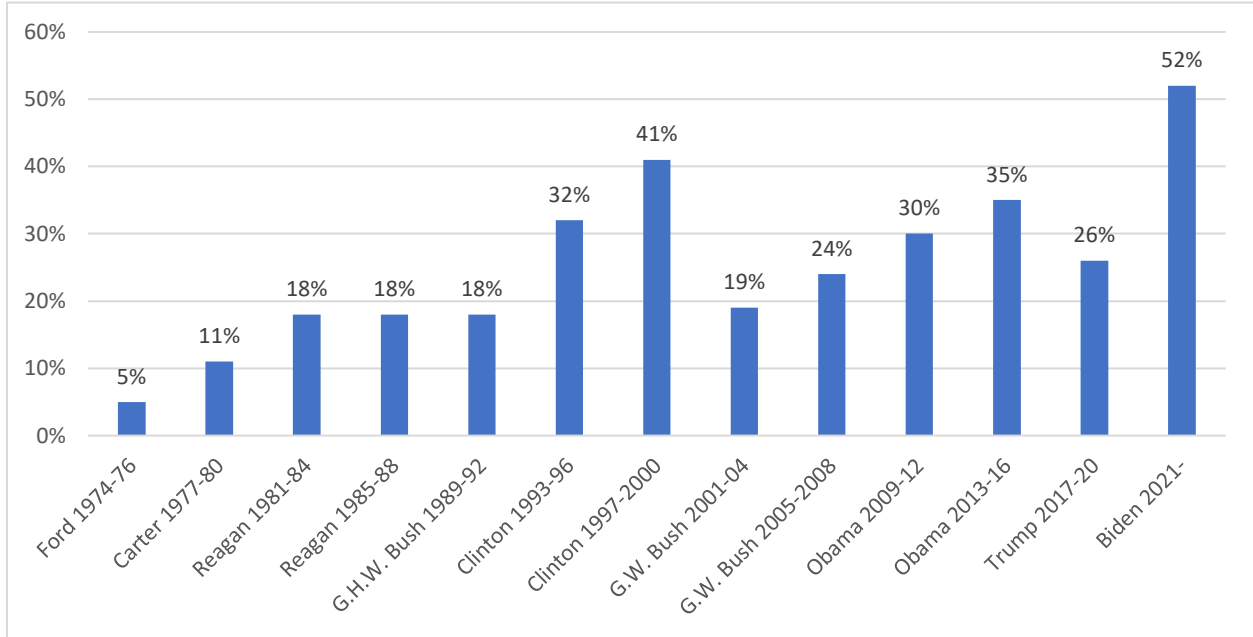
Figure 5: Percentage of US Senators, US Representatives, Governors, and State Legislators Who Are Women



Source: As compiled by the Pew Research Center using data from the Center for American Women and Politics, Rutgers University. <https://www.pewresearch.org/social-trends/fact-sheet/the-data-on-women-leaders/> accessed July 31, 2024.

Female representation in senior positions in the executive branch is also important. These positions are filled by the president. Figure 6 presents additional data from the Center for American Women and Politics, Rutgers University on gender representation in the executive branch at the federal level. It shows the maximum percentage of women serving concurrently in a cabinet position by each presidential administration. Although we have seen more success in gender parity at this level over the past fifty years, the progress might best be described as having significant potholes in the last twenty years. For example, during the second Clinton administration, women held over 40 percent of cabinet positions. This share fell during the subsequent Bush administration, rose in the Obama administration to a maximum of 35 percent in his second term, fell sharply in the Trump administration to slightly over 25 percent, and is now over 50 percent in the Biden administration.

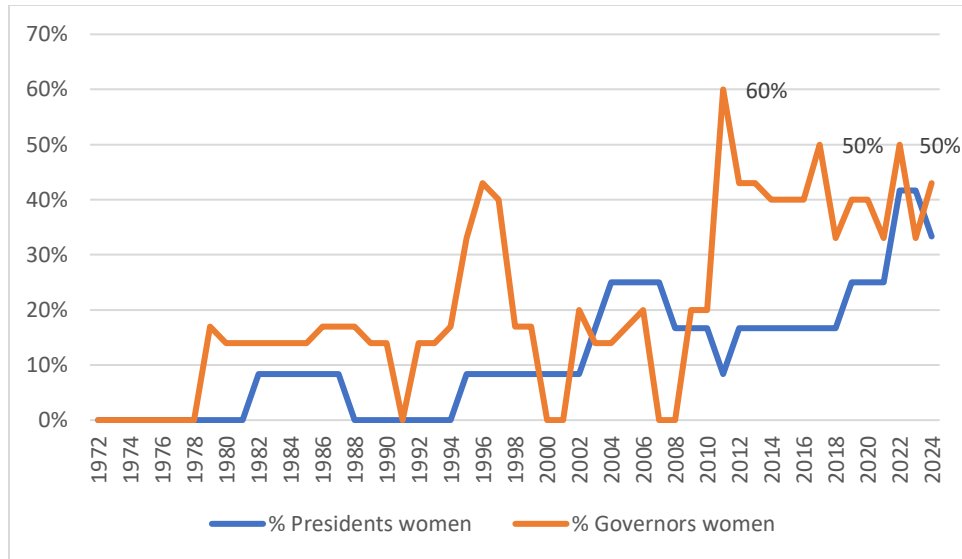
Figure 6: Maximum Percentage of Cabinet Positions Held by Women



Source: data from Center for American Women and Politics, Rutgers University, <https://cawp.rutgers.edu/facts/levels-office/federal-executive/women-appointed-presidential-cabinets> as accessed July 31, 2024.

Given the importance of the Federal Reserve system as a key policymaking institution in our economy, the role of the President to nominate members of the Board of Governors of the Federal Reserve, and the relatively low percentage of women who pursue advanced studies and careers in economics, we might expect that gender representation of both members of the Board of Governors and Presidents of regional Federal Reserve Banks would be low. Yet when we examine trends over the past fifty years shown in Figure 7, we see significant progress towards gender parity in representation by 2024.

Figure 7: Percentage of Federal Reserve System Leadership Who Are Women



Source: <https://www.federalreserve.gov/aboutthefed/bios/board/boardmembership.htm> and <https://www.federalreservehistory.org/people/federal-reserve-bank-leader>. Data presented for members of the Board of Governors uses the gender composition of the board on July 2 of each year.

In Figure 7 we plot the share of women of the twelve regional Federal Reserve bank presidents in blue and the governors of the Federal Reserve System in orange from 1972 to 2024. These data are lumpier than earlier charts given the small numbers and there is evidence of potholes when you look at the percentage of women who were governors of the Federal Reserve system. Governors of the Federal Reserve Board are nominated by the President and confirmed by the US Senate. The maximum number of governors is seven but due to confirmation process there may be fewer than seven in position at any time. In contrast, Presidents of regional Federal Reserve Banks, subject to the approval of the Board of Governors, are appointed by the individual regional bank's Class B and C directors (those directors who are not affiliated with a supervised entity). In 2011, 2017, and 2022 we see parity or more (in 2011) in the gender representation of members of the Board of Governors. Over time we see a steady rising trend in

the representation of women as regional presidents, however, there is a drop in the share of presidents who are women in 2024 that merits watching.

As discussed earlier, women achieved parity in educational attainment in professional degrees overall by 2020. In law², where women comprised only 20 percent of first year law students in 1973, women reached parity in representation in law school graduates in 2000, and today represent over 55 percent of law school graduates. The share of law school deans who are women has also increased markedly over the past twenty years from 10 percent in 2000 to 43 percent in 2022. However, the progress of women as legal practitioners has been slower to grow from 3 percent in 1970 to 38 percent in 2022, in part reflecting the stock of lawyers who completed their studies when women were less well represented. Representation of women as equity partners in law firms has been even slower with just 22 percent of such partners in 2020 being women. At the federal judge level³, which includes the Supreme Court, just 21 percent of judges in 2021 were women.

In 1980 25 percent of medical school graduates were women but by 2023 women had reached more than parity with 55.6 percent of matriculants women⁴. Progress in academic leadership in medicine has been slower, however, with no women medical school deans in 1980 and just 27 percent women by 2023⁵. In addition, the representation of women differs sharply across specialties. For example, among residents in 2022-2023, women made up 87 percent of

² Data from https://www.americanbar.org/groups/business_law/resources/business-law-today/2023-november/see-her-hear-her-historical-evolution-women-in-law/ and <https://www.abalegalprofile.com/women.html>

³ Data from https://www.nawj.org/uploads/statistics/americanbench_genderdatadata_2020vs2021_nawj.pdf

⁴ <https://www.aamc.org/data-reports/workforce/report/diversity-medicine-facts-and-figures-2019> and <https://www.aamc.org/news/press-releases/new-aamc-data-diversity-medical-school-enrollment-2023>

⁵ <https://www.aamc.org/data-reports/faculty-institutions/data/us-medical-school-deans-trends-type-and-gender>

OB/GYN residents and 74 percent of pediatric residents, compared to 20 percent of orthopedic surgery residents and 24 percent of neurosurgeons.⁶

Gender differences in women's representation in management mirror the types of disparities we see in academia, law, and medicine. Beginning with management training, we see that, according to data from the Association to Advance Collegiate Schools of Business (the accrediting body for business school programs), 44 percent of MBA graduates and 40 percent of doctoral graduates in business are women—with enrollment over the past decade increasing just 5 percent for women in MBA programs and 2 percent for women in doctoral program. Of business and management faculty, just 38 percent of assistant professors, 33 percent of associate professors, and only 20 percent of full professors are women. Similarly, women make up only 20 percent of business school deans⁷.

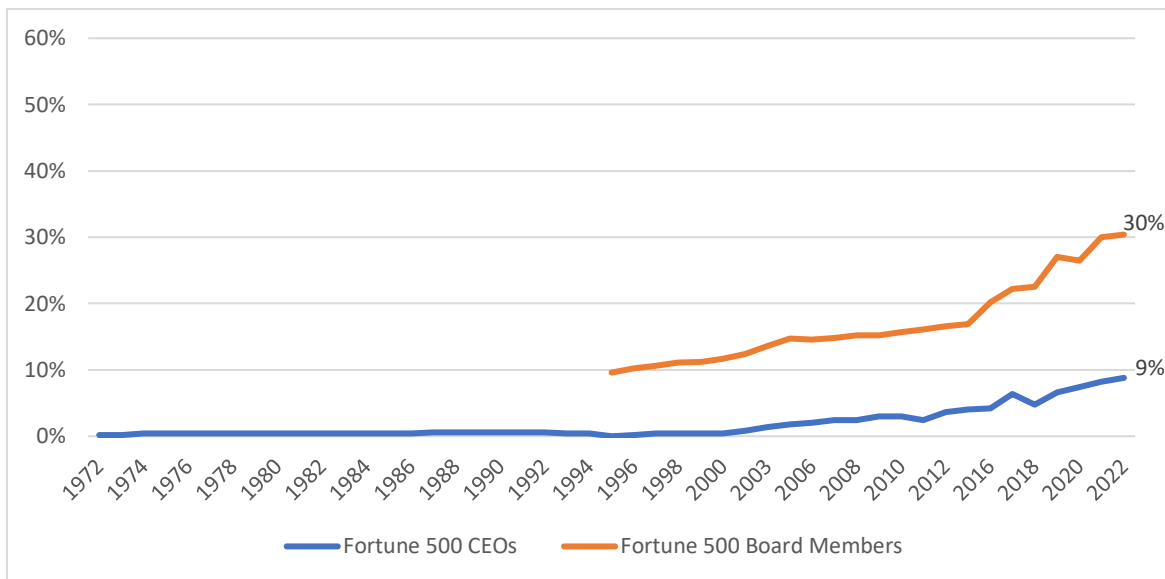
Women's representation in corporate leadership, especially at the largest firms, has been even slower to increase. Katharine Graham of The Washington Post Co. was the first woman CEO to make the Fortune 500 list, in 1972, and, as shown in Figure 8, it was not until after 2000 that we started seeing a rise in women CEOs of these largest firms. Nonetheless, in 2023 women represented only 10.6 percent of Fortune 500 CEOs. Board representation looks a bit better with women now making up 30 percent of board members in Fortune 500 firms. And when we look at entrepreneurs more broadly – over 40 percent of small businesses in the United States are owned by women.⁸

⁶ <https://www.ama-assn.org/medical-students/specialty-profiles/these-physician-specialties-have-biggest-gender-imbalance>

⁷ <https://www.aacsb.edu/insights/articles/2020/09/gender-diversifying-the-business-curriculum>

⁸ <https://advocacy.sba.gov/wp-content/uploads/2023/11/2023-Small-Business-Economic-Profile-US.pdf>

Figure 8: Percentage of Fortune 500 CEOs and Board Members Who Are Women



Sources: Historical list of women CEOs of the Fortune lists: 1972-2023. (2023, June 22). Catalyst <https://www.catalyst.org/research/historical-list-of-women-ceos-of-the-fortune-lists-1972-2023/>. For Fortune 500 board members as compiled by Pew Research using data from Catalyst, Deloitte, and Hendricks and Struggles <https://www.pewresearch.org/social-trends/fact-sheet/the-data-on-women-leaders/> accessed February 3, 2024

III. Explanations for Gender Differences in Representation at the Top

Given these persistent gender differences, what are some of the factors that might explain the apparent glass ceilings that we see for the representation of women in the top tiers of economics, policy, and leadership? As economists, it might be helpful to divide these sources into supply-side versus demand-side (discrimination) factors. However, there are some significant caveats and limitations to this approach. Specifically, some factors may well affect both the supply and demand side. For example, accepted gender norms and stereotyping or the anticipation of or experience with discrimination can affect both women's behavior and their treatment. Hence, we do not attempt to make a strong categorization here.

Despite the marked increases in women's education and occupational shifts from teacher, nurse, librarian, and social worker to a varied group of professions including formerly predominantly male professions like lawyer, physician, professor, and manager, the pipeline to top leadership positions in these fields takes time. In addition, the pipelines might be leaky, reasons for which we will discuss shortly. There may also be low turnover in positions that can block upward progress of later arrivals entirely (e.g., Congress's incumbency advantage, boards of directors, CEO positions, college presidencies) or, even when entry occurs, slow shifts in the overall composition of the category (e.g., senior faculty positions).

In addition, we still observe that having children imposes significantly larger penalties on the career trajectories of women than men (e.g., Waldfogel 1998; Kleven, Landais, and Sogaard 2019; and Cortés and Pan 2023).⁹ Children can negatively impact a range of decisions relating to attachment to the labor force, occupation and occupation level, and firm. All of this might be attributed to the supply side but can also be affected by experience with or anticipation of discrimination, including discrimination based on parenthood.

In terms of other factors, a useful starting point is to consider gender differences in human capital, particularly education and experience. As we have seen, women have now exceeded men with respect to the completion of higher education at all levels, Bachelor's, Master's, PhD, and professional degrees such as law and medicine. Therefore, we do not expect this dimension of human capital to be very important as a source of current gender differences in these types of positions, allowing, of course, for pipeline effects. Moreover, for the labor force as a whole, gender differences in experience have been greatly diminished and now do not account

⁹ Bertrand (2018) particularly emphasizes the challenges women face in dealing with work-family issues in accounting for the glass ceiling.

for much of the gender difference in wages (Blau and Kahn 2017). Nevertheless, research indicates that gender differences in experience and hours remain important in high-skilled jobs, in part due to the high penalties women face in these fields for shorter hours or employment interruptions (e.g., Bertrand, Goldin, and Katz 2010; and Noonan, Corcoran, and Courant 2005).

Claudia Goldin (2014) has argued that some skilled jobs require long hours and work performed at particular times and places and consequently disproportionately reward this. Given the gender division of labor in most families, this generates a gender wage gap. Her analysis provides an alternative to human capital theory for the impact of hours and workforce interruptions on women's advancement, especially in fields like law and business, where she finds evidence of this pattern. Although not explicitly considered by Goldin, whose focus is on intra-occupational pay gaps, it is reasonable to infer that this factor could cause differences in access to higher-level jobs and leadership positions, as well as affecting occupational choice more broadly.

There is also extensive research on how women and men may differ in their noncognitive skills and psychological attributes. Such differences may have contributed to the lack of parity in the representation of women in leadership positions. This includes gender differences in negotiation, risk aversion, and some evidence that women disproportionately shy away from competitive work settings (for a review see, Blau and Kahn 2017). However, some factors likely limit the impact of noncognitive skills on gender gaps. For one, while some noncognitive factors may favor men over women, others, like interpersonal skills appear to favor women over men (Borghans, ter Weel, and Weinberg 2014). Furthermore, competitiveness and excessive risk-taking may not be optimal in all circumstances. And, as we discuss below, women may also

encounter negative reactions when they act in “unfeminine” ways diminishing the returns of doing so.

Gender roles and stereotyping are other important sources of gender differences. Social psychologists have found evidence of targeted forms of prejudice against women as they gain access to high-status, high-paying, male-dominated jobs, which are thought to require characteristics stereotypically ascribed to men. Stereotyping and discrimination can also negatively affect female attitudes and behavior, where women perceive a cost to acting in ways that conflict with their gender identity. Stereotypes can also produce self-expectancy effects and self-fulfilling prophecies that also become a barrier to advancement. (See, e.g., Bertrand and Duflo 2017; Eagly and Karau 2002). In this vein, Sheryl Sandberg discussed the “tyranny of reduced expectations” in her Harvard Class Day address in 2014.¹⁰

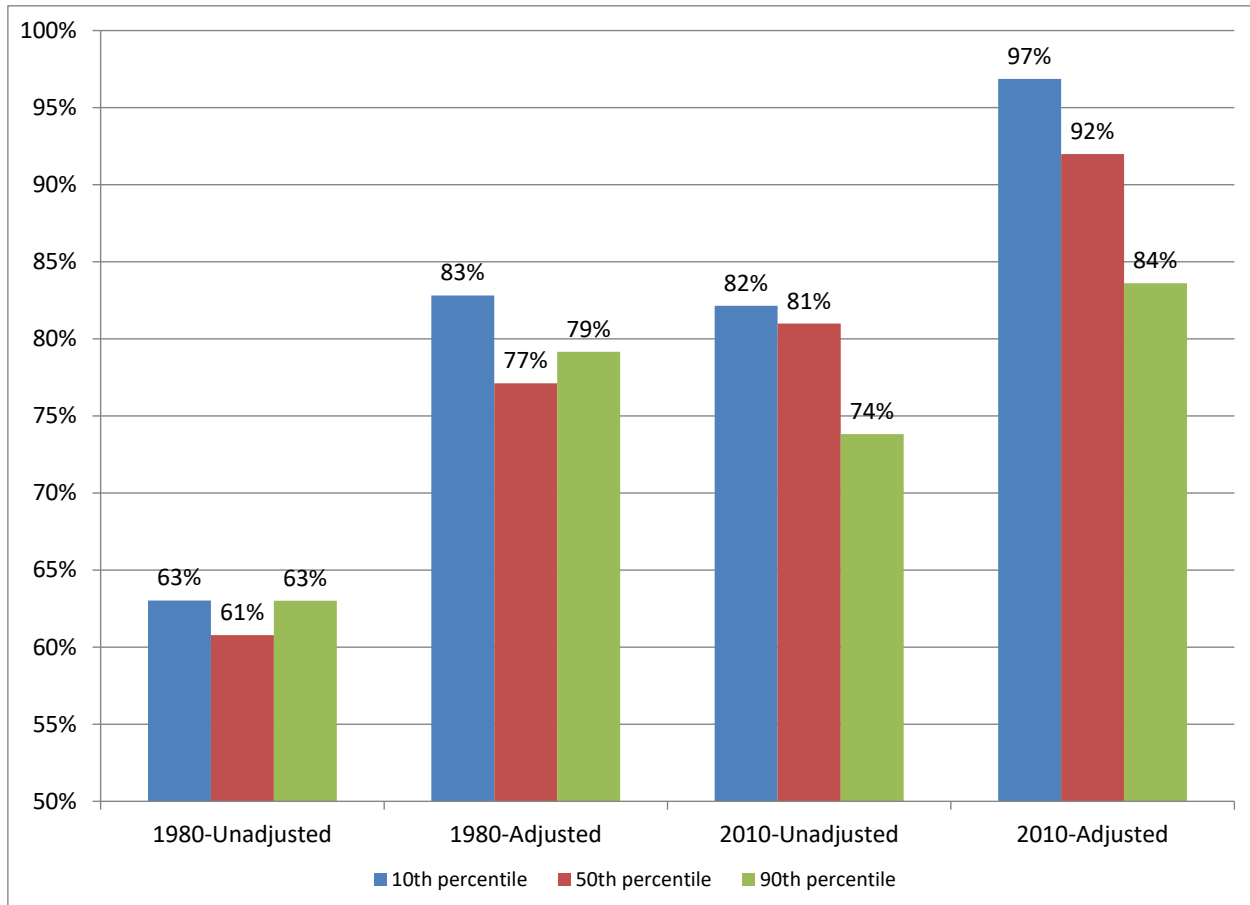
Then there is discrimination. If we look at the caseload at the Equal Employment Opportunity Commission in 2019, for example, over 23,000 cases were filed with the EEOC citing sex discrimination. But discrimination need not be overt and conscious, and there may be more subtle barriers to women’s advancement, especially in predominantly male settings. These include an absence of role models, exclusion from mentor-protégé relationships, and exclusion from informal networks (for a review, see Blau and Winkler 2022). Moreover, it is important to bear in mind that the experience of discrimination, both personal and observed, and the anticipation of experiencing it can impact behavior and diminish expectations of success that, in turn, become self-fulfilling prophecies. We discuss some evidence on mechanisms like these below.

¹⁰ <https://www.rev.com/blog/transcripts/facebook-coo-sheryl-sandberg-commencement-speech-at-harvard-2014>

IV. Empirical Evidence on the Explanations for Gender Differences

Turning to empirical evidence on the sources of gender differences, Francine Blau and Lawrence Kahn (2017) provide a comprehensive analysis of trends in and determinants of the size of the gender wage gap. As shown in Figure 9, over the 1980-2010 period, the gender wage gap closed more slowly at the top of the wage distribution than at the middle or the bottom, both unadjusted and controlling for covariates. These covariates included education, actual labor market experience, occupation, industry, union coverage, race/ethnicity, and region. For those in the 10th percentile, by 2010, controlling for covariates the Female to Male wage ratio was almost 97%; and it was 92% at the median. But for those in the 90th percentile, even after controlling for covariates, the wage ratio was just under 84%. This is consistent with glass ceiling issues hindering progress. The remaining shortfalls are unexplained by the included covariates. While the unexplained gap is suggestive of discrimination, it is potentially a biased measure. It will overestimate discrimination if important omitted variables favor men. It will underestimate discrimination if we include as controls factors that reflect discrimination (e.g., occupation, industry), if women are better endowed than men with respect to omitted factors, or if there are feedback effects. For this reason, it is interesting to consider some other types of evidence that point to discrimination playing a role.

Figure 9: Female to Male Wage Ratios by Percentile, Unadjusted and Adjusted for Covariates



Source: Francine Blau's calculations based on results presented in Francine D. Blau and Lawrence M. Kahn, 2017, "The Gender Wage Gap: Extent, Trends, and Explanations," *Journal of Economic Literature* 55 (3), Table 6, p. 806.

Blau and Kahn (2017) argue that similar types of analyses applied to subgroups that are presumably more homogeneous may be instructive in that they likely suffer less from omitted variable bias, although they acknowledge this could still be a factor. Both the Noonan, Corcoran and Courant (2005) study of lawyers and the Bertrand, Goldin, and Katz (2010) study of MBA's find an important role for factors like hours worked and workforce interruptions in accounting for gender pay differences. In a similar vein, as discussed previously, Goldin (2014) finds evidence of the role of gender differences in the returns to long hours in causing gender pay

gaps. Nonetheless, importantly, both the Noonan, Corcoran and Courant (2005) and the Bertrand, Goldin, and Katz (2010) studies also find evidence of unexplained gaps after controlling for an extensive list of covariates, including hours, work history, and performance in school.¹¹ (Goldin 2014 did not examine this issue.)

Within academia, in fields that have historically had a lower representation of women, we see some progress, but evidence of barriers persists when we look within some subfields. Starting with economics we see in recent research by Donna Ginther and Shulamit Kahn (2021) that women are still significantly less (18.5% less) likely to be promoted to associate professor after controlling for cumulative publications, citations, grants, and grant dollars. However, interestingly, women have almost achieved parity in research-intensive institutions, while significant gaps remain at less research-intensive institutions. In contrast, in biomedical science, physical science, political science, mathematics and statistics, and engineering Ginther and Kahn (2021) find no significant difference in promotion currently. A recent review and meta-analysis of research on STEM fields, including economics, found evidence of bias against women in teaching ratings and salaries but not in hiring, grant funding, journal acceptances, and recommendation letters (Ceci, Kahn, and Williams 2023). However, the authors acknowledge that, even in the areas in which they found no evidence of bias disadvantaging women, “broad societal structural factors may still impede women’s advancement” (p. 15).

In addition, as Blau and Kahn (2017) point out, results from studies with experimental and quasi-experimental designs also provide evidence of discrimination. Two hiring studies that are particularly relevant to our focal group are Moss-Racusin et al (2012) and Reuben, Sapienza,

¹¹ After accounting for the explanatory variables, men earned 11 percent more in the law study and 7 percent more in the MBA study (Blau and Kahn 2017).

and Zingales (2014). Moss-Racusin et al (2012) is a field experiment in which science faculty (from biology, chemistry, and physics) at six large, research-intensive universities were asked to provide feedback on pseudo application materials for a science laboratory manager position by a college senior who ultimately intended to go to graduate school. The faculty were told that their responses would provide feedback to help the student's career development. The application was randomly assigned to be from a male or a female student. It was found that both male and female faculty rated the male applicant as significantly more competent and suitable for the position and selected a higher starting salary for male applicants. They also offered more career mentoring to the male applicants. These results are especially striking in that the underrepresentation of women in STEM is frequently bemoaned. The Reuben, Sapienza and Zingales (2014) study is a laboratory experiment in which some subjects ("employers") hired other subjects ("applicants") to perform an arithmetic task that men and women performed equally well, on average. It was found that when employers had no information about applicants other than sex, both male and female employers were twice as likely to hire a man as a woman. Gender discrimination in hiring was reduced, *but not fully eliminated*, when employers had information about applicants' previous performance on the arithmetic task. A notable feature of this study is that it provides evidence on the role of unconscious stereotypes in influencing discrimination. Specifically, the authors find that the extent of subject's bias in beliefs about women's performance is correlated with their score on a measure of implicit stereotypes.¹²

Another study in the hiring arena that is worth mentioning, although it applies to the whole labor force, is one by Correll, Benard, Paik (2007). Using both laboratory and field experiments, the authors found that the participants had less favorable views regarding the

¹² The measure was the Implicit Association Test, see <https://implicit.harvard.edu/implicit/aboutus.html> .

résumés of equally qualified mothers relative to those of nonmothers. In the lab experiment this corresponded to a lower evaluation for mothers and in the field experiment to lower callbacks for mothers. Fathers were not disadvantaged relative to nonfathers. This suggests that the negative effect of motherhood in the labor market may have a demand-, as well as a supply-side component.

While much of the focus in testing for bias or discrimination has been in hiring, there is also some evidence of an impact of bias on how performance is perceived and rewarded that suggests there are gender differentials adversely affecting women. One area in which evidence of bias has been obtained is college teaching, where it has been found that women receive less favorable evaluations than men for what appears to be similar performance. For example, Mengel, Saurermann, and Zolitz (2019) leveraged data from a major Dutch University where, within each course, students were randomly assigned a male or a female section instructor. Women received systematically lower teaching evaluations even though students' grades and time studying were not affected by their instructor's sex. The lower female evaluations were driven by male students and were larger in mathematical courses. Lower evaluations were especially pronounced for junior women¹³.

Another study suggesting bias focused on the behavior of referring physicians in the face of information on surgeons' performance. Sarsons (2017) found that referrals to female surgeons dropped more sharply than male surgeons after a patient death, whereas referrals to male and female surgeons responded similarly to a good patient outcome. Moreover, after a bad

¹³ See Boring (2020) for a review and further discussion of gender bias in evaluations.

experience with one female surgeon, physicians became less likely to refer patients to other female surgeons.

Finally, it is of interest to note the subjective perceptions that discrimination is an issue in the economics profession. In 2019, the American Economic Association fielded a survey of economists regarding the professional climate in the field. Upon the release of the final detailed results of the survey (American Economic Association, Committee on Equity, Diversity and Professional Conduct, 2019), the past, current, and future presidents of the Association acknowledged that “many members of the economics profession have suffered harassment and discrimination during their careers, including both overt acts of abuse and more subtle forms of marginalization” and stated that the AEA leadership “takes these issues extremely seriously” (Bernanke, Yellen, Blanchard 2019).

Studies of the kind we have reviewed thus far generally do not account for gender differences in noncognitive skills so a question arises as to the magnitude of the potential role of this factor. Unfortunately, much of the evidence on gender differences in noncognitive skills comes from laboratory or field experiments making it difficult to infer what the impact of these differences would be on say the gender pay gap. However, summarizing a subset of analyses that use survey data to quantify the effect of noncognitive skills on the gender pay gap for broad groups of workers, Blau and Kahn (2017) found these factors account for only a small to moderate share of the gap (see Table 7). While this does not speak directly to our focal group, it is not unreasonable to assume the impact may well be small here as well. For one thing, there is some evidence that gender differences in noncognitive skills within fields or occupations are smaller than for broader groups. For example, while women are found to be more risk averse than men in samples drawn from the general population or university students, studies focused

e.g. on mutual fund managers or entrepreneurs find little or no evidence of gender differences in financial risk preferences (Croson and Gneezy 2009). This finding may represent selection into the area of similar individuals or that individuals who enter with different preferences may learn from the environment and become more similar over time. In either case, it suggests that differences within an area will be smaller than for broader aggregates. However, a study of recent MBA graduates from the University of Chicago Booth School of Business found a gender difference in a measure of willingness to compete that was correlated with earnings and helped to account for the gender gap in compensation—although this factor accounted for relatively little of the gender gap (Reuben, Sapienza and Zingales 2015, as cited in Bertrand 2018). Another unresolved issue is highlighted by Bertrand (2018) who has pointed out that some research findings suggest that the extent of gender differences in behavior may depend on the “specific domain (e.g. ‘male job’ or ‘general job’)” (p. 214).

A further important point is that, as noted earlier, women may face negative responses when they act in ways that are perceived as unfeminine. This leaves them to navigate a situation where if they behave in the “appropriate” female way they may lose out because they are perceived as lacking in attributes desirable for the job. But if they act in a manner perceived to be appropriate for men, they may elicit a negative response for being unfeminine. For example, Bowles, Babcock, and Lai (2007) asked study participants to evaluate managers based on a transcript or a video of a job placement interview. They found that participants had a negative response to female managers who initiated negotiations for higher compensation, with subjects reporting they would not like to work with them. However, the same behavior by male managers had little effect on subjects’ willingness to work with them.

We previously noted that role models, mentors, and peers can be important in influencing outcomes for women, including entry, into historically male-dominated fields. There is some research, including experimental evidence suggesting this is indeed the case. Two studies use data on United States Air Force Academy students who were randomly assigned to professors for a number of required standardized courses in math and science to examine the effect of the faculty member's gender on student outcomes. Carrell, Page, and West (2010) found that having a female professor had a strong positive effect on female students' performance in math and science classes, their likelihood of taking future math and science courses, and their likelihood of graduating with a STEM degree. The effects were largest for female students with very strong math skills, the most likely candidates for careers in science. Mansour, Rees, Rintala, and Wozny (2022) further found that, among high-ability female students, being assigned a female professor led to substantial increases in the probability of working in a STEM occupation and the probability of receiving a STEM master's degree.

In recent research Butcher, McEwan, and Weerapana (2023) examined the incidence of majoring in economics among students admitted to an all-female college, Wellesley, comparing those who did and did not choose to attend. They find that admitted women who enrolled were more likely to major in economics, with 44% of the difference in majoring in economics explained by the greater exposure to female instructors and students at Wellesley.

Finally, we would point to the positive effect of the mentoring program of the AEA's Committee on the Status of Women on the outcomes of participating female junior faculty. Applicants were randomly assigned to participate in the program, which was a 2-day mentoring program that also emphasized networking among the participants. The evaluation of the program by Ginther, Currie, Blau, and Croson (2020) found women who participated were more likely to

stay in academia and achieve tenure in top-ranked schools. The authors believe the results speak not only to the importance of mentors but also peer networks.

V. Conclusion

In this paper, we have examined both women's progress in breaking through the glass ceiling and the remaining significant gender gaps in representation at the higher levels. We began by reviewing women's considerable progress in narrowing and indeed for the most part reversing gender gaps in higher education, with women now comprising the majority of recipients of BA, Masters, and Ph.D. degrees, and attaining more than parity among those receiving professional degrees. On the other hand, while there have also been important gains in women's access to high-level positions in academia, government, law, medicine, and management, considerable gender differences remain. We then discussed some explanations for the persistence of gender gaps and the empirical evidence of the impact of various factors. The evidence suggests that gender differences in qualifications and noncognitive skills play a part, as well as different responses of men and women to the long hours required to succeed in some areas. However, there is also evidence that even accounting for such factors, discrimination and stereotyping, both conscious and unconscious, and subtle barriers and roadblocks are also part of the explanation for the persistent gender differences we document. Our consideration of these issues serves to highlight Rebecca Blank's exceptionalism in building the outstanding career she did, including the attainment of high-level positions in academia and government. It also underscores how important her achievements are to younger women seeking to follow in her footsteps.

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