United States Government Accountability Office

Report to Congressional Requesters

December 2020

GENDER PAY DIFFERENCES

The Pay Gap for Federal Workers Has Continued to Narrow, but Better Quality Data on Promotions Are Needed

GAO-21-67

GAO Highlights

Highlights of GAO-21-67, a report to congressional requesters

December 2020

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The Pay Gap for Federal Workers Has Continued to Narrow, but Better Quality Data on Promotions Are Needed

Why GAO Did This Study

As the nation's largest employer, the federal government employed about 2.7 million workers in 2019. Although the pay gap between men and women in the federal workforce is smaller than it is for the entire U.S. workforce and has narrowed over time, studies show that pay disparities continue to exist. GAO was asked to explore the current status of pay equity in the federal workforce.

This report examines how the pay gap between men and women in the federal workforce has changed since 1999, and what factors account for any remaining gap; and the extent to which OPM and EEOC have monitored and taken steps to address the pay gap in the federal workforce, including assessing potential disparities in promotions; among other objectives. GAO analyzed OPM's Enterprise Human Resources Integration data on about 2.1 million federal employees from September 1999 to September 2017 (the most recent reliable data available at the time of GAO's review); reviewed federal agency promotion data collected by EEOC for fiscal years 2015 through 2017 (the most recent available data); and interviewed OPM and EEOC officials and reviewed relevant documentation.

What GAO Recommends

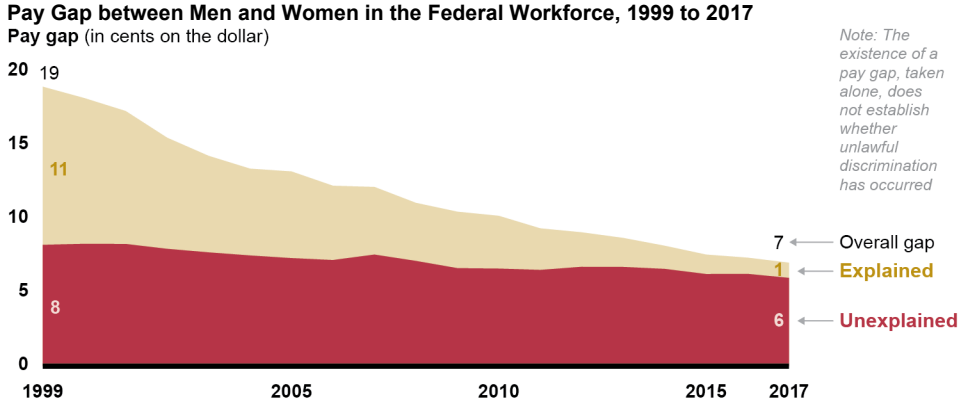
GAO recommends that EEOC take steps to assess the quality of federal agency promotion data and address missing data with agencies in a timelier manner. EEOC neither agreed nor disagreed with GAO's recommendation.

View GAO-21-67. For more information, contact Cindy Brown Barnes at (202) 512-7215 or brownbarnesc@gao.gov.

What GAO Found

The overall pay gap between men and women in the federal workforce has narrowed considerably, from 19 cents on the dollar in 1999 to 7 cents in 2017, but the current pay gap is greater for certain groups of women, according to GAO's analysis of data from the Office of Personnel Management (OPM). Two trends help explain why the pay gap has narrowed: (1) men and women have become more similar in measurable factors related to pay, such as occupation; and (2) women have earned slightly higher rates of pay increases than men. In 2017, most of the overall pay gap—or 6 of 7 cents on the dollar—was not explained by differences between men and women in measurable factors (see figure). This unexplained portion of the pay gap may be due to factors not captured in the data GAO analyzed, such as work experience outside the federal government, or factors that cannot be measured, such as discrimination and individual choices. In 2017, the overall and unexplained gaps were greater for certain groups. For example, compared to White men, the unexplained gap was greater for Hispanic/Latina, Black, and American Indian or Alaska Native women than for White and Asian, Native Hawaiian, or Pacific Islander women.

Pay Gap between Men and Women in the Federal Workforce, 1999 to 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

OPM and the U.S. Equal Employment Opportunity Commission (EEOC) have taken steps to analyze data on the pay gap and help agencies address it. From 2014 to 2016, OPM implemented a government-wide strategy to address the pay gap, and officials said their future efforts will include monitoring the pay gap periodically. EEOC annually collects workforce data from agencies and provides related technical assistance, and officials said they plan to expand these efforts. These data include promotions by gender and race and ethnicity, which EEOC and agencies use to identify potential barriers to career advancement, but GAO found these data were not sufficiently complete. Of the 51 data tables GAO requested, 35 were either missing or had at least one incomplete data element. EEOC officials said this is partly due to promotion applicants not being required to provide demographic information. However, EEOC has not fully assessed the reliability of these data and generally does not follow up with agencies about missing data between technical assistance visits. Without taking steps to assess and improve the quality of these data in a timelier manner, EEOC may miss opportunities to ensure equal opportunity for all promotion applicants.

Contents

Tables

Figures

Abbreviations

CFO	Chief Financial Officers
DOD	Department of Defense
EEOC	U.S. Equal Employment Opportunity Commission
EHRI	Enterprise Human Resources Integration
GS	General Schedule
MD-715	Management Directive 715
OPM	Office of Personnel Management
PATCOB	Professional, Administrative, Technical, Clerical, Other white-collar, and Blue-collar
STEM	Science, Technology, Engineering, and Math

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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December 3, 2020

The Honorable Patty Murray
Ranking Member
Committee on Health, Education, Labor and Pensions
United States Senate

The Honorable Rosa L. DeLauro
Chairwoman
Subcommittee on Labor, Health and Human Services, Education, and Related Agencies
Committee on Appropriations
House of Representatives

The Honorable Tammy Duckworth
United States Senate

The Honorable Katherine Clark
House of Representatives

As the nation's largest employer, the federal government employed about 2.7 million workers in 2019.[1] Although the pay gap between women and men in the federal workforce is smaller than the pay gap in the entire U.S. workforce and has narrowed over time, studies have found that pay disparities continue to exist. In 2009, we found that the gender pay gap for federal workers had narrowed over the previous 20 years from 28 to 11 cents on the dollar, of which 7 cents were not explained by differences between men and women in measurable factors such as occupation, education, and experience.[2] Similarly, in 2014, the Office of Personnel Management (OPM) found that the gender pay gap for white-collar federal workers had narrowed over a 20-year period from 30 to 13 cents

[1]At the time of our review, 2019 data were the most recent data available on the total federal civilian workforce.

[2]See GAO, *Women's Pay: Gender Pay Gap in the Federal Workforce Narrows as Differences in Occupation, Education, and Experience Diminish*, GAO-09-279 (Washington, D.C.: Mar. 17, 2009).

on the dollar, of which about 4 cents were not explained by differences between men and women in measurable factors.[3]

Both OPM and the U.S. Equal Employment Opportunity Commission (EEOC) have played a role in helping address the gender pay gap for federal workers, including conducting related research. For example, OPM and EEOC, along with other agencies, participated in the National Equal Pay Enforcement Task Force, which was established in 2010 to improve the enforcement of equal pay laws.[4] In addition, in 2011, OPM and EEOC issued a joint memorandum outlining their commitment to ensuring equal pay for equal work among federal workers.[5] However, questions remain about whether a gender pay gap continues to exist among federal workers, including its size and contributing factors, and the extent to which OPM and EEOC have continued to monitor and address the pay gap and related issues.

You asked us to update our 2009 report to identify the current status of pay equity in the federal workforce. This report examines (1) how the pay gap between men and women in the federal workforce has changed since 1999, and what factors account for any remaining gap; (2) the size of the gender pay gap among recently hired workers, and how, if at all, recently hired men and women differ on key characteristics; and (3) the extent to which OPM and EEOC have monitored and taken steps to address the gender pay gap in the federal workforce, including assessing potential disparities in promotions.

[3]OPM reported the pay gap in percentage terms in its report. OPM found that between 1992 and 2012, the gender pay gap decreased to 13 percent for all white-collar federal workers and to 11 percent for white-collar federal workers on the General Schedule (GS) classification system. See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014. OPM's analysis for this report was similar to but slightly different from the analysis we conducted for our 2009 report. For example, OPM's analysis did not include blue-collar workers or workers with part-time, seasonal, or intermittent schedules, while GAO's analysis included those workers.

[4]The task force identified key challenges to equal pay enforcement and made several related recommendations, including that EEOC and OPM implement a strategy to improve the federal government's role as a model employer with respect to equal pay. In December 2019, EEOC officials told us that this task force was no longer active.

[5]See EEOC and OPM, *Equal Pay in the Federal Government*, August 16, 2011. In June 2020, OPM officials told us that this memorandum is still in effect and has no expiration date.

To examine how the gender pay gap has changed over time and the factors that contribute to any remaining gap, as well as the size of this gap for recently hired workers and key characteristics of those workers, we analyzed data from OPM's Enterprise Human Resources Integration (EHRI) database from September 1999 through September 2017.[6] At the time of our review, September 2017 data were the most recent reliable data available.[7] Of the approximately 2.7 million federal workers, EHRI contains data on about 2.1 million of them, including civilian employees of most executive branch agencies, several legislative branch commissions, and one judicial branch agency.[8] It does not include data for federal contractors. We analyzed EHRI data for workers who were in pay status as of September 30 of each year, including permanent and temporary workers as well as workers with full-time, part-time, seasonal, and intermittent work schedules. We assessed the reliability of these data by reviewing documentation, interviewing and obtaining information from

[6]To analyze the gender pay gap, including determining the extent to which various factors contribute to the pay gap, we conducted statistical modeling analysis. Using these models, we analyzed the EHRI status data, which include information on each federal worker's adjusted basic pay, agency, birth date (which can be used to calculate age), education level, disability status, occupation, race and ethnicity, gender, veteran's preference and status, bargaining unit status, and work schedule as of September 30 of each year. For a detailed description of our analysis, see appendix II. We also used this database, which was previously called the Central Personnel Data File, in our 2009 report. See GAO-09-279.

[7]We initially analyzed EHRI data from September 1999 through September 2018. However, while OPM officials were reviewing a draft of this report, they discovered and notified us of an error in the September 2018 EHRI data they received from one agency. According to OPM, this error also affected official OPM publications containing these data. Because we learned about this error shortly before we planned to issue this report, and it affected the reliability of our analysis results for 2018, we chose to present our analysis results through September 2017.

[8]Specifically, EHRI coverage of the executive branch currently includes all agencies except the U.S. Postal Service, the Board of Governors of the Federal Reserve, the Central Intelligence Agency, the Defense Intelligence Agency, Foreign Service personnel at the State Department (included until March 2006), the National Geospatial-Intelligence Agency, the National Security Agency, the Office of the Director of National Intelligence, the Office of the Vice President, the Postal Regulatory Commission, the Tennessee Valley Authority, and the White House Office. Also excluded are the Public Health Service's Commissioned Officer Corps, non-appropriated fund employees, and foreign nationals overseas. EHRI coverage of the legislative branch is limited to the Government Printing Office and selected commissions. EHRI coverage of the judicial branch is limited to the U.S. Tax Court. Prior to September 2013, the U.S. Tax Court was reflected as a legislative branch agency. Other recent significant changes to EHRI coverage include that the Consumer Financial Protection Bureau, a component of the Federal Reserve, began reporting in March 2011, and the State Department stopped providing data on Foreign Service Personnel in March 2006.

agency officials responsible for the data, and testing the data for inaccuracies. We determined that the data were sufficiently reliable for our purposes.

To determine the extent to which OPM and EEOC have monitored and taken steps to address the gender pay gap in the federal workforce, including assessing potential disparities in promotions, we interviewed OPM and EEOC officials and reviewed relevant documentation. We also reviewed federal agency promotion data collected by EEOC in the Management Directive 715 (MD-715) report and interviewed EEOC officials about their processes for collecting and analyzing these data. Specifically, we reviewed the promotion data that 17 selected agencies submitted to EEOC for fiscal years 2015 through 2017.[9] At the time of our review, fiscal year 2017 data were the most recent data available. EEOC requires all federal agencies to annually submit the MD-715 report, which includes data on promotion rates for mission-critical occupations by gender and race and ethnicity, including the number of workers who applied for a promotion, were deemed qualified, and were selected.[10] We assessed the reliability of these promotion data by reviewing documentation, interviewing and obtaining information from agency officials responsible for the data, and testing the data for inaccuracies. We determined that these data were not sufficiently reliable for our purposes, for reasons that we discuss later in this report. For a detailed description of our objectives, scope, and methodology, see appendix I.

We conducted this performance audit from February 2019 to December 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to

[9]We selected these 17 agencies because they collectively employed about 95 percent of the federal workforce as of September 2018. We reviewed the promotion data that these agencies submitted to EEOC in Table A9 of the MD-715 report. For more information, see appendix I.

[10]EEOC uses the term “sex” in the MD-715 report. We chose to refer to these data as data on “gender,” for consistency with the rest of this report. For fiscal years 2015 through 2017, EEOC required agencies to provide information on “major occupations,” defined as those occupations that are mission related and heavily populated, relative to other occupations within the agency. Beginning in fiscal year 2019, EEOC required agencies to provide information on “mission-critical occupations,” defined as those occupations without which the agency cannot fulfill its mission, which also tend to be the most heavily populated relative to other occupations within the agency and typically follow a career path to senior leadership positions. According to EEOC officials, they made this change to clarify the subset of included occupations for agencies, but the terms “major occupations” and “mission-critical occupations” are interchangeable.

obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Gender Composition of the Federal Workforce and Prior Research on the Gender Pay Gap for Federal Workers

Over the last 20 years, the federal workforce has consistently included more men than women. For example, according to OPM's EHRI data, men made up 55 percent of the federal workforce in 1999 and 57 percent in 2018.[11] In 2018, of about 2.1 million federal workers captured in the EHRI data, approximately 1.2 million were men and nearly 926,000 were women.[12]

Although estimates of the exact size of the gender pay gap vary, the estimated pay gap between women and men in the federal workforce is smaller than the pay gap in the entire U.S. workforce, which includes the public, private, and not-for-profit sectors.[13] In 2018, the pay gap for federal workers was about 12 cents on the dollar, and the pay gap for the entire workforce was about 18 cents on the dollar, according to self-reported data from the U.S. Census Bureau's American Community Survey.[14]

Prior research has found that the gender pay gap for federal workers is partly explained by differences between men and women in measurable factors that affect pay, such as occupation, education, and experience.[15] This is referred to as the explained pay gap. For example, in our 2009

[11]At the time of our review, the September 2018 EHRI data were not reliable for the purpose of analyzing the gender pay gap for federal workers, but these data were reliable for other purposes, including identifying the total number of federal workers and the gender composition of the federal workforce.

[12]This includes all federal workers captured in the EHRI data in 2018. Of these 2.1 million workers, about 2 million were permanent workers.

[13]In 2018, federal workers made up slightly less than 2 percent of the entire U.S. workforce.

[14]Because these results are based on self-reported data, they may include employees of federal contractors who identified themselves as federal employees. Moreover, these estimates include postal workers, who are excluded from the EHRI data.

[15]For the purposes of this report, we define measurable factors as those factors that: (1) can be measured, (2) are captured in the OPM data we analyzed, and (3) affect pay, as we found in our 2009 report (see GAO-09-279).

report, we found that the pay gap was partly due to differences between men and women in the occupations they held, their levels of education, and how long they had worked for the federal government.[16] We also identified other measurable factors that contributed to the explained gender pay gap, including race and ethnicity, federal agency, and veteran status.[17] However, we found that a portion of the pay gap was not explained by differences between men and women in measurable factors that affect pay. This is referred to as the unexplained pay gap. Specifically, we found that 7 cents of the 11-cent pay gap in 2007 were unexplained after accounting for differences in measurable factors. Similarly, OPM found that about 4 cents of the 13-cent pay gap for white-collar federal workers in 2012 were not explained by measurable factors.[18] The unexplained pay gap may be due to factors that are not captured in available data, such as work experience outside the federal government, or those that cannot be measured, such as discrimination and individual career choices.[19] Furthermore, the explained pay gap could also be influenced by discrimination, to the extent that the measurable factors themselves are affected by discrimination.[20] For a summary of

[16]See GAO-09-279, which examined data from 1988, 1998 and 2007. OPM found several years later that the pay gap for federal workers was partly due to measurable differences between men and women in the same factors. See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014.

[17]Under Title VII of the Civil Rights Act of 1964, it is unlawful employment discrimination for federal employers to discriminate in employment, including compensation, based on race and ethnicity, among other protected bases. See 42 U.S.C. § 2000e-16. Our 2009 report did not determine the reasons why race and ethnicity and veteran status contributed to the explained pay gap, or whether pay differences based on these and other measurable factors reflected discrimination. By including race and ethnicity and veteran status in that analysis, we were not implying that pay differences based on these factors were justified or unaffected by discrimination.

[18]See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014. OPM found that the pay gap for all white-collar federal workers was 13 percent in 2012, which is the same as 13 cents on the dollar. As previously noted, OPM's analysis was similar to but slightly different from the analysis we conducted for our 2009 report. For example, OPM's statistical model controlled for 37 detailed types of occupations, while our main statistical model controlled for six broad types of occupations.

[19]Our 2009 report did not determine whether unexplained pay differences resulted from discrimination.

[20]As previously noted, it is unlawful for federal employers to discriminate in employment, including compensation, on the basis of race and ethnicity. Our 2009 report did not determine whether explained pay differences resulted from discrimination.

selected research on the factors affecting the gender pay gap in the entire U.S. workforce, see appendix I.

OPM categorizes occupations for federal workers into six broad types: Professional, Administrative, Technical, Clerical, Other white-collar, and Blue-collar (see table 1). These broad types of occupations are captured in the EHRI data, along with more detailed types of occupations. For the purposes of this report, we used these six broad types of occupations in our main statistical model.[21] These are the same broad occupational categories that we used in our 2009 report.

Table 1: OPM Categorization of Types of Occupations for Federal Workers

Type of occupation	Description	Examples
Professional	Require knowledge in a specific field, typically acquired through education or training equivalent to a bachelor's or higher degree in that field	Attorneys, engineers, nurses, and pharmacists
Administrative	Do not have a specific educational requirement, but involve skills typically gained through general college education	Program managers, budget analysts, and paralegals
Technical	Associated with and supportive of a professional or administrative field	Nursing assistants, pharmacy technicians, safety technicians, and food inspectors
Clerical	Involve structured work in support of office, business, or fiscal operations	Receptionists, secretaries, dispatchers, and clerks
Other white-collar	Positions that do not fall into other white-collar groups	Most of these positions are related to law enforcement or protective services
Blue-collar	Comprise the crafts, trades, and manual labor	Plumbers, electricians, and mechanics

Source: GAO presentation of Office of Personnel Management (OPM) information. | GAO-21-67

Federal Agencies with a Role in Promoting Equal Pay in the Federal Workforce

While OPM and EEOC have different missions, both agencies have a role in promoting equal pay for men and women in the federal workforce. Specifically:

- OPM's mission is to lead and serve the federal government in enterprise human resource management by delivering policies and services to achieve a trusted, effective civilian workforce. To carry out this mission, OPM is responsible for providing government-wide policy direction and leadership to federal agencies on human resources systems, programs, and policies. OPM is also responsible for providing technical support and guidance to agencies on a variety of

[21]We also conducted a supplemental analysis using more detailed types of occupations; see appendix II.

human resources management policies and practices. In addition, as part of its oversight function, OPM is responsible for ensuring that agencies' human resources programs are effective and meet merit system principles and related civil service requirements.[22] The merit system principles are nine basic standards that govern the management of the executive branch workforce, one of which states that equal pay should be provided for work of equal value.[23]

- EEOC's mission is to prevent and remedy unlawful employment discrimination and advance equal opportunity for all in the workplace, including federal workers as well as most other workers.[24] To carry out this mission with respect to federal workers, EEOC is responsible for providing leadership and guidance to federal agencies on all aspects of the federal government's Equal Employment Opportunity program. According to EEOC officials, if a federal worker submits a formal complaint to their agency about being paid differently because of their gender, the agency generally processes the complaint internally. After the agency investigates the complaint, the worker can 1) ask the agency to issue a decision about whether discrimination occurred, or 2) request a hearing before an EEOC Administrative Judge. If the worker asks the agency to issue a decision but disagrees

[22]For OPM's general statutory responsibilities, see 5 U.S.C. § 1103.

[23]This principle also states that agencies should give appropriate consideration to both national and local rates paid by private sector employers, and should provide appropriate incentives and recognition for excellence in performance. See 5 U.S.C. § 2301(b)(3). Also see U.S. Merit Systems Protection Board, *The Merit System Principles: Keys to Managing the Federal Workforce*, January 2017.

[24]EEOC is responsible for enforcing a number of federal laws prohibiting discrimination in employment, including: Title VII of the Civil Rights Act of 1964, as amended (42 U.S.C. §§ 2000e-2000e-17), prohibiting discrimination on the basis of race, color, religion, sex, and national origin; the Equal Pay Act of 1963, as amended (29 U.S.C. § 206(d) and various other sections of Title 29, U.S.C.), generally prohibiting sex-based wage discrimination; the Age Discrimination in Employment Act of 1967, as amended (29 U.S.C. §§ 621-633a), prohibiting employment discrimination against persons 40 years of age or older; Title I of the Americans with Disabilities Act of 1990, as amended (42 U.S.C. § 12111-12117), prohibiting employment discrimination against qualified individuals with disabilities; and the Genetic Information Nondiscrimination Act of 2008, as amended (42 U.S.C. § 2000ff-1 and various other sections of Titles 29 and 42, U.S.C.), prohibiting discrimination on the basis of genetic information in employment.

with the decision, the worker can appeal to EEOC.[25] In addition, through its program oversight function, EEOC collects annual workforce data from federal agencies through the MD-715 report. EEOC officials said they use these data to help agencies identify potential barriers to equal employment opportunity, including gender disparities. Agencies are required to report a variety of data to EEOC through the MD-715 report, including data on the agency's total workforce by gender and race and ethnicity, as well as data on promotions by gender and race and ethnicity.[26] Agencies are also required to submit a self-assessment, in which officials assess their agency's Equal Employment Opportunity program against the elements of a model program, and identify areas where potential barriers to equal employment opportunity may exist, such as those related to gender and race and ethnicity, among others.

The Gender Pay Gap for Federal Workers Has Narrowed Considerably Since 1999, but Is Greater for Certain Groups of Women Than for Others

[25]According to EEOC, a worker who believes an administrative law judge erred in a ruling would have to file an appeal to EEOC from an agency's final order in order to challenge such errors. See 42 U.S.C. § 2000e-16 for EEOC's general federal sector oversight responsibilities. See 29 C.F.R. §§ 1614.105-110 for procedures related to the filing and processing of individual complaints by federal employees alleging discrimination, and 29 C.F.R. §§ 1614.401-409 for procedures related to appeals.

[26]See EEOC, *Equal Employment Opportunity: Management Directive 715 (EEO MD-715)*, October 1, 2003. Under 29 C.F.R. § 1614.102(e), agency affirmative action programs must comply with all Management Directives and Bulletins that EEOC issues.

The Gender Pay Gap for Federal Workers Narrowed Considerably from 1999 to 2017, and Most of the Current Gap Is Not Explained by the OPM Data We Analyzed

We found that the overall gender pay gap—the difference in average annual salaries of men and women in the federal workforce—has narrowed considerably, from 19 cents on the dollar in 1999 to 7 cents on the dollar in 2017.[27] This means that in 2017, women in the federal workforce earned 93 cents for every dollar earned by men. That year, women earned an average of $80,213 and men earned an average of $86,301.[28]

This overall gender pay gap is made up of two parts—the explained pay gap and the unexplained pay gap—which have both decreased since 1999:

- **The explained pay gap** is the portion of the overall pay gap that is explained by differences between men and women in measurable factors that affect pay, such as occupation, education, experience, race and ethnicity, and veteran status.[29] From 1999 to 2017, the explained pay gap decreased considerably, from 11 cents to 1 cent on the dollar (see fig. 1). According to EEOC officials, race and ethnicity differ fundamentally from the other measurable factors because they are identified in Title VII of the Civil Rights Act as bases for unlawful employment discrimination. By including race and ethnicity and veteran status in our analysis, we are not implying that pay differences based on these factors are justified or unaffected by discrimination.
- **The unexplained pay gap** is the remaining portion of the overall pay gap that is not explained by differences between men and women in

[27]Unless otherwise noted, we rounded percentage estimates to whole numbers and presented them in cents on the dollar. These results reflect the estimated gap in the annual average rate of pay, and do not include overtime pay. We obtained similar results using the annual median rate of pay. See appendix III. In addition, these results are consistent with what we found in our 2009 report. In that report, we found that the overall pay gap, which we measured using the annual average rate of pay, narrowed by 17 cents on the dollar from 1988 (28 cents) to 2007 (11 cents). See GAO-09-279. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[28]These dollar amounts reflect 2017 dollars, and are not adjusted for inflation.

[29]It was beyond the scope of this report to determine the reasons why race and ethnicity and veteran status contributed to the explained pay gap, and whether pay differences based on these and other measurable factors were affected by discrimination.

measurable factors that affect pay.[30] From 1999 to 2017, the unexplained gap decreased from 8 to 6 cents on the dollar.[31] Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that either are not captured in the data we analyzed or cannot be measured. For example, OPM data do not capture work experience outside the federal government or parental status.[32] Other factors that cannot be measured, such as discrimination and individual career choices, could also affect pay.[33] In its 2014 report, OPM identified several potential reasons for the unexplained pay gap, including the availability or absence of workplace flexibilities that may be important to workers—such as flexibility in work hours, whether travel is required, and the opportunity to telework—as well as workers' caregiving responsibilities, such as child care and elder care.[34] For example, a worker who expects to need flexible work arrangements may choose a position that offers greater flexibility but pays less than another position for which he or

[30]To estimate the size of the unexplained pay gap, we used statistical methods that enabled us to isolate pay differences based on gender from pay differences based on measurable factors that affect pay. Our analysis could not determine whether unexplained pay differences resulted from discrimination, which cannot be measured as an independent factor in multivariate analyses.

[31]We used five different models to estimate the size of the unexplained pay gap. All five models found that the unexplained pay gap decreased from 1999 to 2017. However, the size of the unexplained pay gap varied based on the factors we controlled for in each of the models. For example, in 2017, this gap ranged from 4 to 8 cents on the dollar across our models (see appendix II). The results presented here are from our main model, which is the same model we used in our 2009 report. In this model, we chose to control for six broad types of occupations. In some of our alternative models, we used a detailed measure of occupation that controlled for more types of occupations and had fewer underlying occupations within each group. Although the detailed measure of occupation reduced the pay gap more than the broad measure, we opted to use the broader specification in our main model because the occupation variable itself may reflect discriminatory practices. Specifically, occupation could be influenced by discrimination if women are steered toward or away from certain occupations. If that were the case, using a more precise measure of occupation in the model might hide the contribution of any such discrimination to the pay gap, and thereby understate the unexplained gap.

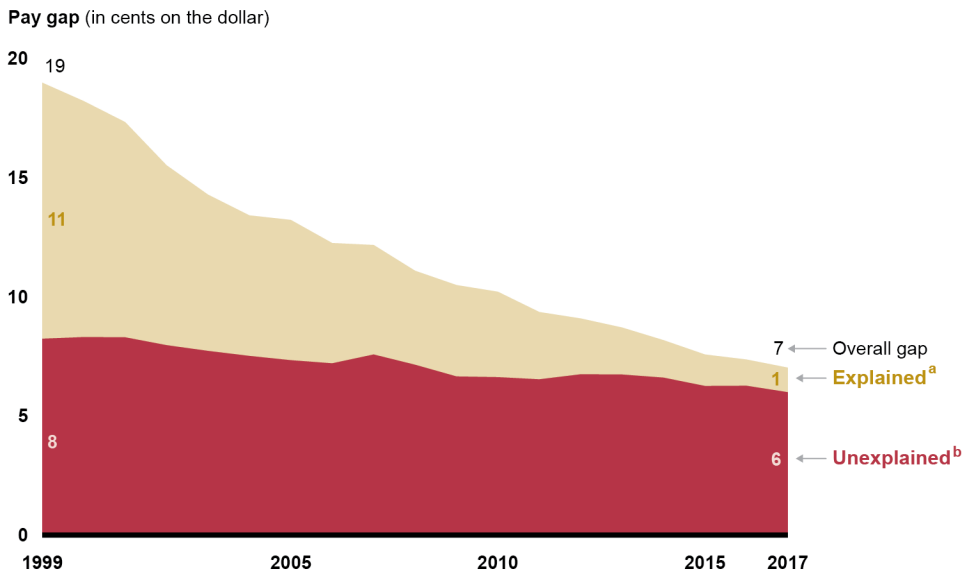
[32]While the U.S. Census Bureau's American Community Survey contains information that can be used to determine parental status, it is less reliable than OPM data for the purpose of identifying federal employees. Furthermore, while it would not be expected that parental status would affect pay, research has found that it can. See appendix I.

[33]As previously noted, our analysis could not determine whether unexplained pay differences resulted from discrimination.

[34]OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014.

she is qualified. Furthermore, the explained pay gap could be influenced by discrimination, which would lead to the unexplained pay gap being understated.[35] However, the existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

Figure 1: Pay Gap between Men and Women in the Federal Workforce, in Cents on the Dollar, 1999 through 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: The overall pay gap reflects the gap in the annual average rate of pay between men and women. We obtained similar results using the annual median rate of pay.

[a]The explained pay gap is the portion of the overall pay gap that is explained by differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status.

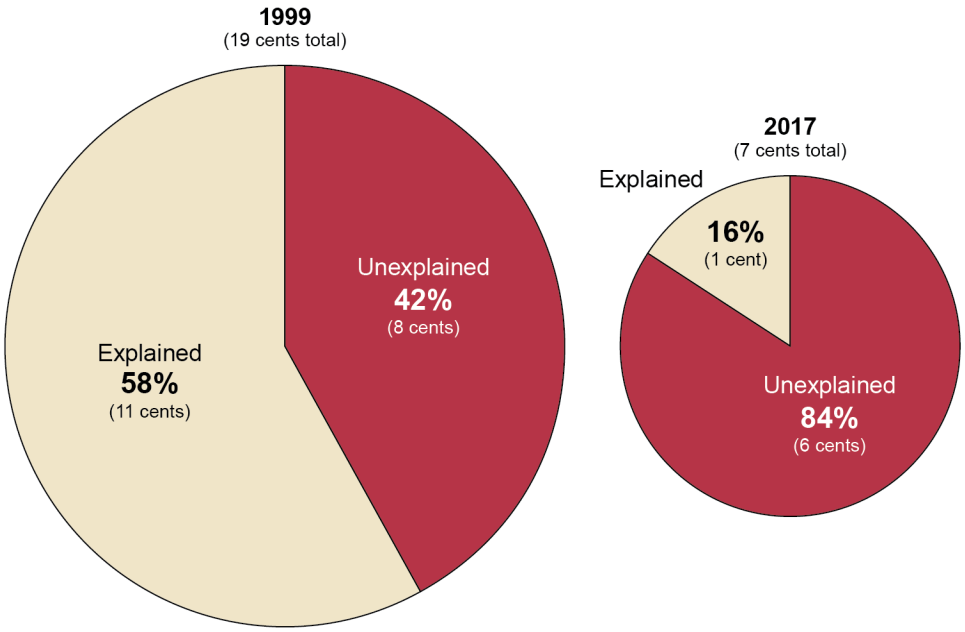
[b]The unexplained pay gap is the remaining portion of the overall pay gap that is not explained by differences between men and women in measurable factors. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

In 2017, about 16 percent of the overall pay gap (1 of 7 cents on the dollar) was explained by measurable differences between men and

[35]For example, if women are steered toward or away from certain occupations or educational opportunities, then accounting for differences between men and women in occupation or education could mask the effect of discrimination in these areas and cause the unexplained gap to be understated.

women in the data we analyzed.[36] This was a considerable change from 1999, when the explained pay gap represented a larger share of the overall pay gap (about 58 percent), and the unexplained gap represented a smaller share of the overall pay gap (about 42 percent).[37] See fig. 2.

Figure 2: Percentage of the Overall Pay Gap Explained by Differences between Men and Women, 1999 and 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: "Cents" refers to cents on the dollar. The explained pay gap is the portion of the overall pay gap that is explained by differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. The unexplained pay gap is the remaining portion of the overall pay gap that is not explained by differences between men and women in measurable factors. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[36]Due to rounding, the percentage of the overall pay gap that was explained by our model (16 percent) is slightly different from the percentage that would result from dividing 1 cent by 7 cents (14 percent).

[37]In our 2009 report, we found that differences in measurable factors accounted for 36 percent of the overall pay gap (4 cents of the 11-cent gap in average pay) in 2007. See GAO-09-279.

Of those factors explaining 16 percent of the overall gender pay gap in 2017, we found that some explained more of the pay gap than others. Specifically, we found that, in absolute terms, the explained pay gap between men and women in 2017 was mostly due to differences in whether they were veterans, the federal agencies where they worked, their race and ethnicity, and how long they had worked for the federal government.[38] The importance of certain factors in explaining the gender pay gap has changed since 1999. For example, the percentage of the pay gap explained by occupation decreased (from 32 to 7 percent), while the percentages explained by federal agency and veteran status increased (from 5 to 16 percent and from 13 to 30 percent, respectively).[39] For more information about the factors that help explain the pay gap and the changes in the importance of these factors over time, see appendix II.

As in our 2009 report, we identified several trends that continued to help explain why the overall gender pay gap has narrowed over time. Specifically, from 1999 to 2017, men and women in the federal workforce became more alike in the following ways:

[38]These results are from our main model, which controlled for occupation at a high level (using six broad types of occupations) as well as other factors. When we controlled for these factors, we found that some of them decreased the pay gap (such as federal agency), while others increased the pay gap (such as veteran status). When we used our model that controlled for occupation at a detailed level (using 38 types of occupations), we found that occupation explained a greater portion of the pay gap (24 percent) than when we used our main model (7 percent). For more information about the effects of individual factors using our main model, and for these effects using each of our four alternative models in 2017, see appendix II.

[39]These results are from our main model. Because the size of the overall pay gap decreased over this time period, the changes in the percentages of the pay gap explained by occupation, federal agency, and veteran status do not necessarily mean that these effects have changed in absolute value. For example, the percentage of the overall pay gap explained by veteran status increased from 1999 to 2017, but in percentage point terms, the effect of veteran status on the pay gap was similar in both years. See appendix II. As we discuss later in this report, we found that federal agencies varied with respect to the gender distribution of their employees in 2017. Specifically, some agencies employed higher percentages of men than women, some employed higher percentages of women than men, and the others employed approximately equal percentages of men and women.

- The percentage of women who were clerical workers decreased considerably, and the percentage of men who were clerical workers remained about the same;[40]
- The percentage of women who were in professional and administrative occupations increased, and the percentage of men in these occupations increased to a lesser extent;[41]
- The percentage of women with a bachelor's degree or higher increased considerably, and the percentage of men with a bachelor's degree or higher increased to a lesser extent (women are now slightly more likely than men to have a bachelor's degree or higher);[42] and
- Women and men now have the same amount of federal experience, on average. Women's average years of federal work experience decreased slightly, while men's average years of federal work experience decreased to a greater extent.[43]

[40]The percentage of women who were clerical workers decreased from about 19 to 8 percent, and the percentage of men who were clerical workers remained at about 3 percent. For more information, see appendix II. OPM defines clerical occupations as those that involve structured work in support of office, business, or fiscal operations; examples include receptionists and secretaries.

[41]The percentage of women who were in professional and administrative occupations increased from about 50 to 67 percent, and the percentage of men in these occupations increased from about 57 to 63 percent. For more information, see appendix II. OPM defines professional occupations as those that require knowledge in a specific field, typically acquired through education or training equivalent to a bachelor's or higher degree in that field; examples include attorneys, nurses, and pharmacists. OPM defines administrative occupations as those that do not have a specific educational requirement, but involve skills typically gained through general college education; examples include budget analysts and paralegals.

[42]The percentage of women with a bachelor's degree or higher (bachelor's degree, master's degree or advanced certificate, professional degree, or doctoral degree) increased from about 31 to about 53 percent, and the percentage of men with a bachelor's degree or higher increased from about 45 to 51 percent. For more information, see appendix II.

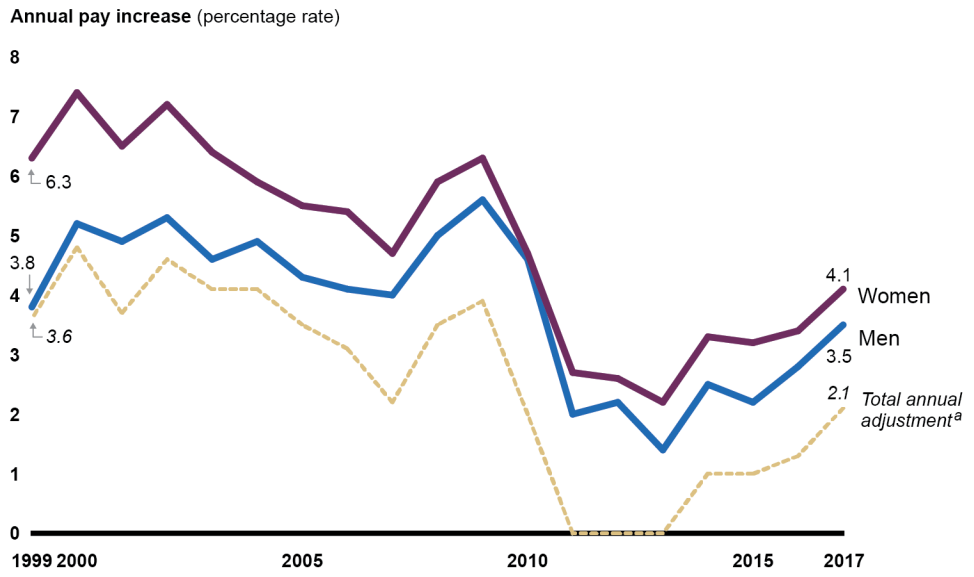
[43]In 1999, men had an average of 16 years of federal work experience and women had an average of 14.1 years of federal work experience. In 2017, men and women both had an average of 13.6 years of federal work experience. However, within this overall trend of men and women becoming increasingly similar over time, we found an exception that helps explain why federal work experience remained important in explaining the pay gap in 2017. Specifically, in 2017, women were more likely than men to have less than five years of federal work experience, but were also more likely than men to have more than 30 years of experience. In other words, the underlying distribution of experience by gender became more different over time. For more information, see appendix II.

In addition, the continued narrowing of the overall gender pay gap may also be partly explained by women earning slightly higher rates of pay increases than men over time. Pay increases under the General Schedule (GS) system, which covers the majority of federal workers, include increases due to performance—such as step increases and promotions—as well as the total annual pay adjustment that federal workers often receive.[44] We found that from 1999 to 2017, women earned slightly higher rates of pay increases than men in almost all years (see fig. 3).[45] In 2017, the rate of pay increases for women was 0.2 percentage points greater than for men, using the average increase in pay. When we measured this difference using the median increase in pay, which is less affected by extremely high and low amounts, the rate of pay increases for women was about 0.6 percentage points greater than for men. Although this difference in the rate of pay increases is small, it may help explain the narrowing pay gap because it has persisted over time. However, we found some variation within this overall trend among workers who were early in their careers. Specifically, while women earned slightly higher rates of pay increases overall, men earned slightly higher rates of pay increases than women among workers with less than 5 years of federal work experience.

[44]There are two types of step increases. Within-grade step increases are periodic increases in the rate of basic pay, which workers receive if they meet certain requirements including having an acceptable level of performance. 5 U.S.C. § 5335. Generally, workers with outstanding performance ratings may also receive additional quality step increases. 5 U.S.C. § 5336, 5 C.F.R. pt. 531, subpt. E. The total annual adjustment is not related to performance, and includes the annual across-the-board pay increase and the increase in locality pay.

[45]The exceptions to this trend were in 2007, 2010, and 2012, when the difference between the rate of pay increases for women and men was less than .05 percentage points. When we conducted regression analysis to understand the factors driving the differential in the rate of pay increases, we found that years of federal work experience explained nearly 60 percent of the explained portion of the difference in pay increases in 2017. However, the model (which we used to understand the overall pay gap between men and women) did not explain pay increases as well as it explained pay. The model explained about 15 percent of pay increases (the R-squared value was .142), while it explained about 75 percent of pay (the R-squared value was .739). As a result, much of the differential in pay increases is unexplained. As previously noted, potential reasons for an unexplained gap include factors that are not captured in the data we analyzed—such as work experience outside the federal government—as well as those that cannot be measured, such as discrimination and individual career choices.

Figure 3: Rate of Pay Increases for Men and Women in the Federal Workforce (Median Increase in Pay), 1999 through 2017



Source: GAO analysis of the Office of Personnel Management's (OPM) Enterprise Human Resources Integration data; OPM; Congressional Research Service; and GAO. | GAO-21-67

Note: Pay increases for men and women include the total annual adjustment that federal workers often receive, as well as increases due to performance, such as step increases under the General Schedule (GS) system and promotions. These results reflect the median increase in the annual rate of pay, which is less affected by extremely high and low amounts than the average increase in the annual rate of pay. We obtained similar results using the average increase in the annual rate of pay. We did not control for inflation as part of this analysis.

[a]The total annual adjustment includes the annual across-the-board pay increase and the average increase in locality pay for certain federal workers. Federal workers did not receive an annual adjustment in 2011, 2012, and 2013.

The Gender Pay Gap is Greater for Certain Groups of Women, Including for Several Racial and Ethnic Groups

In 2017, both the overall gender pay gap and the unexplained gender pay gap were greater for certain groups of women, including Hispanic/Latina

women, Black women, and American Indian or Alaska Native women.[46] In this section of the report, we focus on the unexplained pay gap, which is the remaining gap after accounting for measurable factors that affect pay; for the overall pay gap for these groups, see appendix V.[47] Specifically, as compared to White men, we found that the unexplained pay gap for Hispanic/Latina women, Black women, and American Indian or Alaska Native women ranged from 9 to 12 cents on the dollar, while it was smaller for White women (7 cents) and for Asian, Native Hawaiian, or Pacific Islander women (4 cents).[48] In addition, the unexplained pay gap was generally greater for women with lower levels of education than for women with higher levels of education.[49] For example, the unexplained pay gap was 7 cents on the dollar for women with a high school degree and 3 to 4 cents for women with bachelor's degrees, master's degrees, advanced certificates, or doctoral degrees. The unexplained pay gap was also greater for women who worked in blue-collar occupations (11 cents

[46]These results are from our main model, which controlled for occupation at a high level (using six broad types of occupations) as well as other factors. We also examined the size of the unexplained pay gap using our model that controlled for occupation at a detailed level. For the results from our model with detailed occupations, see appendix II. Because the race and ethnicity categories in the EHRI data have changed over time, we used broad categories that could be compared across the 19 years of data we analyzed. In cases where Hispanic/Latino was combined with another race, we classified that person as Hispanic/Latino, following OPM guidance on historical consistency.

[47]The unexplained pay gap for these groups may be understated if the explained pay gap reflects discrimination based on race and ethnicity. Our analysis could not determine whether explained or unexplained pay differences resulted from discrimination, which cannot be measured as an independent factor in multivariate analyses. We did not assess whether or how discrimination can be measured from a legal perspective.

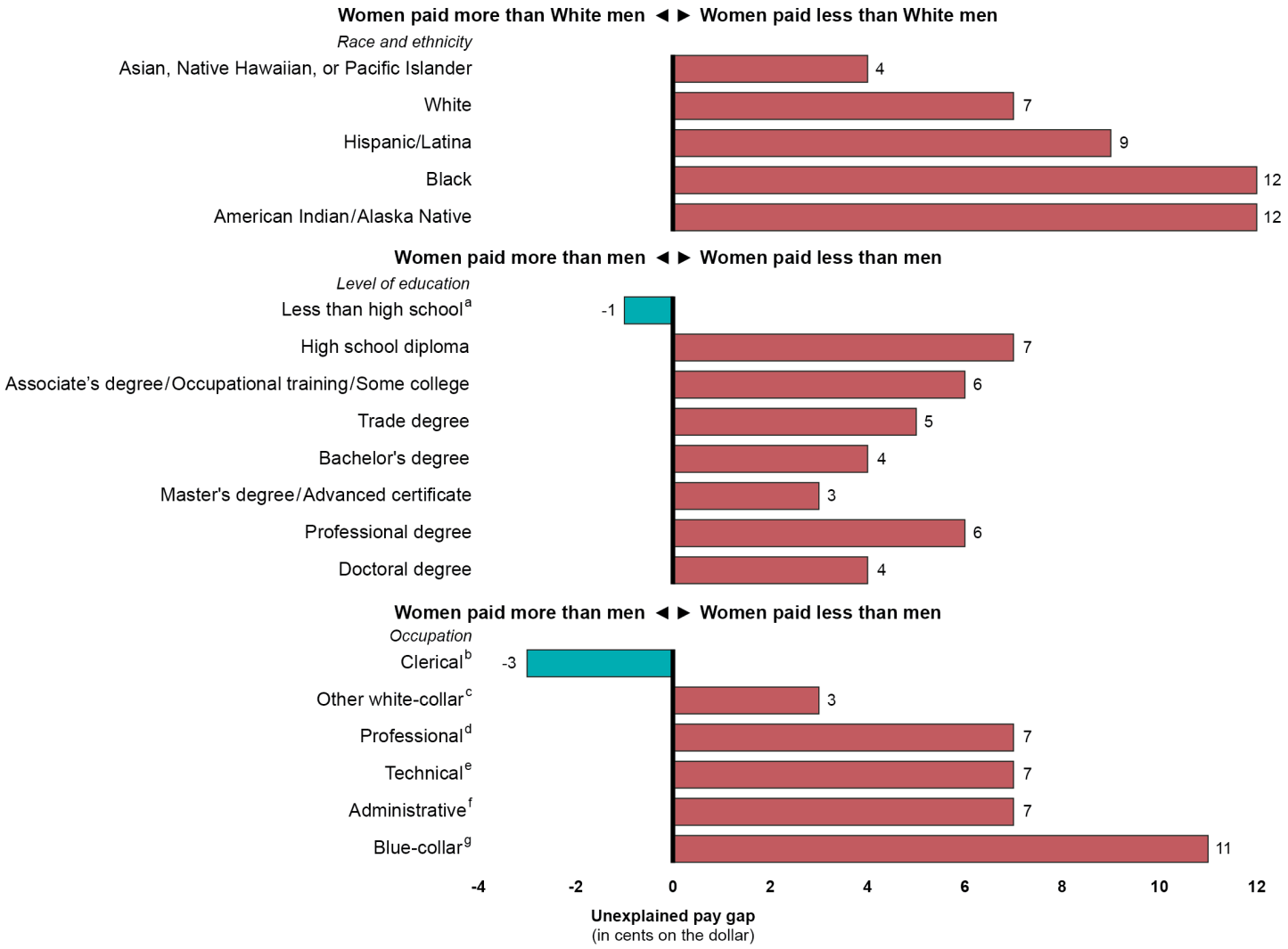
[48]Specifically, we compared the annual average rate of pay for women in each of these racial and ethnic groups to the annual average rate of pay for White men. As compared to men in the same racial and ethnic group, the unexplained pay gap was greater for Asian, Native Hawaiian, or Pacific Islander women and White women (7 cents on the dollar), while it was smaller for Black women, Hispanic/Latina women, and American Indian or Alaska Native women (4 to 5 cents). In EEOC's comments on our 2009 report, which compared gender differences in pay within racial and ethnic groups, EEOC suggested that we examine gender differences in pay both across and within racial and ethnic groups, which we did in this analysis. See GAO-09-279. Our analyses of pay differences by race and ethnicity for the overall workforce and recent hires were the only parts of our analysis where we used White men as the comparison group. Otherwise, we used all men as the comparison group.

[49]An exception to this pattern was that the unexplained pay gap for women with professional degrees (6 cents on the dollar) was higher than the unexplained gap for women with other advanced degrees (3 to 4 cents). In addition, these data represent a worker's level of education at the time of hiring, and may or may not be updated to reflect additional education that a worker obtained after being hired.

on the dollar), as compared to other occupations (3 to 7 cents). While women earned less than men in almost all of the groups we examined, we found that women with less than a high school degree and women in clerical occupations earned more than men in those groups (see fig. 4). However, average salaries for workers in these groups are lower than average salaries for all federal workers.[50] Additionally, the unexplained pay gap was generally greater for women with more years of federal work experience than for women with fewer years of experience. For example, the unexplained gap was 8 cents on the dollar for women with 30 to 34 years of experience, and 5 cents for women with less than 5 years of experience. However, the unexplained gap did not continue to increase for women with 35 or more years of experience.

[50]For example, in 2017, workers in clerical occupations earned an average of about $40,000, and workers with less than a high school degree earned an average of about $61,000, while the average salary across all federal workers was about $84,000. In 2017, clerical workers represented about 5 percent of the entire federal workforce and were predominantly female (about 69 percent). That year, workers with less than a high school degree represented less than 1 percent of the federal workforce and were evenly distributed by gender.

Figure 4: Unexplained Pay Gap between Men and Women in the Federal Workforce in Cents on the Dollar, by Race and Ethnicity, Level of Education, and Occupation, 2017



Source: GAO analysis of the Office of Personnel Management's (OPM) Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The unexplained pay gap is the portion of the overall pay gap that remains after accounting for differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. For women in each racial/ethnic group, we compared their annual average rate of pay to the annual average rate of pay for White men. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[a]In 2017, women with less than a high school degree earned 1 cent more on the dollar than men with the same level of education. However, the average salary for workers with less than a high school degree is lower than the average salary for all federal workers. For example, in 2017, workers with

less than a high school degree earned an average of about $61,000, while all federal workers earned an average of about $84,000.

[b]In 2017, women in clerical occupations earned 3 cents more on the dollar than men in those occupations. However, the average salary for workers in clerical occupations is lower than the average salary for all federal workers. For example, in 2017, workers in clerical occupations earned an average of about $40,000, while all federal workers earned an average of about $84,000. OPM defines clerical occupations as those that involve structured work in support of office, business, or fiscal operations. Examples include receptionists, secretaries, dispatchers, and clerks.

[c]OPM defines other white-collar occupations as those that do not fall into other white-collar groups. Most of these positions are related to law enforcement or protective services.

[d]OPM defines professional occupations as those that require knowledge in a specific field, typically acquired through education or training equivalent to a bachelor's or higher degree in that field. Examples include attorneys, engineers, nurses, and pharmacists.

[e]OPM defines technical occupations as those that are typically associated with and supportive of a professional or administrative field. Examples include nursing assistants, pharmacy technicians, safety technicians, and food inspectors.

[f]OPM defines administrative occupations as those that do not have a specific educational requirement, but involve skills typically gained through general college education. Examples include program managers, budget analysts, and paralegals.

[g]OPM defines blue-collar occupations as those that comprise the crafts, trades, and manual labor. Examples include plumbers, electricians, and mechanics.

We also found that the size of the unexplained gender pay gap by federal agency ranged from about 2 to 11 cents on the dollar, compared to the government-wide unexplained gap of 6 cents. Of the 24 Chief Financial Officers (CFO) Act agencies[51]—generally the largest federal agencies—20 agencies had an unexplained pay gap of about 6 cents on the dollar or less, while four agencies had an unexplained pay gap of about 7 cents or

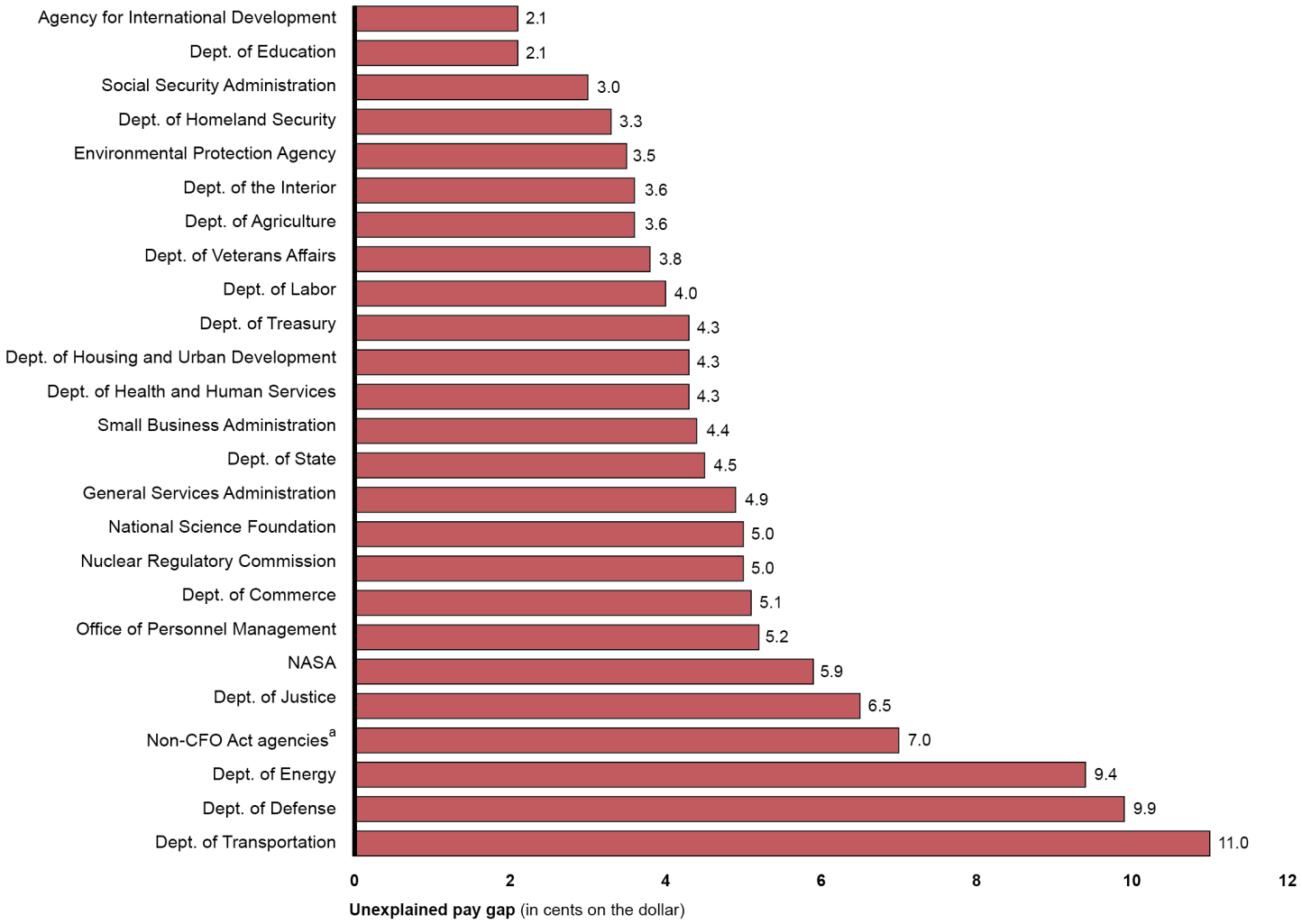
[51]These 24 agencies, which employed 98 percent of the federal workers in the EHRI dataset in 2017, are those identified in the Chief Financial Officers (CFO) Act of 1990, as amended, 31 U.S.C. § 901(b). They are the U.S. Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Homeland Security, Housing and Urban Development, the Interior, Justice, Labor, State, Transportation, the Treasury, and Veterans Affairs, as well as the U.S. Agency for International Development, Environmental Protection Agency, General Services Administration, National Aeronautics and Space Administration (NASA), National Science Foundation, Nuclear Regulatory Commission, Office of Personnel Management, Small Business Administration, and Social Security Administration.

more (see fig. 5).[52] Our analysis could not determine the reasons for these differences, and the size of an agency's unexplained pay gap does not necessarily reflect the extent to which it has taken steps to reduce the pay gap. In addition, it is important to note that the existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred. However, we found that agencies with larger percentages of women tended to have smaller unexplained pay gaps, and agencies with smaller percentages of women tended to have larger unexplained pay gaps (see figs. 5 and 6).[53] For example, in 2017, at the Department of Education, women made up 63 percent of the workforce, and the unexplained pay gap was about 2 cents. In contrast, at the Department of Transportation, women made up 26 percent of the workforce, and the unexplained pay gap was about 11 cents.

[52]These results are from our main model, which controlled for occupation at a high level (using six broad types of occupations) as well as other factors (for more information, see appendix II). Our model did not include agency-specific factors, which could contribute to differences in the size of the pay gap across agencies. Some agencies have a greater share of occupations requiring a high level of scientific or other technical expertise. To the extent that these occupations are higher paid and predominantly male, this may explain some of the observed pay gap between men and women, which is unaccounted for in our model. For additional measures of the pay gap by agency, including the overall gaps in average and median pay, see appendix IV. In its 2014 report, OPM also analyzed differences in the overall pay gap for 8 selected agencies and the remaining group of agencies and found that this gap varied across agencies. We analyzed the unexplained pay gap for the 24 CFO agencies as well as the remaining group of over 100 smaller agencies.

[53]The 12 CFO agencies where women made up at least 50 percent of the workforce had unexplained pay gaps ranging from about 2 to about 5 cents on the dollar, with an average unexplained pay gap of about 4 cents. The remaining 12 CFO agencies where women made up less than 50 percent of the workforce had unexplained pay gaps ranging from about 3 to about 11 cents on the dollar, with an average unexplained pay gap of about 6 cents. However, our analysis did not establish a causal relationship between the percentage of women and the size of the unexplained pay gap at federal agencies.

Figure 5: Unexplained Pay Gap between Men and Women at Chief Financial Officers (CFO) Act Agencies, 2017

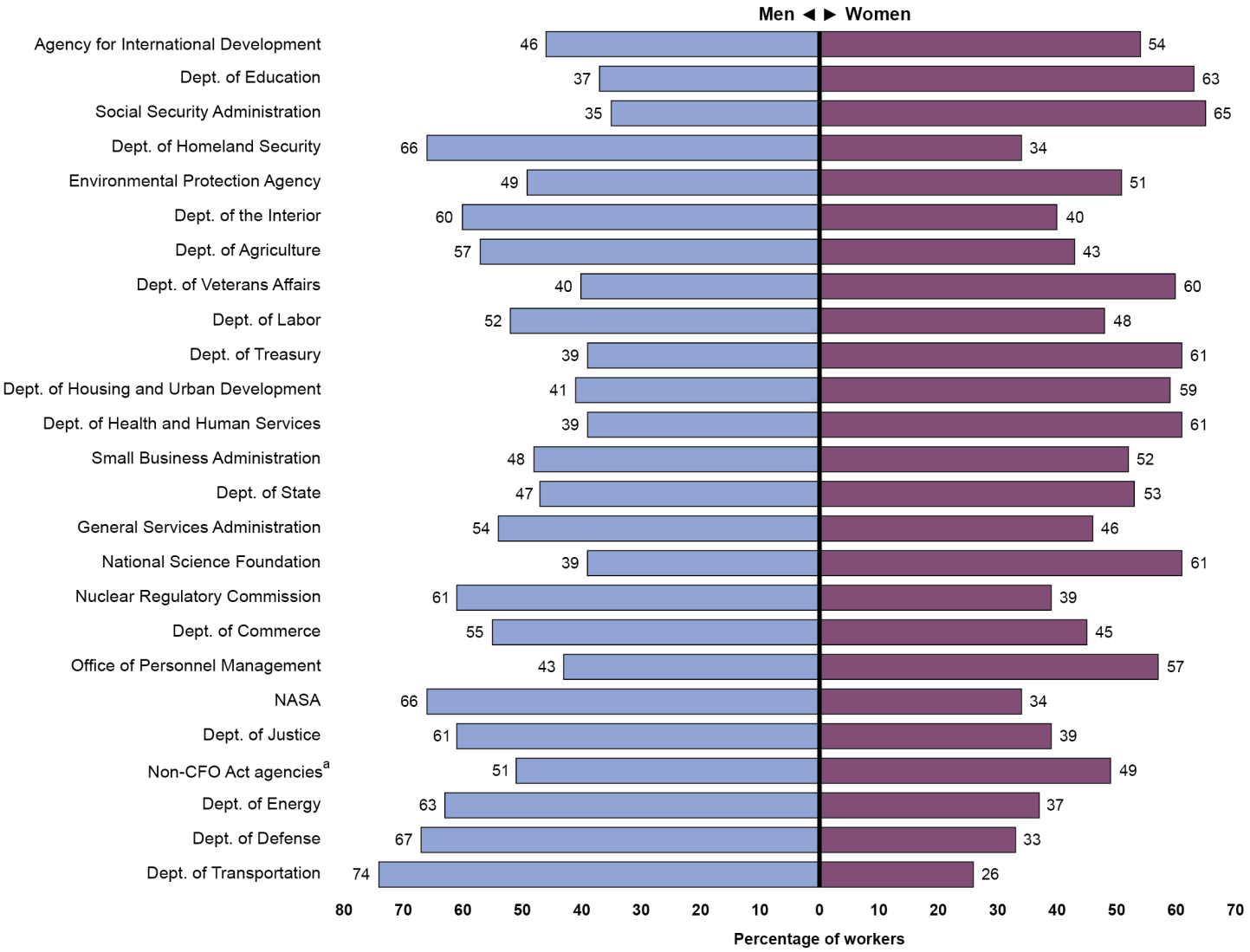


Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: The unexplained pay gap is the portion of the overall pay gap that is not explained by differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. Similarly, our analysis could not determine the reasons for differences in this gap across federal agencies. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred. In addition, the size of an agency's unexplained pay gap does not necessarily reflect the extent to which it has taken steps to reduce the pay gap.

[a]The Non-CFO Act agencies are the other federal agencies that are captured in the Office of Personnel Management's Enterprise Human Resources Integration data but are not among the 24 agencies identified in the Chief Financial Officers (CFO) Act of 1990, 31 U.S.C. § 901(b), which generally are the largest federal agencies.

Figure 6: Percentage of Men and Women Employed by Chief Financial Officers (CFO) Act Agencies, 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: The order in which agencies are listed reflects the size of their unexplained pay gaps in 2017, from smallest to largest. The unexplained pay gap is the portion of the overall pay gap that is not explained by differences between men and women in measurable factors, such as type of occupation, level of education, and years of federal work experience. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. Similarly, our analysis could not determine the reasons for differences in this gap across federal agencies. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred. In addition, the size of an agency's unexplained pay gap does not necessarily reflect the extent to which it has taken steps to reduce the pay gap.

[a]The Non-CFO Act agencies are the other federal agencies that are captured in the Office of Personnel Management's Enterprise Human Resources Integration data, but are not among the 24

agencies identified in the Chief Financial Officers (CFO) Act of 1990, 31 U.S.C. § 901(b), which generally are the largest federal agencies.

The Gender Pay Gap Is Slightly Smaller for Recent Hires Than for All Federal Workers, and Recently Hired Men and Women Differ from Each Other on Key Characteristics

The Gender Pay Gap for Workers with up to 5 Years of Experience Is Slightly Smaller Compared to the Gap for All Federal Workers

We found that the overall and unexplained gender pay gaps for recent hires—those with up to 5 years of federal experience, including military service—are slightly smaller than these pay gaps for all federal workers.[54] In 2017, there were about 497,000 recently hired workers, representing 24 percent of the entire federal workforce.[55] That year, the overall pay gap for recent hires was 6 cents on the dollar compared to the 7-cent pay

[54]The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred. We also analyzed an alternative definition of recent hires with 5 years or less of federal experience, where we did not count military service towards federal experience. This alternative definition captured all recently hired federal workers, regardless of the length of any military service. We mostly found these two differently defined groups to be similar in terms of gender composition and pay differences by gender.

[55]Recent hires were more evenly distributed by gender than the overall federal workforce in 2017. Specifically, 52 percent of recent hires were male and 48 percent were female, while 57 percent of the overall federal workforce was male and 43 percent was female. However, this trend did not persist when we excluded military experience from federal work experience. In this case, we found that recent hires have almost the same gender distribution as the overall workforce, in that 44 percent were women and 56 percent were men. As previously mentioned, the federal workforce has consistently included more men than women over the last 20 years.

gap for all federal workers.[56] Additionally, the unexplained pay gap for recent hires was 5 cents on the dollar, compared to 6 cents for all federal workers. The factors that were most important in explaining the pay gap for recent hires, in absolute terms, were the same as those for the entire federal workforce—veteran status, federal agency, and federal work experience—except that educational level was the other key factor, instead of race and ethnicity.

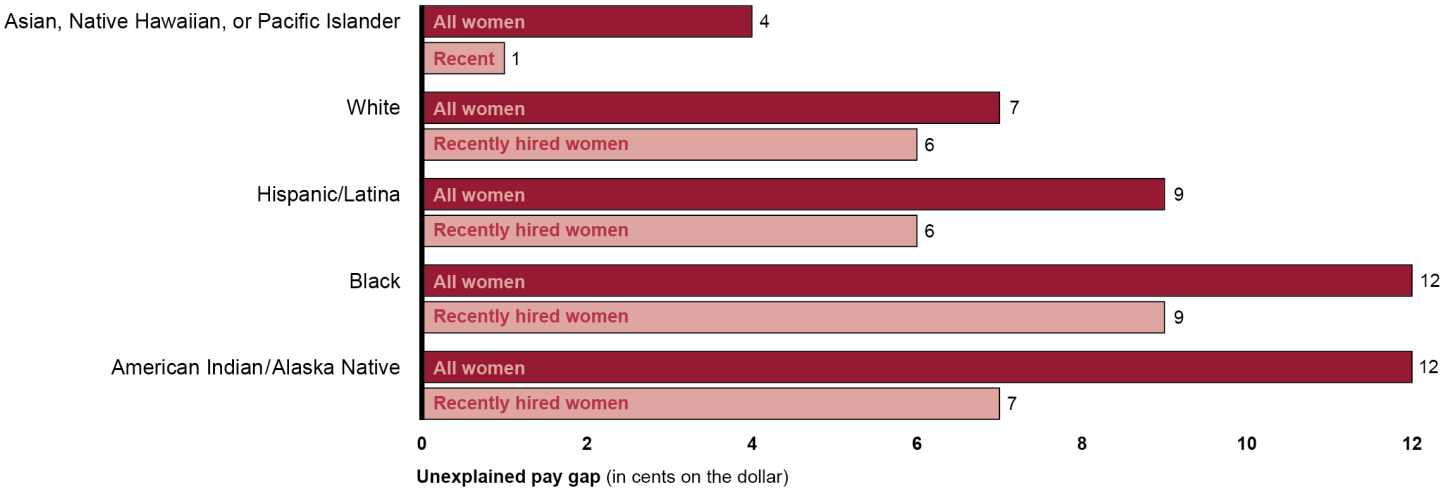
Furthermore, we found that the unexplained gender pay gap for certain groups of recently hired women is lower than the unexplained pay gap for these groups of women in the entire federal workforce. Specifically, in 2017:

- For all of the racial and ethnic groups we examined, the unexplained gender pay gap for recently hired women was lower than this gap for all women in the federal workforce.[57] See figure 7.
- For 5 of the 7 levels of education we examined, the unexplained gender pay gap for recently hired women was lower than this gap for all women in the federal workforce. See figure 8.
- For 3 of the 6 of the occupations we examined, the unexplained gender pay gap for recently hired women was lower than this gap for all women in the federal workforce. See figure 9.

[56]These results reflect the estimated gap in the annual average rate of pay, and do not include overtime pay. In 2017, the average salary for recently hired men was $67,190, as compared to $62,890 for recently hired women. These dollar amounts reflect 2017 dollars, and are not adjusted for inflation.

[57]As previously noted, for women in each racial and ethnic group, we compared their annual average rate of pay to the annual average rate of pay for White men.

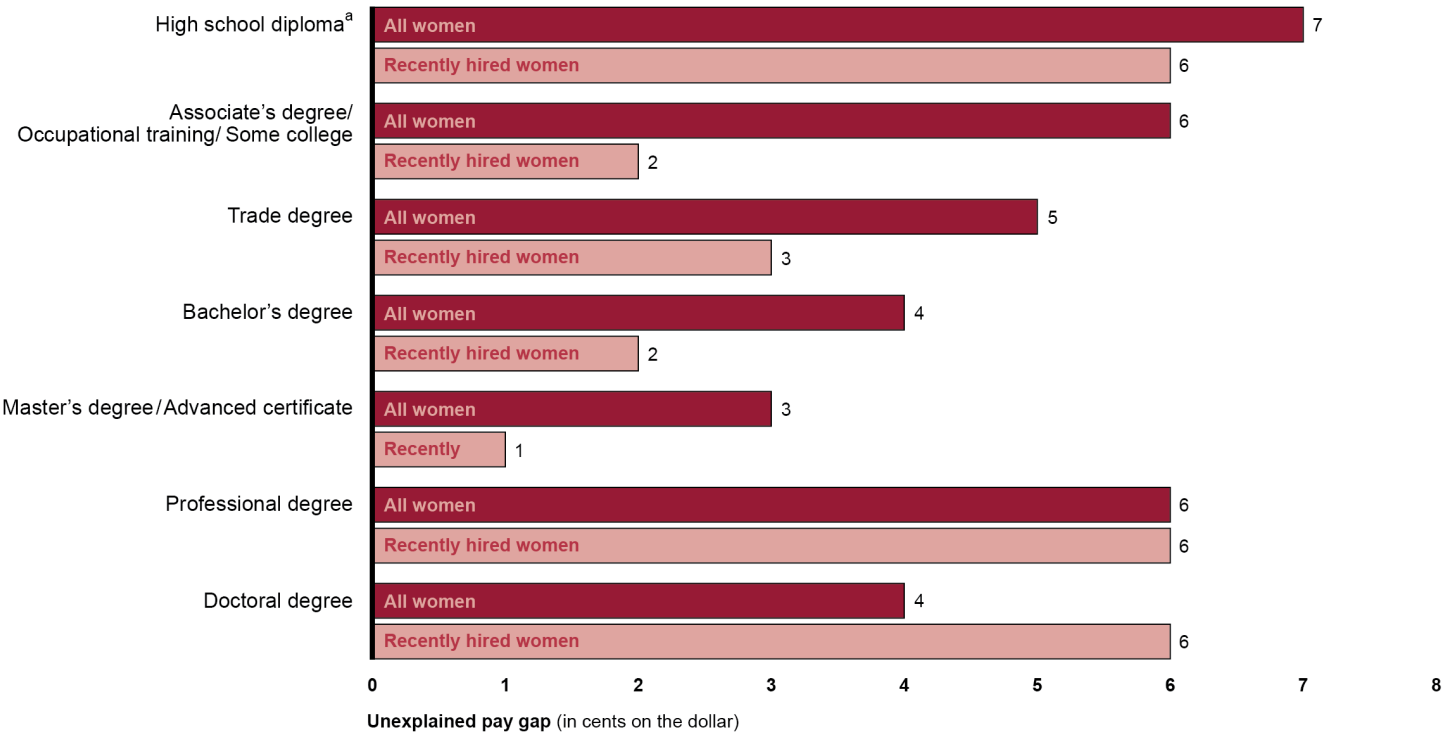
Figure 7: Unexplained Pay Gap for Recently Hired Women and All Women in the Federal Workforce, in Cents on the Dollar, by Race and Ethnicity, 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: We defined recent hires as those with up to 5 years of federal experience, including military service. The unexplained pay gap is the portion of the overall pay gap that remains after accounting for differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. For women in each racial and ethnic group, we compared their annual average rate of pay to the annual average rate of pay for White men. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

Figure 8: Unexplained Pay Gap for Recently Hired Women and All Women in the Federal Workforce, in Cents on the Dollar, by Level of Education, 2017

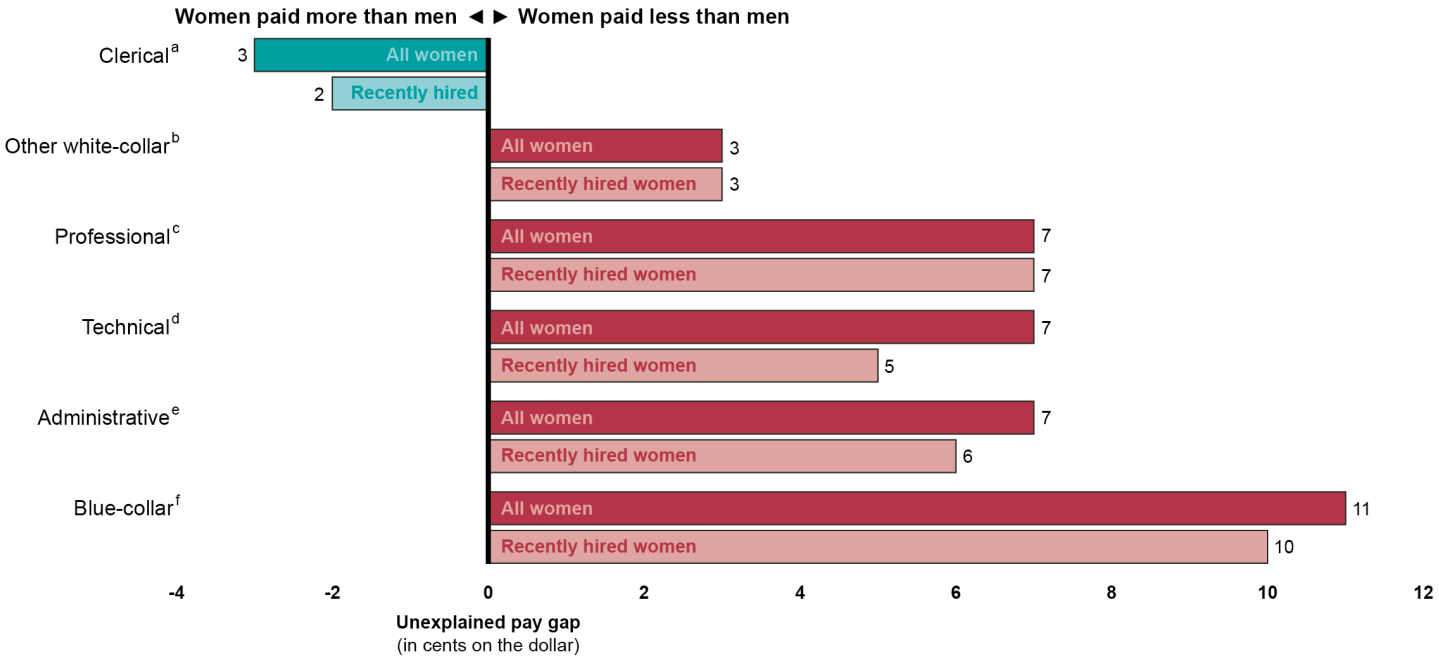


Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: We defined recent hires as those with up to 5 years of federal experience, including military service. The unexplained pay gap is the portion of the overall pay gap that remains after accounting for differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[a]We estimated the unexplained pay gap for recently hired women with less than a high school degree, but we did not report it in this figure because the number of observations was small (less than 1,500), and because we found that the difference between recently hired men's and women's pay was not statistically significant.

Figure 9: Unexplained Pay Gap for Recently Hired Women and All Women in the Federal Workforce, in Cents on the Dollar, by Occupation, 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: We defined recent hires as those with up to 5 years of federal experience, including military service. The unexplained pay gap is the portion of the overall pay gap that remains after accounting for differences between men and women in measurable factors, such as type of occupation, level of education, years of federal work experience, race and ethnicity, and veteran status. Our analysis could not determine the reasons for the unexplained pay gap, which may be due to factors that we did not or could not measure. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[a]As previously noted, average salaries for workers in clerical occupations are lower than average salaries for workers across all federal occupations. For example, in 2017, recently hired workers in clerical occupations earned an average of about $35,000, while all recently hired federal workers earned an average of about $65,000. The Office of Personnel Management (OPM) defines clerical occupations as those that involve structured work in support of office, business, or fiscal operations. Examples include receptionists, secretaries, dispatchers, and clerks.

[b]OPM defines other white-collar occupations as those that do not fall into other white-collar groups. Most of these positions are related to law enforcement or protective services.

[c]OPM defines professional occupations as those that require knowledge in a specific field, typically acquired through education or training equivalent to a bachelor's or higher degree in that field. Examples include attorneys, engineers, nurses, and pharmacists.

[d]OPM defines technical occupations as those that are typically associated with and supportive of a professional or administrative field. Examples include nursing assistants, pharmacy technicians, safety technicians, and food inspectors.

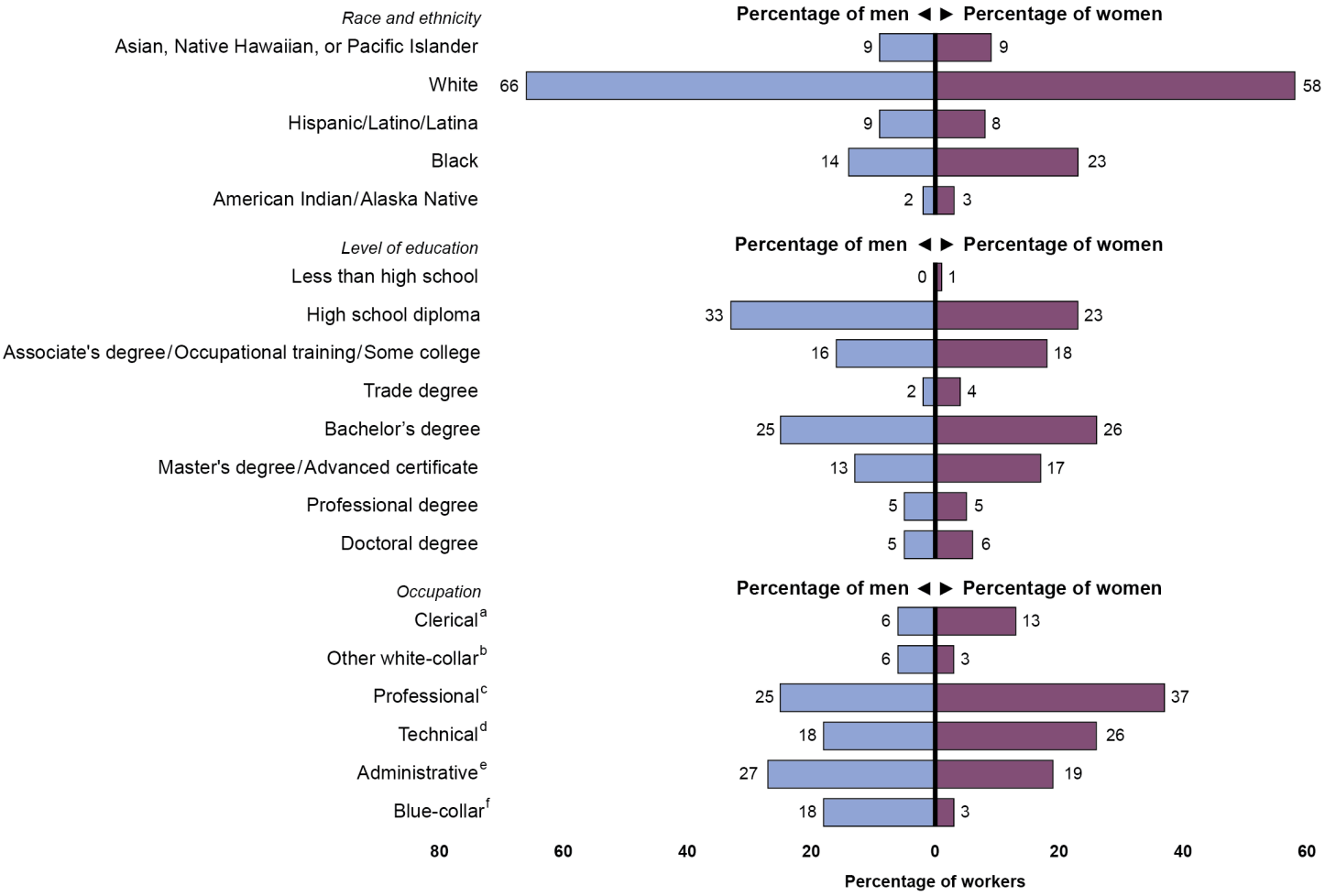
[e]OPM defines administrative occupations as those that do not have a specific educational requirement, but involve skills typically gained through general college education. Examples include program managers, budget analysts, and paralegals.

[f]OPM defines blue-collar occupations as those that comprise the crafts, trades, and manual labor. Examples include plumbers, electricians, and mechanics.

Recently Hired Men and Women Differ Somewhat from Each Other by Race and Ethnicity, Level of Education, Occupation, and Federal Agency

While men and women in the federal workforce have become more similar over time in terms of their occupations, education, and experience, we observed some differences among recently hired men and women. In terms of race and ethnicity, recently hired men in 2017 were more likely to be White than recently hired women, and recently hired women were more likely to be Black. With respect to education, recently hired women were slightly more likely than recently hired men to have each level of education above a high school degree, with the exception of a professional degree. Regarding occupation, recently hired women were more likely than recently hired men to work in professional, technical, and clerical occupations, while recently hired men were more likely to work in administrative, blue-collar, and other white-collar occupations. See figure 10.

Figure 10: Recently Hired Women and Men in the Federal Workforce, by Race and Ethnicity, Level of Education, and Occupation, 2017



Source: GAO analysis of the Office of Personnel Management's (OPM) Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: We defined recent hires as those with up to 5 years of federal experience, including military service. Percentages may not add to 100 due to rounding. Additionally, about 1 percent of individuals are missing education data.

[a]The Office of Personnel Management (OPM) defines clerical occupations as those that involve structured work in support of office, business, or fiscal operations. Examples include receptionists, secretaries, dispatchers, and clerks.

[b]OPM defines other white-collar occupations as those that do not fall into other white-collar groups. Most of these positions are related to law enforcement or protective services.

[c]OPM defines professional occupations as those that require knowledge in a specific field, typically acquired through education or training equivalent to a bachelor's or higher degree in that field. Examples include attorneys, engineers, nurses, and pharmacists.

[d]OPM defines technical occupations as those that are typically associated with and supportive of a professional or administrative field. Examples include nursing assistants, pharmacy technicians, safety technicians, and food inspectors.

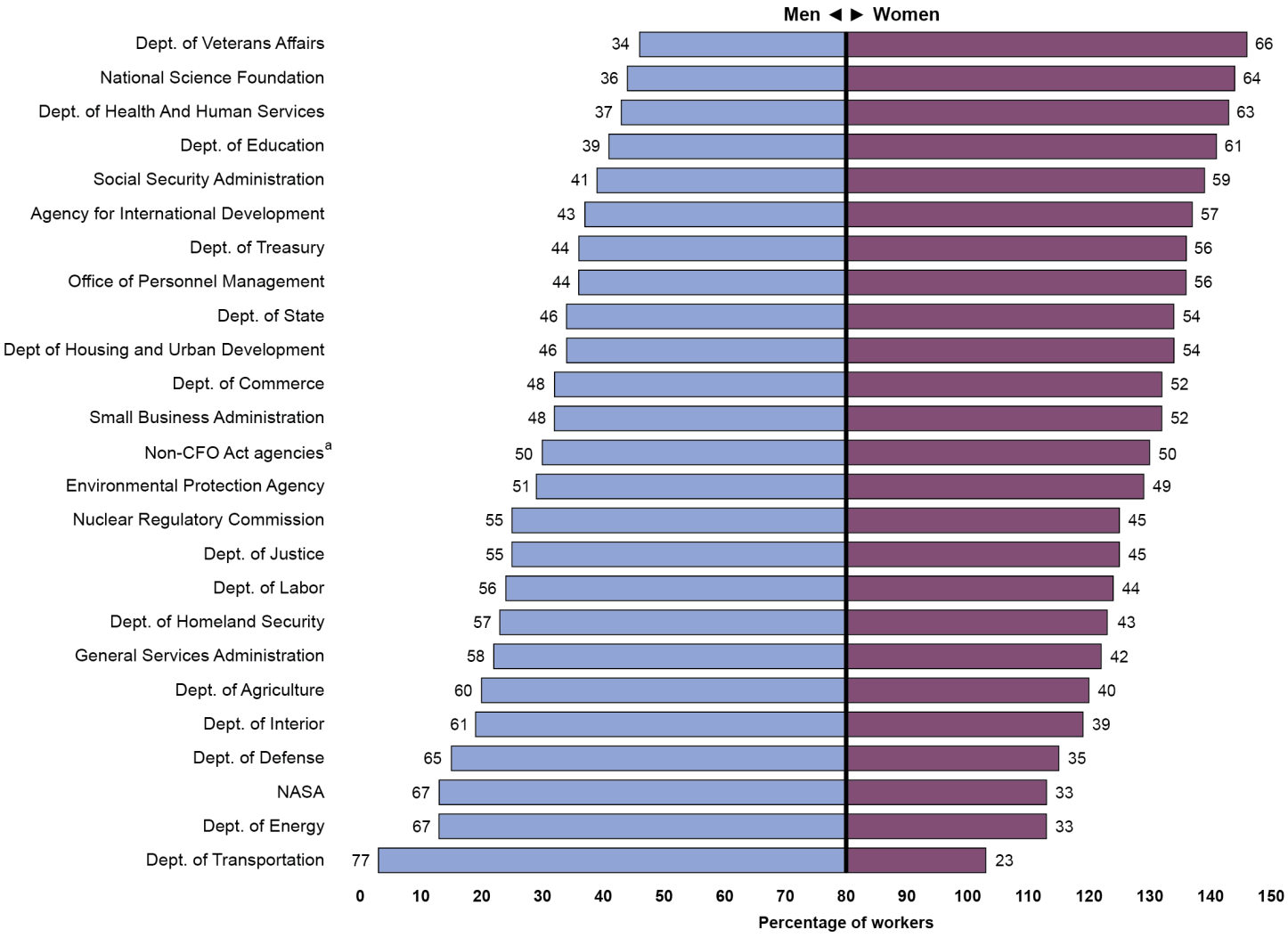
[e]OPM defines administrative occupations as those that do not have a specific educational requirement, but involve skills typically gained through general college education. Examples include program managers, budget analysts, and paralegals.

[f]OPM defines blue-collar occupations as those that comprise the crafts, trades, and manual labor. Examples include plumbers, electricians, and mechanics.

With respect to federal agency, in 2017, men comprised a greater proportion of recent hires than women at 12 of the 24 CFO Act agencies, while women comprised a greater proportion of recent hires at the other 12 agencies.[58] Agencies where men comprised a greater proportion of recent hires included the Department of Transportation (77 percent), the Department of Energy (67 percent), and the National Aeronautics and Space Administration (67 percent). Women made up a larger percentage of recent hires at the Department of Veterans Affairs (66 percent), the National Science Foundation (64 percent), and the Department of Health and Human Services (63 percent). See figure 11.

[58]Across all 24 CFO Act agencies, recent hires were 48 percent women and 52 percent men in 2017.

Figure 11: Percentage of Recently Hired Men and Women within Chief Financial Officers (CFO) Act Agencies, 2017



Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration data. | GAO-21-67

Note: We defined recent hires as those with up to 5 years of federal experience, including military service.

[a]The Non-CFO Act agencies are the other federal agencies that are captured in the Office of Personnel Management's Enterprise Human Resources Integration data but are not among the 24 agencies identified in the Chief Financial Officers (CFO) Act of 1990, 31 U.S.C. § 901(b), which generally are the largest federal agencies.

OPM and EEOC Have Taken Steps to Monitor and Address the Pay Gap, but EEOC Has Not Assessed the Quality of Promotion Data or Addressed Missing Data in a Timely Way

OPM and EEOC Have Taken Steps to Analyze Gender Pay Gap Data and Assist Agencies

OPM and EEOC have undertaken various efforts to monitor and address the gender pay gap in the federal workforce.

OPM's Efforts

As required by a 2013 Presidential Memorandum, OPM analyzed the gender pay gap in the federal workforce and developed a government-wide strategy for advancing pay equality.[59] In 2014, OPM issued a report that presented the results of its pay gap analysis and outlined its strategy, which included efforts related to starting salaries and promotions, salary transparency, and the recruitment of women and minorities, among other initiatives.[60] OPM officials told us that all activities supporting this strategy were completed between 2014 and 2016. Examples of OPM's key efforts included work in the following areas:[61]

- **Starting salaries and promotions.** OPM collected information from agencies on their policies and practices regarding starting salaries

[59]See *Presidential Memorandum—Advancing Pay Equality in the Federal Government and Learning from Successful Practices*, The White House, May 10, 2013.

[60]See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014. OPM found that the pay gap for federal workers was partly due to measurable differences between men and women in the occupations they hold as well as their levels of education. These results are similar to those found in GAO's 2009 report on the gender pay gap in the federal workforce. See GAO-09-279.

[61]For a complete list of OPM's efforts under this strategy, see appendix VI.

and promotions for workers covered by the General Schedule (GS) system and equivalent level white-collar positions in other pay systems, and summarized this information in its 2014 report. In the same report, OPM analyzed data on gender differences in promotions and found that a greater percentage of women received promotions than men.[62]

- **Salary transparency.** In 2014, OPM worked with federal agencies to increase salary transparency by ensuring that agencies made salary tables or rate ranges outside of the GS system available to job candidates.
- **Job classification.** In 2014, OPM officials said they held an Interagency Classification Policy Forum with federal agencies to identify agency needs related to classifying jobs under the GS system. According to OPM officials, the forum included guidance and training to support agencies in applying the GS classification system and identified several areas for future exploration, including gender pay disparities across occupations.[63]
- **Recruitment of women and minorities.** Beginning in 2014, OPM officials said they engaged in multiple initiatives to increase the recruitment of women and minorities into the federal workforce. For example, OPM shared best practices for recruiting women with agencies through webinars. OPM officials also said they conducted outreach to minority professional organizations and colleges and universities, among other efforts.
- **Gender pay gap analysis.** In 2015, OPM issued guidance to agencies on how to conduct their own gender pay gap analyses. OPM officials said they also gave technical assistance to agencies that requested it, including providing detailed analyses and information on

[62]OPM analyzed EHRI data from 1992, 2002, and 2012. For example, OPM found that for white-collar workers in 2012, the overall promotion rate was 3.94 percent for women and 3.38 percent for men. When OPM examined promotion rates by specific occupational categories, OPM found that the female promotion rate exceeded the male promotion rate for 27 of 37 specific occupational categories in 2012. However, the EHRI data do not include the number of applicants for promotion. As a result, OPM's promotion analysis did not account for the relative numbers of men and women who applied for promotion, only the total number of men and women in each occupational category.

[63]OPM said they briefed federal agencies on the results of the session in 2015.

analysis methods.[64] When we interviewed Chief Human Capital Officers Council representatives from 14 agencies, we asked if their agencies needed additional assistance from OPM on analyzing the pay gap, and none said they did.

EEOC's Efforts

With respect to EEOC's efforts to monitor and address the gender pay gap, EEOC has analyzed workforce data from federal agencies and provided related technical assistance. EEOC collects annual data from federal agencies on their workforce demographics through the MD-715 report. EEOC and agencies use these data to identify barriers to equal employment opportunities, including disparities by gender and race and ethnicity. EEOC officials told us that they conduct periodic technical assistance visits with agencies to provide detailed feedback on the data agencies have submitted in the MD-715 report.[65] During these visits, EEOC officials said they discuss trends in the data, as well as discrepancies such as missing or incomplete entries, with agencies. For example, as part of a technical assistance visit to one agency, EEOC officials said they identified major errors in one of the agency's MD-715 data tables, which made it appear that most agency workers had disabilities when they did not. EEOC officials said they helped the agency correct these errors, which occurred because of a technology malfunction in how the data were extracted from the agency's database.

Additionally, EEOC has conducted research and written reports related to gender disparities, including pay equity issues. For example, in 2018, EEOC issued a report that included an examination of gender disparities among federal workers in public safety occupations, such as police officers, firefighters, security officers, and criminal investigators.[66] Furthermore, in 2015, EEOC's *Annual Report on the Federal Workforce* included an analysis of the demographic composition of the federal

[64]OPM, *Guidance for Agencies Conducting Gender Pay Data Analysis*, Attachment to *Additional Guidance on Advancing Pay Equality in the Federal Government*, July 2015. This guidance stated that "OPM encourages agencies to develop plans for conducting ongoing data analysis related to gender pay equality on a regular and recurring basis to remain focused on addressing this important issue and to measure progress in closing any gender pay gaps."

[65]EEOC conducts these technical assistance visits every year with one-third of the agencies, or about 60 to 70 agencies per year. Each agency receives a technical assistance visit every 3 years.

[66]See EEOC, *Program Evaluation: Recruitment & Hiring Gender Disparities in Public Safety Occupations*, June 2018. EEOC officials told us that they are developing a second report on promotion and retention rates for women in public safety occupations.

workforce, which found that senior level positions in the federal government continued to be dominated by White men.[67] In addition, in 2013, EEOC issued a report summarizing the findings of a working group it commissioned to identify obstacles that hinder equal employment opportunities for women in the federal workforce, which included findings on pay disparities by gender. The working group included discussions with representatives from minority and women's professional organizations, including Blacks in Government, Federally Employed Women, and the African American Federal Executive Association. Working group participants reported various challenges to equal opportunity, including that men continue to earn higher average salaries than women, and that higher-level management positions in the federal workforce remain difficult for women to obtain, among other challenges.[68]

Plans for Future Efforts

Going forward, OPM plans to periodically monitor data on the gender pay gap, and EEOC plans to expand its data collection efforts. OPM officials said they plan to continue monitoring data on the pay gap every 2 to 3 years by conducting descriptive analyses—for example, calculating average pay by gender—which they said they have done twice since OPM issued its 2014 report. OPM officials said that if they identify significant changes in the pay gap, they would assess the need for government-wide policy direction. In addition, officials said they plan to encourage agencies to conduct their own analyses and take appropriate steps to reduce the pay gap. OPM officials noted their 2014 study found that the pay gap is largely due to differences in the occupations men and women hold, which they said individual agencies are best positioned to address through hiring. Even so, officials said OPM plans to provide government-wide policy direction and leadership on the pay gap as needed. Regarding EEOC's planned efforts, officials stated that monitoring and addressing the pay gap is part of EEOC's oversight responsibility and will continue to be a priority for EEOC in the future, although officials acknowledged that individual agencies and OPM also have a role in this area. EEOC officials said they plan to expand their efforts to collect annual workforce data from agencies. Specifically, officials said they plan to collect detailed salary data from agencies in

[67]See EEOC, *Annual Report on the Federal Workforce,* FY 2015.

[68]See EEOC, *Women's Work Group Report,* December 2013.

$10,000 increments, which they expect will help them better identify pay disparities.[69]

EEOC Data on Promotions are Incomplete, and EEOC Has Not Assessed Data Quality or Addressed Missing Data in a Timely Manner

The annual workforce demographic data that EEOC collects from agencies through the MD-715 report include data on promotions by gender and race and ethnicity, which EEOC and agencies use to assess whether there are barriers to career advancement for any particular groups of workers, including women. For example, EEOC officials said they recently used these data to identify barriers to advancement for people with disabilities, with the goal of ensuring that these workers were represented at every grade level of mission-critical occupations within the federal government. EEOC officials said they worked with agencies on conducting additional analyses, developing recruitment efforts, and devising other strategies for ensuring equal representation of people with disabilities at all grade levels.

We considered using promotion data from the MD-715 report to analyze promotion rates by gender and race and ethnicity across the federal government, but we found that the data were not sufficiently reliable for our analysis. We reviewed 3 years of Table A9 promotion data for 17 agencies and identified the following types of discrepancies in the data, which EEOC officials confirmed:

- **Missing data.** In some cases, agencies did not submit any promotion data. We found that 22 of the expected 51 data tables were missing.
- **Incomplete data.** In other cases, agencies submitted incomplete promotion data. For example, some agencies reported the number of applicants selected for promotion, but did not report the numbers who applied for promotion or who were deemed qualified for promotion. Other agencies reported the total number of applicants, but did not report any demographic information—such as gender or race and ethnicity—for those applicants. Of the 29 tables that agencies submitted, we found that 13 had at least one incomplete data element. We also observed some instances of agencies providing inconsistent data from one year to the next. For example, one agency

[69]According to officials, this effort began in fiscal year 2020 with EEOC's collection of fiscal year 2019 data. EEOC officials said that they previously faced challenges comparing agencies' pay data across various pay systems, and they expect that collecting pay data in $10,000 salary increments will help address these challenges. According to EEOC officials, they cannot use OPM's EHRI data for this purpose because EEOC's jurisdiction includes federal workers who are not captured in the EHRI data, including employees of the U.S. Postal Service, the U.S. Foreign Service, and government corporations like the Tennessee Valley Authority.

provided an incomplete table in 2015, a complete table in 2016, and no table in 2017.

EEOC officials described several reasons why promotion data may be missing or incomplete, including:

- **Voluntary demographic information.** According to EEOC officials, promotion applicants are not required to provide demographic information such as gender and race and ethnicity, so these data may not exist for every applicant. Moreover, gender and race and ethnicity are recorded together in the report (e.g., White women, Black men), rather than recorded separately, so if applicants provide their gender but not their race and ethnicity, or their race and ethnicity but not their gender, they will not be included in the report. EEOC officials said they did not know whether applicants provide their demographic information to a greater extent for some agencies or occupations than for others.
- **Different data sources.** The data that agencies submit in the MD-715 report come from different sources, such as central databases where applications are filed for multiple agencies, agencies' own personnel files, and other sources, so the data may be completed to a different extent in each database or may be inconsistent across databases. Additionally, agency officials may not be familiar with how to submit data from certain data sources.
- **Coordination issues.** Agencies' human resources and equal employment and opportunity offices may not always coordinate well with each other to share information needed to complete the report.
- **Variation in agency staff and resources.** High staff turnover can mean that officials may complete the report differently and with varying degrees of completeness from one year to the next, especially if the agency lacks standardized operating procedures for completing the report. Additionally, agencies have varying levels of resources, including different numbers of staff and different types of software. In particular, smaller agencies may not have sufficient resources to collect more complete data.

EEOC officials have made some changes to the MD-715 report in recognition of these issues. For example, beginning in fiscal year 2020, EEOC officials said that the report will include a field for agencies to submit data on vacancy announcements, or the number of positions that agencies are trying to fill for each occupation. By collecting data about vacancy announcements, EEOC officials said they may better understand the reasons why data are missing. For example, if agencies used this

new field consistently, it could allow EEOC to understand whether the agencies were trying to fill positions but did not have complete applicant data to submit, or whether there were no vacancies to begin with (for example, due to hiring freezes). Additionally, EEOC officials said that, beginning in fiscal year 2020, they plan to advise agencies to provide data on the number of applicants selected for promotion, even if the other fields are incomplete due to missing applicant data. EEOC officials also said that it would be helpful if agency officials could provide comments in the data table to explain why data are missing or incomplete, but they have not been able to implement this feature due to technical limitations.

While EEOC officials are aware of some of the reasons why agency officials provide incomplete promotion data in the MD-715 report, they have not fully assessed the reliability of these data. For example, according to EEOC officials, they have not quantified the extent to which promotion data are missing and incomplete. They also have not evaluated the extent to which various reasons contribute to data errors. Officials said the promotion data tables do not include data checks that would allow them to detect missing or incomplete data.[70] They said that data checks do not exist because promotion applicants are not required to provide demographic information. However, without examining the reasons for the missing data, they do not know with certainty that this is the primary reason for the discrepancies, and they may miss some issues they or the agencies could address. More fully understanding the extent to which each issue is responsible for incomplete data submissions would enable EEOC officials to better target their efforts to help agencies submit more complete data. EEOC officials acknowledged they could do more to improve the reliability of the promotion data.

Moreover, EEOC officials said they generally do not follow up with agencies in between periodic technical assistance visits to identify the reasons for data discrepancies and address those discrepancies. As noted above, EEOC conducts these visits on a rolling basis and visits each agency once every 3 years. While officials said they discuss missing and incomplete data with agencies during these visits, they do not systematically track these issues between these visits. As a result, EEOC officials said that some data discrepancies are not corrected in the

[70]EEOC officials said that other data tables in the MD-715 report include data checks.

system, because these corrections must be made during the same fiscal year.[71]

According to EEOC's Management Directive 715, the purpose of collecting the MD-715 report data is to ensure that all workers and applicants for employment enjoy equality of opportunity in the federal workplace, regardless of race, sex, and national origin, among other protected bases. Additionally, federal standards for internal controls state that an agency's management should use quality information to achieve the agency's objectives, and that relevant data should be collected from reliable sources in a timely manner based on the identified information requirements.[72] These controls also state that management should evaluate both internal and external data for reliability and should consider if the information is appropriate, current, complete, accurate, accessible, and provided on a timely basis. Management should also make revisions when necessary so that it receives quality information.

Without taking steps to assess the quality of the promotion data in the MD-715 report, understand the reasons for the discrepancies, and address them with agencies in a timelier manner, EEOC and agencies lack quality information for identifying and addressing any barriers to promotions, including any barriers for women. This lack of quality information may in turn limit the ability of EEOC and agencies to ensure equal opportunity for all applicants seeking promotion. While EEOC may not be able to correct all of the data issues we identified, because some of them need to be addressed by agencies and because applicants for promotion are not required to provide demographic information, EEOC could take steps to better understand the limitations of agencies' data and work with agencies to make corrections where possible.

Conclusions

As the nation's largest employer, the federal government plays an important role in ensuring equal pay for equal work, including serving as a model for other employers. Since 1999, the pay gap between men and women in the federal workforce has narrowed considerably, and remains lower than the pay gap in the entire U.S. workforce. However, the gender pay gap for federal workers has not yet closed, and the remaining gap is

[71]EEOC officials noted that, as part of a recent affirmative action initiative, they followed up right away with all agencies that had discrepancies in the data they submitted. However, they said this immediate follow up is not typical.

[72]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 10, 2014), Principle 13.

mostly unexplained by measurable differences between men and women. Importantly, this unexplained portion of the pay gap is larger for most women of color, including American Indian and Alaska Native women, Black women, and Hispanic/Latina women. More optimistically, the unexplained pay gap for recently hired workers—including women of color—is slightly lower than this gap for all federal workers, which could indicate that the gender pay gap in the federal workforce will narrow further in the future.

At the same time, opportunities exist to improve data on career advancement for federal workers, including barriers to promotion for certain groups. As part of EEOC's mission to advance equal opportunity for all workers, it collects data from federal agencies on promotions by gender and race and ethnicity. However, these data are incomplete, which limits the extent to which EEOC and agencies can use them to identify and help address any barriers to promotion for certain groups. While agencies may be in the best position to tackle some of these data issues, EEOC also has a role in assessing the quality of these data and addressing discrepancies with agencies in a timelier manner. Without more complete data, EEOC and agencies may miss opportunities to ensure that all applicants for promotion have equal opportunity to advance their careers.

Recommendation for Executive Action

The Chair of EEOC should take steps to assess the quality of the promotion data in the MD-715 report and address data discrepancies with agencies in a timelier manner. (Recommendation 1)

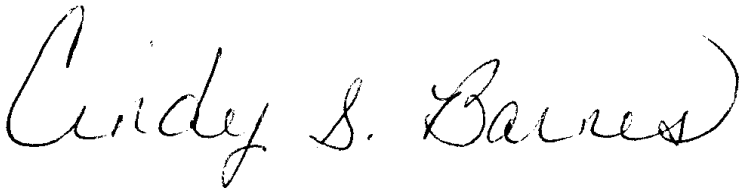
Agency Comments

We provided a draft of this product to OPM and EEOC for comment. OPM and EEOC provided technical comments, which we incorporated as appropriate. EEOC neither agreed nor disagreed with our recommendation. We also provided report excerpts with agency-specific results to the 24 CFO Act agencies for their technical review.

We are sending copies of this report to the appropriate congressional committees, the Director of OPM, the Chair of EEOC, and other interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-7215 or brownbarnesc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on

the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.



Cindy S. Brown Barnes
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Education, Workforce, and Income Security

Appendix I: Objectives, Scope, and Methodology

The objectives of this review were to determine (1) how the pay gap between men and women in the federal workforce has changed since 1999, and what factors account for any remaining gap; (2) the size of the gender pay gap among recently hired workers, and how, if at all, recently hired men and women differ on key characteristics; and (3) the extent to which the Office of Personnel Management (OPM) and the U.S. Equal Employment Opportunity Commission (EEOC) have monitored and taken steps to address the gender pay gap in the federal workforce, including assessing potential disparities in promotions.

To examine how the gender pay gap has changed over time and the factors that contribute to any remaining gap, as well as the size of this gap for recently hired workers and key characteristics of those workers, we analyzed data from OPM's Enterprise Human Resources Integration (EHRI) database from September 1999 through September 2017. At the time of our review, September 2017 data were the most recent reliable data available.[1] We determined that the data were sufficiently reliable for our purposes. In this appendix, we describe the data we included in and excluded from our analysis, how we assessed the reliability of the data, and the limitations of our analysis (see below). We describe our analyses using the EHRI data in more detail in appendix II.

To determine the extent to which OPM and EEOC have monitored and taken steps to address the gender pay gap in the federal workforce, including assessing potential disparities in promotions, we interviewed OPM and EEOC officials and reviewed relevant documentation. In addition, we interviewed officials representing 14 agencies that are

[1]We initially analyzed EHRI data from September 1999 through September 2018. However, while OPM officials were reviewing a draft of this report, they discovered and notified us of an error in the September 2018 EHRI data they received from one agency. According to OPM, this error also affected official OPM publications containing these data. Because we learned about this error shortly before we planned to issue this report, and it affected the reliability of our analysis results for 2018, we chose to present our analysis results through September 2017.

members of the Chief Human Capital Officers Council.[2] We also interviewed officials from the Merit Systems Protection Board about their perspectives and past efforts related to the gender pay gap. In addition, we reviewed federal agency promotion data collected by EEOC in the Management Directive 715 (MD-715) report and interviewed EEOC officials about their processes for collecting and analyzing these data. Specifically, we reviewed the promotion data that 17 selected agencies submitted to EEOC in Table A9 of the MD-715 report for fiscal years 2015 through 2017.[3] At the time of our review, fiscal year 2017 data were the most recent data available. In this appendix, we describe the data we analyzed and how we assessed the reliability of the data (see below). We determined that the data were not sufficiently reliable for our purposes, for reasons that we discuss below.

Additionally, we conducted interviews to obtain background and context for our work. Before we conducted our analysis, we interviewed representatives of two organizations with different perspectives on the gender pay gap: the Independent Women's Forum and the Institute for Women's Policy Research. Specifically, we discussed the variables that we planned to include in our analysis, considerations in interpreting the

[2]The Chief Human Capital Officers Council was created to advise and coordinate the activities of the agencies of its members on such matters as modernization of human resources systems, improved quality of human resources information, and legislation affecting human resources operations and organizations. 5 U.S.C. § 1401, note. The Council advises and collaborates with OPM and other federal agencies to develop government-wide human capital management strategies. The 14 agencies that participated in our interview included: Department of Commerce, Department of Health and Human Services, Department of Homeland Security, Department of Energy, Department of Education, Department of Justice, Department of Veterans Affairs, Environmental Protection Agency, National Science Foundation, Nuclear Regulatory Commission, Office of Management and Budget, Office of Personnel Management, Small Business Administration, and U.S. Agency for International Development.

[3]We selected these 17 agencies because they collectively employed about 95 percent of the federal workforce as of September 2018. The 17 agencies were: Department of Agriculture, Department of Commerce, Department of Energy, Department of Health and Human Services, Department of Homeland Security, Department of Justice, Department of Labor, Department of the Interior, Department of Transportation, Department of Treasury, Department of Veterans Affairs, Environmental Protection Agency, National Aeronautics and Space Administration, Social Security Administration, and the following departments within the Department of Defense (DOD): Department of the Air Force, Department of the Army, and Department of the Navy. EEOC officials told us that DOD does not submit MD-715 data for DOD overall; rather, each of the three military departments and DOD's fourth estate organizations submit data separately. We reviewed MD-715 data for the Air Force, Army, and Navy, but we did not review MD-715 data for the fourth estate organizations, which include the Office of the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, the Joint Staff, the DOD Inspector General, the defense agencies, and DOD field activities.

results, and possible explanations for an unexplained pay gap, among other topics. We also interviewed Federally Employed Women, a membership organization that works for the advancement and professional growth of women in federal service. We reviewed our prior report and OPM's study on the gender pay gap in the federal workforce and selected studies on the gender pay gap that were not specific to the federal workforce (see below for a summary of those studies). Finally, we reviewed relevant federal laws and regulations.

Analysis of OPM's Enterprise Human Resources Integration Data

Data

We analyzed the EHRI annual status data, which consist of data elements describing workers who were present in the federal workforce on September 30 of each year, with some notable exclusions described below. These elements include information on each federal worker's adjusted basic pay (which takes into account various differences in pay based on locality, special rates, and existing pay caps), agency, birth date (which can be used to calculate age), education level, disability status, occupation, race and ethnicity, gender, veteran's preference and status, bargaining unit status, and work schedule. We analyzed 19 years of status file data, from 1999 through 2017. Specifically, we analyzed data for workers who were in pay status as of September 30 of each year, including permanent and temporary workers, as well as workers with full-time, part-time, seasonal, and intermittent work schedules.

Exclusions

While EHRI is considered the most comprehensive database of federal workers, it does not include information for the entire federal workforce. Of the approximately 2.7 million federal workers, EHRI contains data on about 2.1 million of them, including civilian employees of most executive

branch agencies, several legislative branch commissions, and one judicial branch agency.[4] It does not include data for federal contractors.

In addition to those exclusions and for purposes of consistency, we performed some routine data cleaning by systematically excluding certain observations from our analysis. Specifically, we excluded workers:

- who were not in pay status as of September 30 of each year,
- who were missing wage data or other required data,
- with earnings less than $5,000 in a given year,
- under the age of 16, and
- whose records were not readable.

Definition of Recent Hires

We defined workers as recent hires if they had 5 or fewer years of federal work experience. Our measure of federal experience includes credited military service, which generally includes active duty service but does not include all service for military retirees. We chose 5 years as our definition, rather than a shorter period, because we wanted to include veterans with limited military service. To test the effect of our definition, we also analyzed an alternative definition where we did not count military service towards federal experience. This alternative definition captured all recently hired federal workers, regardless of the length of any military service. We mostly found these two differently defined groups to be similar in terms of gender composition and pay differences by gender.

[4]Specifically, EHRI coverage of the executive branch currently includes all agencies except the U.S. Postal Service, the Board of Governors of the Federal Reserve, the Central Intelligence Agency, the Defense Intelligence Agency, Foreign Service personnel at the State Department (included until March 2006), the National Geospatial-Intelligence Agency, the National Security Agency, the Office of the Director of National Intelligence, the Office of the Vice President, the Postal Regulatory Commission, the Tennessee Valley Authority, and the White House Office. Also excluded are the Public Health Service's Commissioned Officer Corps, non-appropriated fund employees, and foreign nationals overseas. EHRI coverage of the legislative branch is limited to the Government Printing Office and selected commissions. EHRI coverage of the judicial branch is limited to the U.S. Tax Court. Prior to September 2013, the U.S. Tax Court was reflected as a legislative branch agency. Other recent significant changes to EHRI coverage include that the Consumer Financial Protection Bureau, a component of the Federal Reserve, began reporting in March 2011, and the State Department stopped providing data on Foreign Service Personnel in March 2006.

Data Reliability

We assessed the reliability of these data by reviewing documentation, interviewing and obtaining information from agency officials responsible for the data, and testing the data for inaccuracies. We determined that the data were sufficiently reliable for our purposes. Specifically, we:

- reviewed technical documentation on the data elements included in EHRI and our past analyses of the reliability of EHRI data;
- interviewed OPM officials knowledgeable about the EHRI data and consulted these officials periodically throughout the course of our study; and
- conducted our own electronic data testing to assess the accuracy and completeness of the data used in our analyses.

While the EHRI data are reliable, the education and disability data they contain have a notable limitation. Specifically, a worker's level of education may be understated because it represents education at the time of hiring, and may or may not be updated to reflect additional education that a worker obtained after being hired. Similarly, disability status is entered at the time of hiring, and may or may not be updated if a worker's disability status changes at a later date.

Data Used for Descriptive and Multivariate Analyses

We used the following variables from the EHRI status file in our descriptive and multivariate analyses (for more information about the specific methods we used to analyze the data, and the specific variables we used in particular models, see app. II):

- Average salary (average rate of pay): We performed our analysis using adjusted basic pay as recorded in the EHRI data, which takes into account various differences in pay based on locality, special rates, and existing pay caps. This figure reflects the amount individuals would have earned had they worked a complete year. It does not reflect actual earnings, which are not available in the EHRI data, and does not include overtime pay.
- Age: We computed age using the worker's month and year of birth, and the date the data were drawn (September of each year).

- Federal work experience: We measured federal work experience by the months between the worker's service leave computation date and the date the data were drawn (September of each year).[5]
- Race and ethnicity: We defined race and ethnicity using the five broad categories in the EHRI data that could be compared across the 19 years of data we analyzed: (1) American Indian or Alaska Native; (2) Asian, Native Hawaiian; or Pacific Islander; (3) Black; (4) Hispanic/Latino; and (5) White.[6]
- Education: We classified workers into eight educational categories, which reflect the highest degree obtained by the worker at the time of hiring: (1) Less than high school, (2) High school diploma, (3) Associate's degree/occupational training/some college, (4) Trade degree, (5) Bachelor's degree, (6) Master's degree/advanced certificate, (7) Professional degree, and (8) Doctoral degree.
- Disability status: We defined disability status by whether the worker did or did not have an EHRI code for a disability condition. Disability status is self-identified by workers when they are hired, and workers can update their disability status if it changes at a later date.
- Agency: We defined agency as the agency where the worker was employed.
- Work schedule: We classified workers into three categories: (1) full-time schedule; (2) part-time schedule; or (3) other schedule (such as seasonal or intermittent).
- Occupation: We mainly defined occupation using the six broad occupational categories in the EHRI data: (1) Professional, (2) Administrative, (3) Technical, (4) Clerical, (5) Other white-collar, and (6) Blue-collar. For the purposes of our analysis, we called this categorical variable PATCOB. However, we also examined a more

[5]We used the leave computation date, rather than the retirement computation date, because our analysis covered years in which the retirement computation date was not available. According to OPM, the leave computation date includes years of active military service, but does not include all years for military retirees, except in special circumstances.

[6]Because the race and ethnicity categories in the EHRI data have changed over time, we used broad categories that were comparable from 1999 through 2017. OPM used the same categories, as well as an "Other" category, in its 2014 report. In cases where Hispanic/Latino was combined with another race, we classified that person as Hispanic/Latino, following OPM guidance on historical consistency.

disaggregated measure of occupation, based on combining PATCOB and occupational family.[7] This resulted in 38 occupational categories.

- Veteran status: We classified workers into three categories: (1) not a veteran, (2) veteran who qualified for veterans' preference in hiring, and (3) veteran who did not qualify for veterans' preference in hiring.
- State: We defined state as the location of the worker's employment, which may or may not be the location of the worker's residence.
- Bargaining unit status: We classified workers into three categories: (1) not eligible to be in a union, (2) eligible to be in a union and a member of a union, and (3) eligible to be in a union but not a member of a union.
- Supervisory status: We classified workers into two categories: (1) supervisor/manager and (2) not a supervisor/manager.

Key Differences between Our Analysis and OPM's Analysis for Its 2014 Report

The analysis we conducted for this report has some key differences from the gender pay gap analysis that OPM conducted for its 2014 report.[8] These differences help explain why our analysis and OPM's analysis yielded similar, but slightly different, results.[9] Specifically, we examined a different population and defined certain variables differently, which makes it difficult to compare our results with OPM's results.

Differences in population:

- OPM's analysis did not include blue-collar workers, while our analysis included workers in all types of occupations including blue-collar workers. We chose to include blue-collar workers because they made up nearly one-tenth of the federal workforce in 2017 and about 90 percent of those workers were male, which we wanted to reflect in our

[7]Occupational families define occupations in more detail than PATCOB, using the first two digits of the occupational series. Examples of occupational families are "Business and Industry" and "Information Technology." In total, there are 23 potential occupational families that we could have combined with PATCOB. However, we did not include all combinations of occupational family and PATCOB; rather, we grouped combinations together in a similar manner as OPM did in its 2014 report.

[8]See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014.

[9]We found, as did OPM, that the overall pay gap decreased over time, and that a portion of the pay gap was not explained by measurable factors, but we obtained different estimates of the size of the overall pay gap and unexplained pay gap. For example, in 2012, OPM found that the unexplained pay gap was 3.8 percent, and we found that this gap was 6.8 percent in that year (using our main model).

reported pay gaps. Additionally, by including blue-collar workers, we were able to determine the extent to which differences across all six PATCOB categories help explain average differences in pay.

- OPM's analysis did not include workers with part-time, seasonal, or intermittent schedules, while our main model included all of these workers. We chose to include workers with all types of work schedules to comprehensively reflect the federal workforce. Additionally, in 2017, women made up a majority of federal workers with part-time schedules. By including workers with various work schedules, we were able to determine the extent to which differences in work schedules help explain average differences in pay.

Differences in definition of variables:

- OPM used fewer federal agencies in its model (8 selected agencies, plus a catch-all category for all other agencies, while we used the 24 CFO Act agencies in our models, plus a catch-all category for all other agencies).[10] We chose to include the 24 CFO Act agencies in our models to comprehensively reflect the federal workforce. The 24 CFO Act agencies employed 98 percent of all federal workers in the EHRI dataset in 2017.
- OPM used more detailed types of occupations in its model (37 occupational groups), while we used six broad types of occupations (PATCOB) in our main model, as we did in our 2009 report. However, to show how differences in the specification might affect the results, we also ran four alternative models, two of which include 38 types of occupations.[11] Our reasons for choosing a broad measure of occupation in this report are the same as in our 2009 report.[12]
  - First, a broad measure of occupation is easier to interpret within a regression because it has fewer categories.
  - Second, in the decomposition methodology, categories that are exclusively male or female are excluded from the analysis, which

[10]OPM combined several agencies for the purposes of its analysis. Specifically, OPM's model combined the Departments of Homeland Security, Justice, and Treasury into a single category.

[11]Our detailed occupation model produced an unexplained pay gap of 4.9 percent in 2012, which is close to OPM's estimate for that year (3.8 percent). For the results of our detailed occupation model and other alternative models, see appendix II.

[12]See GAO-09-279.

is an advantage to using broad categories, particularly when analyzing subgroups.

- Third, when choosing the variables in our model, we were concerned that the distribution of some variables might be affected by discrimination. Specifically, the fact that men and women are hired into or remain in different occupations may itself reflect some level of discrimination associated with gender. Therefore, controlling for occupation at a detailed level might hide discrimination within the explained pay gap. We attempted to strike a balance between the extremes of not controlling for occupation and controlling for occupation at a detailed level by controlling for occupation at a broad level using PATCOB.

Limitations of the Analysis

This analysis was not intended to be used to determine whether or not discrimination exists in the federal workforce, as the existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred. A few limitations, some of which are common to almost all multivariate analyses, prevent us from definitively determining whether unexplained differences in pay by gender are due to discrimination, individual career choices, or other factors. First, discrimination cannot be measured as an independent factor in multivariate analyses.[13] Second, we lack data on several factors that may legitimately influence wages, such as experience outside of the federal workforce. Third, certain variables that were included in our model—such as occupation, education level, and part-time status—may have been imprecisely measured or reported.

With respect to the first limitation, even factors that are expected to affect pay, like occupation and education, could be influenced by discrimination. For example, women may tend to be selected for certain occupations as opposed to others. Specifically, the fact that men and women are distributed differently across occupations may itself reflect some level of discrimination associated with hiring, promotion, or other employer

[13]We did not assess whether or how discrimination can be measured from a legal perspective.

practices.[14] With respect to individual career choices, a worker who expects to need flexible work arrangements may choose a position that offers greater flexibility but pays less than another position for which he or she is qualified. For example, if women have a greater share of parental responsibilities than men, they may need greater flexibilities with work arrangements. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

With respect to the second limitation, some of the pay gap may be affected by the possibility that women, or certain women and men, may be more or less likely to enter the federal workforce. For example, there may be differences between men and women in their years of relevant non-federal work experience. However, because our data were limited to men and women who were already employed by the federal government, we did not have information on their prior employment.

With respect to the third limitation, we conducted additional analyses of the EHRI data to better understand the degree to which different measures of key variables might impact our results. Specifically, we developed four additional models, which all found that the unexplained pay gap decreased from 1999 through 2017, but the size of the unexplained gap varied based on the factors we controlled for in each of the models (for more information, see appendix II). For example, we tested a more detailed specification of the occupation variable and found that the unexplained pay gap declined from about 6 percent in 1999 to about 4 percent in 2017. Although more precise measures of occupation reduced the pay gap more than broad measures, we opted to use a broader specification in our main model because, as described above, the occupation variable itself may reflect discriminatory practices. Specifically, occupation could be influenced by discrimination if women are steered toward or away from certain occupations. If that were the case, using a more precise measure of occupation in the model might hide the contribution of any such discrimination to the pay gap, and thereby understate the unexplained gap.

[14]For discussions of gender biases in hiring, see Shelley J.Correll, Stephen Benard, and In Paik, 2007, “Getting a Job: Is There a Motherhood Wage Penalty?” *American Journal of Sociology* 112(5): 1297-1338; and Corinne A. Moss-Racusin, John F. Dovidio, Victoria L. Brescoll, Mark J. Graham, and Jo Handelsman, 2012, “Science faculty’s subtle gender biases favor male students,” *PNAS,* 109 (41): 16474-16479. For a discussion of managerial bias favoring men over equally performing women in awarding monetary rewards, see Emilio J. Castilla, and Stephen Benard, 2010, “The Paradox of Meritocracy in Organizations,” *Administrative Science Quarterly*, 55(4): 543-676.

We were also unable to analyze pay for transgender federal workers, whose gender identity or gender expression differs from their sex assigned at birth. When we asked OPM officials whether EHRI reflects changes in gender identity during federal employment, officials said that gender may or may not be updated in these circumstances, depending on whether a worker requests it and provides required documentation. As a result, we decided not to conduct a separate analysis of transgender workers.

Review of EEOC's MD-715 Data

To determine the extent to which EEOC has assessed potential disparities in promotions, we reviewed federal agency promotion data collected by EEOC in the Management Directive 715 (MD-715) report and interviewed EEOC officials about their processes for collecting and analyzing these data. Specifically, we reviewed the promotion data that 17 selected agencies—including three departments within the Department of Defense—submitted to EEOC in the MD-715 report for fiscal years 2015-2017. [15] We selected these 17 agencies because they collectively employed about 95 percent of the federal workforce as of September 2018. At the time of our review, fiscal year 2017 data were the most recent data available.[16]

EEOC requires all federal agencies to annually submit the MD-715 report. Specifically, we reviewed Table A9 of the MD-715 report, which includes data on promotion rates for mission-critical occupations by gender and race and ethnicity, including the number of workers who applied for a

[15]These agencies were: Department of Agriculture, Department of Commerce, Department of Energy, Department of Health and Human Services, Department of Homeland Security, Department of Justice, Department of Labor, Department of the Interior, Department of Transportation, Department of Treasury, Department of Veterans Affairs, Environmental Protection Agency, National Aeronautics and Space Administration, Social Security Administration, and the following departments within the Department of Defense (DOD): Department of the Air Force, Department of the Army, and Department of the Navy. EEOC officials told us that DOD does not submit MD-715 data for DOD overall; rather, each of the three military departments and DOD's fourth estate organizations submit data separately. We reviewed MD-715 data for the Air Force, Army, and Navy, but we did not review MD-715 data for the fourth estate organizations, which include the Office of the Secretary of Defense, the Chairman of the Joint Chiefs of Staff, the Joint Staff, the DOD Inspector General, the defense agencies, and DOD field activities.

[16]EEOC officials said they granted federal agencies extensions on submitting data for fiscal year 2018 due to the government shutdown from December 2018 to January 2019.

promotion, were deemed qualified, and were selected.[17] The data provided includes all workers, workers by gender, and workers by race and ethnicity (specifically American Indian or Alaskan Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, and those who identify with two or more races/ethnicities).

We considered using MD-715 report data to analyze promotion rates by gender and race and ethnicity across the federal government, but we found that the data were not sufficiently reliable for our analysis because there were many instances of missing or incomplete data. We discuss this in detail in our report. As part of our assessment of the reliability of the MD-715 promotion data, we also reviewed documentation, interviewed and obtained information from agency officials responsible for the data, and tested the data for inaccuracies.

Review of Selected Literature on the Gender Pay Gap

We conducted a selective literature review to provide additional context for the results of our quantitative gender pay gap analyses. Specifically, we reviewed academic articles on factors that may help explain gender differences in pay. We focused our review especially on factors not included in our models due to limitations in available federal data.

We selected relevant literature through two processes. First, we consulted Blau and Kahn's (2017) original research and review article providing a broad summary of literature on factors contributing to the gender pay gap.[18] Second, to further consider potential factors, we consulted websites of two academic programs focused on gender research: Harvard Kennedy School of Government's Women and Public Policy Program and Stanford University's Clayman Institute for Gender

[17]EEOC uses the term "sex" in the MD-715 report. We chose to refer to this data as data on "gender," for consistency with the rest of this report. For fiscal years 2015 through 2017, EEOC required agencies to provide information on "major occupations," defined as those occupations that are mission related and heavily populated, relative to other occupations within the agency. Beginning in fiscal year 2019, EEOC required agencies to provide information on "mission-critical occupations," defined as those occupations without which the agency cannot fulfill its mission, which also tend to be the most heavily populated relative to other occupations within the agency and typically follow a career path to senior leadership positions. According to EEOC officials, they made this change to clarify the subset of included occupations for agencies, but the terms "major occupations" and "mission-critical occupations" are interchangeable.

[18]Francine D. Blau and Lawrence M. Kahn. 2017. "The Gender Wage Gap: Extent, Trends, and Explanations," *Journal of Economic Literature*, 55(3): 789-865.

Research.[19] Based on references and topics covered in the review article and gender program websites, we selected and reviewed articles that address some key factors that may influence gender pay disparities. We considered the overall impact of the article, assessed in part by citation counts, to focus our selection on relatively more recognized studies.

The selected studies include a range of key individual, organizational, and macro institutional factors that help explain the gender pay gap. While the articles we selected are not specific to the federal workforce, the factors they discuss are potentially relevant across professional contexts, including the federal workforce. Some factors may be more relevant for federal workers than others. As this literature selection is limited in scope, it does not consider all potential factors contributing to the pay gap. It also does not address all competing perspectives on a particular factor, though we developed a general understanding of multiple perspectives through the review article and the literature review sections of the additional articles.

We identified the following factors in the literature review that help explain the gender pay gap.

Differences in gender representation by occupation. First, some gender pay differences continue to reflect differences in the occupations in which men and women are employed.[20] As an example, women are underrepresented in some science, technology, engineering, and math (STEM) occupations, which pay more on average than other fields.[21] Furthermore, one randomized, double-blind study of academic STEM faculty found that subtle biases, rather than overt or intended sexism, may lead faculty to assess female students as less competent than male students. In turn, faculty recommended that female students receive

[19]Harvard Kennedy School of Government, Women and Public Policy Program, Gender Action Portal: https://gap.hks.harvard.edu/ (Accessed October 15, 2019); Stanford University, The Clayman Institute for Gender Research: https://gender.stanford.edu/ (Accessed October 15, 2019).

[20]Blau and Kahn, "The Gender Wage Gap," p.789-865.

[21]U.S. Bureau of Labor Statistics, Employment Projections, Employment in STEM occupations, Table 1.11 Employment in STEM occupations, 2018 and projected 2028 and U.S. Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey, Table 11 Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity, 2019.

lower salaries than male students for a laboratory manager position.[22] Faculty also indicated that they would offer less mentoring to female students than to male students, which the study's authors suggest could further contribute to STEM professionals' experiences and career trajectories. In contrast, women are disproportionately employed in occupations involving "care work"—such as teaching and health care—which pay less, on average, than other fields. A study of the 1982-1993 waves of the National Longitudinal Survey of Youth found a wage penalty for care work of between 5 to 6 percent relative to non-care work, controlling for other job characteristics and human capital factors.[23]

Parental status. Even within the same occupation, research shows that some gender differences in pay reflect differences in parental status. Both decisions on the part of employers and those on the part of employees, including applicants, can be shaped by various social and cultural factors and may contribute to gender differences by parental status.[24] Building on research which found that mothers earned lower wages than women without children, one study we reviewed examined potential mechanisms contributing to this pay disparity in a laboratory experiment that controlled for occupation.[25] Researchers found that evaluators rated hypothetical marketing job applicants who were mothers as less competent and committed than women who did not have children. In turn, they recommended mothers for hire less frequently and recommended that mothers receive lower starting salaries. Fathers, in contrast, received some advantages, with evaluators recommending they receive significantly higher starting salaries compared to men who did not have children. In a follow-up study, researchers submitted fictitious, yet realistic, resumes to real employers, and found that women who were not presented as mothers received over twice as many callbacks as similarly qualified mothers. In addition, another study we reviewed found that parental status contributes to a rising difference between men's and women's pay over the course of their careers, at least in some

[22]Corinne A. Moss-Racusin, et al. *Science faculty's subtle gender biases,* 16474-16479.

[23]Paula England, Michelle Budig, and Nancy Folbre. 2002. "Wages of Virtue: The Relative Pay of Care Work," *Social Problems* 49(4): 455-473.

[24]Blau and Kahn, "The Gender Wage Gap," p.789-865.

[25]Correll, et al. *Getting a Job,* 1297-1338.

professions.[26] Researchers found that, among other factors, gender differences in the number of career interruptions and weekly hours worked contributed to an increasing pay disparity between men and women who held master's degrees in Business Administration. Specifically, as compared to men, women experienced more career interruptions and worked fewer hours per week, which was largely associated with motherhood.

Salary negotiation. Some gender differences in pay may reflect the extent to which men and women negotiate starting salaries. For example, one study found that some women's reluctance to negotiate for higher pay could be explained by them correctly interpreting the social penalties for asking for higher pay.[27] While federal workers likely have fewer opportunities to negotiate pay than workers in other sectors, there may be gender differences for federal workers in the propensity to negotiate or how these negotiation efforts are received.

Organizational culture and pay structures. Organizational culture and compensation structures may affect pay by gender. Specifically, researchers have documented that many organizations now explicitly evaluate and theoretically reward workers based on performance. Performance-based evaluation and compensation structures are intended to reward performance without regard to gender and other demographic characteristics and, as a result, are often considered fairer than those structures that do not take performance into account. We have previously reported on the importance of transparent and performance-based compensation systems.[28] However, organizational cultures and performance-based compensation systems may disadvantage women with regards to pay. Using experimental methods, one study we reviewed found that when organizations emphasize meritocratic values such as equity and fairness when making performance-based compensation decisions, MBA students with work and managerial experience assigned

[26]Marianne Bertrand, Claudia Goldin, and Lawrence F. Katz. 2010. "Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors," *American Economic Journal: Applied Economics*, 2(3): 228-55.

[27]Hannah Riley Bowles, Linda Babcock, and Lei Lai. 2007. "Social Incentives for Gender Differences in the Propensity to Initiative Negotiations: Sometimes It Does Hurt to Ask," *Organizational Behavior and Human Decision Processes*, 103(1): 84-103.

[28]See *GAO, Results-Oriented Cultures: Modern Performance Management Systems Are Needed to Effectively Support Pay for Performance*, GAO-03-612T (Washington, D.C.: April 1, 2003).

higher bonuses to men than women, all other factors being equal. This phenomenon has been termed the "paradox of meritocracy."[29] The authors conclude that these findings should not deter the use of performance-based compensation systems, but rather highlight the difficulty of applying these systems in an objective way.

Overwork. Finally, broader institutional changes in the nature of work may also contribute to the gender pay gap. Cha and Weeden (2014) examine why the overall gender pay gap initially narrowed, but then stalled, between 1979 and 2009, despite many social and economic changes that have further narrowed the gap. During this time period, the prevalence of "overwork" (working 50 or more hours per week) as well as hourly wage returns for overwork increased. A greater proportion of men than women engaged in overwork during this period, which raised men's wages, calculated on an hourly basis, relative to women's wages. This contributed an estimated 10 percent increase in the overall pay gap, which offset other factors that narrowed the pay gap.[30]

We conducted this performance audit from February 2019 to December 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[29]Castilla and Benard, The Paradox of Meritocracy, 543-676.

[30]Youngjoo Cha and Kim A. Weeden. 2014. "Overwork and the Slow Convergence in the Gender Gap in Wages," *American Sociological Review*, 79(3): 457-84.

Appendix II: Descriptive Statistics, Statistical Methods, and Additional Results

This appendix provides descriptive statistics for the federal workers captured in the Enterprise Human Resources Integration (EHRI) data, describes the statistical methods we used to estimate differences in pay between men and women, and includes additional results of our analyses. As described in appendix I, the Office of Personnel Management (OPM) produces the EHRI data as a central source of administrative information regarding the federal workforce. We analyzed the EHRI status file data for the years 1999 through 2017, analyzing each year separately.

Descriptive Statistics

Table 2 shows descriptive statistics for men and women for the first and last years of our analysis. Specifically, it shows the distribution of characteristics we controlled for in our analysis to identify factors that explain differences in pay, and how those characteristics differ by gender. As the table shows, there has been a significant narrowing in the gap both in pay and in certain characteristics that can affect pay, although gaps remain.

Table 2: Descriptive Statistics for Selected EHRI Variables Used in Our Analysis, 1999 and 2017

	1999		2017	
	Women	**Men**	**Women**	**Men**
Number of federal employees in analysis		1,748,914		2,080,773
Percentage by gender	44.8%	55.2%	43.4%	56.6%
Salary				
Average annual adjusted salary	41,724	51,422	80,213	86,301
Percent difference between women's and men's average salaries		-18.9%		-7.1%
Median annual adjusted salary	36,832	47,728	73,874	79,496
Percent difference between women's and men's median salaries		-22.8%		-7.1%
Race and Ethnicity				
American Indian or Alaska Native	2.52%	1.83%	2.55%	1.72%
Asian, Native Hawaiian, or Pacific Islander	4.32%	4.54%	7.46%	6.82%
Black	23.73%	11.67%	25.16%	13.89%
Hispanic/Latina/Latino	6.22%	6.73%	8.28%	9.13%
White	63.21%	75.22%	56.56%	68.44%
Education				
Less than high school	1.48%	1.59%	0.67%	0.51%
High school diploma	30.67%	25.06%	22.43%	28.33%
Associate's degree/ Occupational training/ Some college	27.84%	22.51%	20.21%	18.16%

	1999		2017	
	Women	Men	Women	Men
Trade degree	4.94%	2.94%	3.61%	1.83%
Bachelor's degree	20.62%	27.84%	27.86%	28.36%
Master's degree/ Advanced certificate	7.03%	10.08%	17.28%	15.23%
Professional degree	2.24%	3.75%	3.85%	3.56%
Doctoral degree	1.16%	2.91%	3.87%	3.76%
Missing/Unknown	4.02%	3.33%	0.22%	0.25%
Occupation (PATCOB)				
Professional	20.94%	25.60%	30.45%	24.76%
Administrative	29.54%	31.18%	36.43%	38.34%
Technical	26.49%	14.03%	21.49%	13.71%
Clerical	19.01%	3.42%	8.04%	2.85%
Other white-collar	0.76%	4.34%	1.34%	5.76%
Blue-collar	3.26%	21.42%	2.25%	14.58%
Age				
16 to under 25	3.10%	2.01%	1.91%	1.91%
25 to under 35	15.77%	12.65%	15.97%	16.03%
35 to under 45	32.22%	27.49%	24.04%	23.63%
45 to under 55	34.97%	40.08%	29.47%	29.53%
55 to under 65	12.48%	15.77%	24.26%	23.55%
65 and over	1.45%	1.99%	4.35%	5.35%
Disability status				
Disability	5.89%	7.68%	9.13%	11.54%
No disability	90.81%	88.83%	87.91%	84.30%
Missing/unknown	3.30%	3.50%	2.96%	4.16%
Federal work experience (in years)				
0-4	17.97%	14.46%	22.97%	18.26%
5-9	14.84%	13.17%	21.83%	23.32%
10-14	21.26%	18.39%	16.70%	20.48%
15-19	17.37%	17.25%	11.81%	13.91%
20-24	13.76%	14.59%	6.48%	7.36%
25-29	9.35%	13.01%	8.99%	7.41%
30-34	4.47%	6.89%	7.09%	5.61%
35-39	0.79%	1.82%	3.03%	2.52%
40+	0.18%	0.42%	1.11%	1.11%
Average years of federal work experience	14.1	16.0	13.6	13.6

	1999		2017	
	Women	Men	Women	Men
Veteran status				
Veteran with preference in hiring	4.34%	40.98%	11.48%	37.30%
Veteran without preference in hiring	2.40%	7.71%	2.94%	7.62%
Not a veteran	93.27%	51.31%	85.58%	55.09%
Work schedule				
Full-time	88.74%	94.31%	91.99%	95.35%
Part-time	4.88%	1.78%	3.29%	1.60%
Other schedule	6.38%	3.91%	4.72%	3.06%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

Methods to Estimate Differences in Pay

To estimate the extent to which differences between men's and women's average pay were not explained by measurable factors that can affect pay, we employed statistical methods that enabled us to isolate differences based on gender from differences in factors related to pay. Specifically, we employed a decomposition analysis and a regression analysis (see below). Although the two analyses yielded similar results, we chose to focus on the decomposition analysis in our report because it enabled us to estimate not only the percentage of the pay gap that was unexplained by measurable factors, but also the percentages explained by individual factors.[1] To perform these analyses, we developed one main model, as well as four alternative models to better understand the degree to which different measures and combinations of key variables might impact our results (see below).

Decomposition Analysis

For this analysis, we performed a decomposition analysis that was substantially similar to our prior work on this topic.[2] In this decomposition analysis, we examined the difference in pay by gender using a method

[1]Because we are using the logarithm of the annual adjusted salary as the dependent variable, what we are decomposing is the average log point difference between women and men. We modified that estimate to more closely approximate a percent difference or salary gap, by taking its exponent and subtracting 1.

[2]See GAO, *Women's Pay: Gender Pay Gap in the Federal Workforce Narrows as Differences in Occupation, Education, and Experience Diminish*, GAO-09-279 (Washington, D.C.: Mar. 17, 2009).

referred to as "Oaxaca decomposition."[3] Using this approach, we decomposed the extent to which the difference between men's and women's wages was (a) explained because it could be attributed to different levels of characteristics that affect wages (like different levels of education for men and women) or (b) unexplained because it was based on different returns to characteristics (like different returns to being a college graduate for men and women). We performed this analysis for the federal workforce as a whole, as well as for subgroups of workers.

In order to construct the decomposition, we:

1. Estimated the following regressions separately for men and women.

(1) $\text{Ln}(\text{Annual Pay}_m)$	$= \alpha_m + \mathbf{x}_m * \beta_m + e_m$
(2) $\text{Ln}(\text{Annual Pay}_w)$	$= \alpha_w + \mathbf{x}_w * \beta_w + e_w$

$\mathbf{x}(.)$ is a vector of covariates for an individual employee, $\beta_{(.)}$ is a vector of parameters, and $e_{(.)}$ is a normally distributed random error term with mean zero.

2. Obtained the average levels of characteristics for both men and women.
3. Constructed the gaps by multiplying the average characteristics by the estimated coefficients:
   - Overall gap: $(\text{mean}(x_w) * \beta_w - \text{mean}(x_m) * \beta_m)$
     - This is the overall gap, and should be very close to the average difference in pay between men and women.
   - Explained gap: $(\text{mean}(x_w) * \beta_m - \text{mean}(x_m) * \beta_m)$
     - The gap which is explained by men and women having differing levels of characteristics that affect pay.
   - Unexplained gap: $(\text{mean}(x_w) * \beta_w - \text{mean}(x_w) * \beta_m)$

[3]See Ronald L. Oaxaca and Michael R. Ransom. "Identification in Detailed Wage Decompositions." The Review of Economics and Statistics, Vol. 81, No. 1 (Feb., 1999), pp. 154-157.

- This is known as the “unexplained gap” because it is the gap that is not explained by men and women having differing levels of characteristics that affect pay.

Regression Analysis

For this analysis, we performed a regression analysis similar to our prior work on this topic.[4] In the regression analysis, we estimated the wage differential after controlling for differences in characteristics of men and women associated with pay. We used the same regression specification as in the decomposition analysis; however, in this model we included both men and women, and estimated the unexplained gap using a dummy variable.

$$(1)\ \text{Ln(Annual Pay)} = \alpha + \beta^{*}(\text{female}) + \delta^{*}\mathbf{x}$$

In this model, “female” is a dummy variable that takes the value of one if the person is female and zero otherwise. The equation provides the estimated pay gap after controlling for characteristics of the individual.

Variables Included in Our Model

In general, the variables that we included in our main model were consistent with our prior work on this topic. As in our prior work, we re-analyzed the data using varying sets of explanatory variables to explore the effects of including or excluding certain variables or defining them differently, to address the possibility that the results from our main model could be changed by an alternate specification. Table 3 describes the specific variables included in our main model and alternative models. We used four alternative models.

1. **Including detailed occupation:** Rather than using PATCOB to capture occupation, we included a more detailed measure.[5] Specifically, we combined PATCOB and occupational family, which resulted in 38 occupational categories.
2. **Including supervisory status:** In addition to a more detailed measure of occupation, we included a variable indicating whether the worker was a supervisor or manager.

[4]See GAO-09-279.

[5]PATCOB includes six broad occupational categories: Professional, Administrative, Technical, Clerical, Other white-collar, and Blue-collar.

3. **Excluding work characteristics:** We excluded variables that were specific to the worker's current position, such as occupation, agency, work schedule, and bargaining unit status.
4. **Excluding demographic characteristics:** We excluded demographic variables, such as race and ethnicity, disability status, and veteran status.

Table 3: Variables Included in Our Main Model and Alternative Models

	Work characteristics	Worker characteristics	Demographic characteristics	Geography
Main model	Occupation (PATCOB)[a], agency, work schedule, and bargaining unit status	Federal work experience, educational degree attained, and age[b]	Race and ethnicity, disability status, and veteran status	State
Alternative models				
1. **Including detailed occupation:** Combined PATCOB and occupational family, which resulted in 38 occupational categories.	Occupation (PATCOB and occupational family), agency, work schedule, and bargaining unit status	Federal work experience, educational degree attained, and age	Race and ethnicity, disability status, and veteran status	State
2. **Including supervisory status:** In addition to a more detailed measure of occupation, included a variable indicating whether the worker was a supervisor or manager.	Supervisory status, occupation (PATCOB and occupational family), agency, work schedule, and bargaining unit status	Federal work experience, educational degree attained, and age	Race and ethnicity, disability status, and veteran status	State
3. **Excluding work characteristics:** Excluded variables that were specific to the worker's current position, such as occupation, agency, work schedule, and bargaining unit status.	None	Federal work experience, educational degree attained, and age	Race and ethnicity, disability status, and veteran status	State
4. **Excluding demographic characteristics:** Excluded demographic variables, such as race and ethnicity, disability status, and veteran status.	Occupation (PATCOB), agency, work schedule, and bargaining unit status	Federal work experience, educational degree attained, and age	None	State

Source: GAO. | GAO-21-67

[a]PATCOB includes six broad occupational categories: Professional, Administrative, Technical, Clerical, Other white-collar, and Blue-collar.

[b]We classified age as a worker characteristic rather than a demographic characteristic because our measure of work experience only includes federal work experience, and the age variable is likely be a proxy for non-federal work experience.

Results

Results from Main Model

Table 4 presents the pay gap results using our main model from 1999 through 2017, including results from both our decomposition and regression analyses.[6] The table presents four estimates of the pay gap for each year, including those that control for differences in men's and women's characteristics and those that do not. These results are presented in terms of average annual pay. We found similar results using median annual pay (see app. III). Due to challenges involving the estimation of error of decomposition estimates, we did not attempt to compute standard errors for estimates that were based on our decomposition methodology, such as the unexplained gap. Full coverage of the population of federal workers in the EHRI data eliminated sampling error as a component of the random residual variation in our models. Each year of regressions contained approximately 2 million observations. In addition, the underlying regressions explained about 70 to 80 percent of the differences in pay, and the underlying coefficients were statistically significant by a wide margin.

As the table shows:

- The difference in average pay is very close to the overall pay gap from our decomposition analysis, and both have diminished over time. Specifically, both of these unadjusted gaps, which do not control for additional factors, have diminished from about 19 percent in 1999 to 7 percent in 2017.
- The unexplained pay gaps from our decomposition and regression analyses have both narrowed over time, and show similar trends. Specifically, our decomposition analysis found that the unexplained pay gap has diminished from about 8 percent to about 6 percent. Similarly, our regression analysis found that the unexplained pay gap has diminished from about 9 percent to about 7 percent. Both of these gaps control for additional factors, as described above.

[6]As previously noted, we focused on the findings from our decomposition analysis in our report. The decomposition analysis enabled us to estimate not only the percentage of the pay gap that was unexplained by measurable factors, but also the percentages explained by individual factors.

Table 4: Percentage Difference in Women's Average Annual Pay Compared to Men's Average Annual Pay, 1999-2017

	Not controlling for factors		Controlling for factors	
Year	Overall pay gap (average pay)	Overall pay gap (decomposition analysis)	Unexplained pay gap (decomposition analysis)	Unexplained pay gap (regression analysis)
1999	-18.9%	-18.7%	-8.3%	-9.1%
2000	-18.1%	-17.9%	-8.4%	-9.2%
2001	-17.4%	-17.2%	-8.5%	-9.2%
2002	-15.9%	-15.5%	-8.1%	-9.0%
2003	-14.9%	-14.3%	-7.8%	-8.6%
2004	-13.9%	-13.4%	-7.5%	-8.4%
2005	-13.2%	-12.8%	-7.4%	-8.3%
2006	-12.5%	-12.2%	-7.3%	-8.1%
2007	-12.1%	-11.7%	-7.7%	-8.5%
2008	-11.5%	-11.1%	-7.1%	-8.0%
2009	-10.6%	-10.3%	-6.8%	-7.7%
2010	-10.2%	-9.9%	-6.7%	-7.7%
2011	-9.5%	-9.4%	-6.7%	-7.6%
2012	-9.2%	-9.0%	-6.8%	-7.7%
2013	-8.8%	-8.7%	-6.9%	-7.8%
2014	-8.1%	-8.0%	-6.7%	-7.6%
2015	-7.6%	-7.5%	-6.4%	-7.4%
2016	-7.3%	-7.3%	-6.3%	-7.3%
2017	-7.1%	-7.2%	-6.1%	-7.1%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

In addition to identifying the percentage of the pay gap that is unexplained by measurable factors, the decomposition methodology allows estimates of the percentage of the pay gap that is explained by each individual factor, or group of factors. Positive factors contribute to men earning more than women. A factor is positive when more men than women have a certain characteristic that tends to increase pay. Negative factors contribute to women earning more than men. A factor is negative when more women than men have a certain characteristic that tends to increase pay. For example, in 2017, education was a negative factor because women had higher levels of education than men. Table 5 shows the percentage of the pay gap explained by certain factors at three points

in time: 1999, 2009, and 2017. As shown in the table, the percentage of the pay gap explained by certain factors has shifted over time.

Specifically, we found that:

- The importance of occupation in explaining the pay gap has decreased. Occupation explained almost 32 percent of the gap in pay in 1999, and about 24 percent in 2009, but in 2017, it explained only about 7 percent of the gap.[7]
- The importance of agency in explaining the pay gap has increased. Agency explained about 5 percent of the gap in 1999, about 10 percent in 2009, and about 16 percent of the gap in 2017.[8]

Table 5: Extent to Which the Factors in Our Main Model Explained the Overall Pay Gap in 1999, 2009, and 2017

Factor	Percent contribution to the pay gap in 1999	Percent contribution to the pay gap in 2009	Percent contribution to the pay gap in 2017
Positive factors (contributed to men earning more than women)			
Agency	5.4	10.2	16.2
Race and ethnicity	5.7	10.2	14.3
Federal work experience	10.7	-1.8	9.6
Occupation[a]	31.6	23.8	6.9
Bargaining unit status	3.1	4.2	6.4
Work schedule	2.2	2.0	3.5
Age	3.5	0.2	0.2
Negative factors (contributed to women earning more than men)			
Veteran status	-12.7	-15.8	-30.0
Education	9.7	5.4	-6.6
Disability status	-0.4	-0.5	-2.2
State	-0.8	-2.8	-1.9
Total explained	**58.1**	**35.2**	**16.4**

[7]In our alternative model that defined occupation at a more detailed level (using 38 types of occupations), the percentage of the pay gap explained by occupation decreased from about 45 percent in 1999 to about 24 percent in 2017.

[8]In our alternative model that defined occupation at a detailed level, the percentage of the pay gap explained by agency increased from about 3 percent in 1999 to about 21 percent in 2017.

Factor	Percent contribution to the pay gap in 1999	Percent contribution to the pay gap in 2009	Percent contribution to the pay gap in 2017
Unexplained	41.9	64.8	83.6
Total	**100.0**	**100.0**	**100.0**

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: A factor is positive when more men than women have a certain characteristic that tends to increase pay. A factor is negative when more women than men have a certain characteristic that tends to increase pay. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

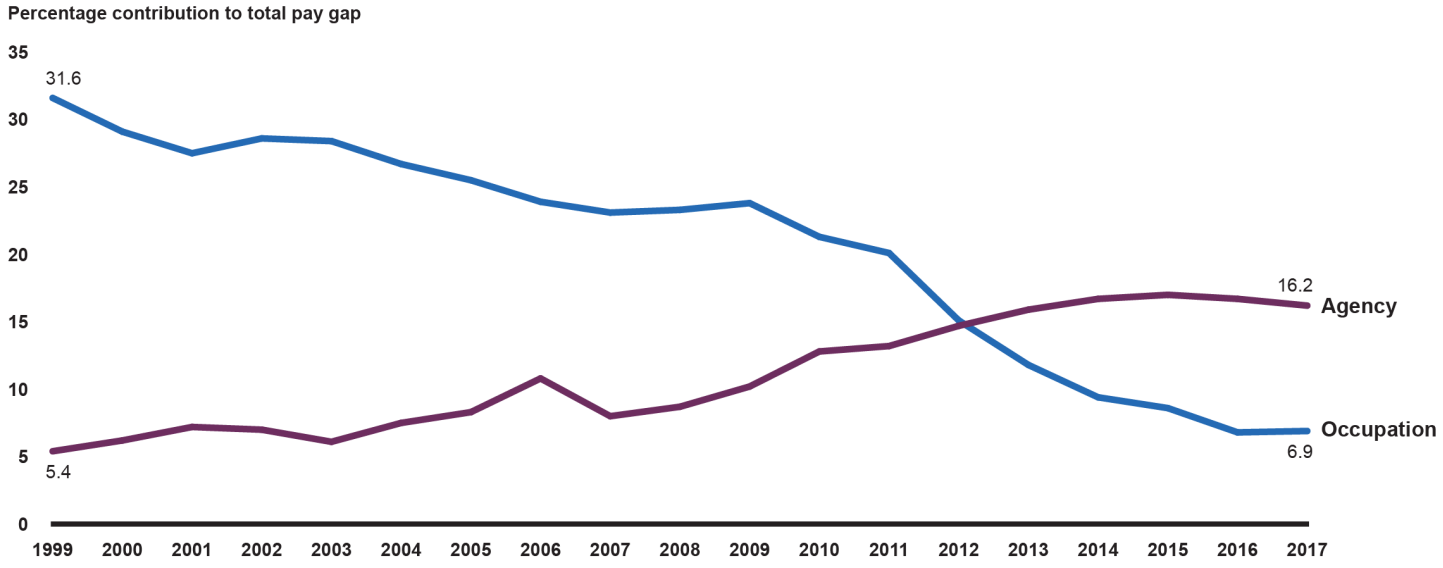
[a]Our main model controlled for occupation at a high level, using six broad types of occupations: Professional, Administrative, Technical, Clerical, Other white-collar, and Blue-collar.

While this analysis shows which factors contribute the most to the pay gap, these results should be interpreted with the following caveats:

1. The percentages in the table above refer to the percentage of the overall pay gap explained by each individual factor. However, since the overall pay gap has declined, an increasing percentage over time does not necessarily imply that the effect of a factor has increased in absolute value. For example, in percentage point terms, veteran status explained about 2.6 points in 1999, and about 2.3 points in 2017. However, since the overall gap decreased from about 19 percent to about 7 percent over that time period, the percentage of the pay gap explained by veteran status increased from 13 percent to 30 percent, in absolute terms.
2. We estimated the importance of the factors in explaining the pay gap in a multi-variable setting where all of the factors were included at the same time. The estimated coefficient of a factor varies depending on what other variables are included in the model at the same time. For example, in the alternate model where we did not control for occupation, the percentage of the pay gap explained by race and ethnicity changed from 14 percent to 24 percent in 2017.
3. The precise specification of variables affects the estimated coefficients. For example, in the model that defined occupation at a more detailed level, the percentage of the pay gap explained by occupation increased from 7 percent to 24 percent in 2017 (although the trend in the importance of occupation over time was consistent). See table 7.
4. Finally, while the table above indicates three points in time, the actual change in percentage happened at different times during the period. Figure 12 shows the percentage of the pay gap that was explained by

occupation and agency in each year of our study, and shows that the change occurred somewhat gradually over this 19-year period. An explanation for the trend in occupation is that men and women are becoming more similar in PATCOB occupational categories. For example, we estimated that the percentage of men in the lowest-paid PATCOB occupations (clerical, blue-collar, and technical) in 2017 was the same as the percentage of women—about 30 percent. A partial explanation for the trend in agency is that men and women are becoming less similar in the agencies at which they work. For example, in the decomposition methodology, this has the effect of increasing the power of agency in explaining differences in pay.

Figure 12: Change Over Time in the Extent to Which Occupation and Agency Explain the Pay Gap (Main Model), 1999-2017



Source: GAO analysis of the Office of Personnel Management's Human Resources Integration data. | GAO-21-67

Note: Our main model controlled for occupation at a high level (using six broad types of occupations) and controlled for agency using 25 agency categories.

Results from Alternative Models

As shown in table 6, all four alternative models that control for different sets of factors show that the unexplained pay gap declined over this 19-year period. However, compared to the other three alternative models, the unexplained pay gap was higher in the model that excludes work characteristics, such as occupation. For a list of the variables we included in each of our models, see table 3.

Table 6: Unexplained Pay Gap by Model, Including Main Model and Alternative Models, 1999-2017

Year	Main model	Alternative model 1: Including detailed occupation	Alternative model 2: Including supervisory status	Alternative model 3: Excluding work characteristics	Alternative model 4: Excluding demographic characteristics
1999	-8.3%	-6.2%	-5.8%	-13.1%	-6.5%
2000	-8.4%	-6.2%	-5.8%	-12.7%	-6.7%
2001	-8.5%	-6.2%	-5.8%	-12.4%	-6.9%
2002	-8.1%	-6.2%	-5.6%	-11.8%	-6.7%
2003	-7.8%	-6.1%	-5.6%	-11.2%	-6.4%
2004	-7.5%	-5.8%	-5.4%	-11.0%	-6.2%
2005	-7.4%	-5.8%	-5.3%	-10.9%	-6.3%
2006	-7.3%	-5.7%	-5.3%	-10.6%	-6.2%
2007	-7.7%	-5.7%	-5.3%	-10.6%	-6.5%
2008	-7.1%	-5.3%	-4.9%	-9.9%	-6.1%
2009	-6.8%	-5.0%	-4.6%	-9.7%	-5.8%
2010	-6.7%	-4.9%	-4.5%	-9.5%	-5.6%
2011	-6.7%	-4.9%	-4.5%	-9.4%	-5.5%
2012	-6.8%	-4.9%	-4.5%	-9.4%	-5.6%
2013	-6.9%	-4.8%	-4.4%	-9.3%	-5.6%
2014	-6.7%	-4.7%	-4.3%	-9.1%	-5.3%
2015	-6.4%	-4.5%	-4.1%	-8.8%	-5.0%
2016	-6.3%	-4.3%	-4.0%	-8.6%	-4.8%
2017	-6.1%	-4.2%	-3.9%	-8.3%	-4.6%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

Table 7 describes the extent to which the factors we used in our main model explained the overall pay gap in each of our models, including our four alternative models, in 2017.

Table 7: Extent to Which the Factors in Our Main Model Explained the Overall Pay Gap in Each of Our Models, 2017

	Percent contribution to the overall pay gap				
Factor	**Main model**	**Alternative model 1: Including detailed occupation**	**Alternative model 2: Including supervisory status**	**Alternative model 3: Excluding work characteristics**	**Alternative model 4: Excluding demographic characteristics**
Positive factors in main model (contributed to men earning more than women)					
Agency	16.2	20.9	19.9	Not included	19.4
Race and ethnicity	14.3	11.7	11.7	23.7	Not included
Federal work experience	9.6	9.9	9.8	12.9	8.5
Occupation	6.9	24.4	24.1	Not included	7.7
Bargaining unit status	6.4	6.2	4.0	Not included	6.6
Work schedule	3.5	5.5	5.2	Not included	2.9
Age	0.2	0.0	0.0	-0.7	0.1
Negative factors in main model (contributed to women earning more than men)					
Veteran status	-30.0	-25.7	-24.7	-29.1	Not included
Education	-6.6	-5.9	-5.8	-11.9	-7.0
Disability status	-2.2	-1.5	-1.4	-3.8	Not included
State	-1.9	-2.6	-2.8	-6.0	-1.4
Factors that were not included in main model					
Supervisory status	Not included	Not included	7.6	Not included	Not included
Total explained	**16.4**	**43.1**	**47.6**	**-15[a]**	**36.8**
Unexplained	83.6	56.9	52.5	115[a]	63.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: With respect to occupation, alternative models 1 and 2 included a detailed measure of occupation (38 occupational categories), alternative model 3 did not include occupation, and alternative model 4 included a broad measure of occupation (6 occupational categories). A factor is positive when more men than women have a certain characteristic that tends to increase pay. A factor is negative when more women than men have a certain characteristic that tends to increase pay.

[a]This model excluded work characteristics, all of which were positive factors that decreased the pay gap in our main model. As a result, the factors included in this model collectively increased the overall pay gap by 15 percent (or had a negative effect of 15 percent). Furthermore, because the set of factors included in this model had relatively less power to close the pay gap than the sets of factors we used in other models, the unexplained pay gap was greater than the overall pay gap.

Analysis of Growth in Pay (Pay Increase Analysis)

We estimated the average and median growth in annual adjusted pay from one year to the next, by estimating the percentage change in individuals' pay, and then estimating the average and median differences

in these pay increases between men and women.[9] We also attempted to investigate the extent to which gender differences in pay increases might be explained by measurable factors, by applying the same variables as in our analysis of differences in pay. We found that a much smaller share of the gender differences in pay increases was explained by measurable factors in 2017—only about 15 percent of these differences was explained by these factors, compared to about 74 percent of the gender differences in pay.

[9]For the purposes of this analysis, pay increases for men and women included the total annual adjustment that all federal workers often receive, as well as increases due to promotions and performance (including step increases under the General Schedule (GS) system).

Appendix III: Overall Pay Gap in Average Pay, Median Pay, and Other Pay Percentiles, 1999-2017

Table 8 below shows the overall pay gap between men and women in the federal workforce from 1999 through 2017, measured in terms of average annual pay, median annual pay, and other pay percentiles. For example, the gap at the 10th percentile of pay reflects the percent difference between the 10th percentile of women's pay and the 10th percentile of men's pay. These measures do not control for factors.

Table 8: Overall Pay Gap between Men and Women in the Federal Workforce (Percentage Difference in Women's Annual Pay Compared to Men's Annual Pay), 1999-2017

Year	Gap in average pay	Gap in median pay	Gap at the 10th percentile of pay	Gap at the 25th percentile of pay	Gap at the 75th percentile of pay	Gap at the 90th percentile of pay
1999	-18.9%	-22.8%	-15.4%	-18.9%	-18.4%	-20.0%
2000	-18.1%	-21.6%	-14.9%	-18.3%	-18.3%	-20.1%
2001	-17.4%	-20.3%	-14.7%	-17.4%	-17.9%	-19.1%
2002	-15.9%	-18.2%	-9.4%	-15.6%	-16.9%	-17.7%
2003	-14.9%	-16.9%	-6.4%	-14.0%	-16.0%	-16.4%
2004	-13.9%	-15.6%	-6.9%	-13.1%	-15.0%	-15.5%
2005	-13.2%	-14.4%	-8.1%	-13.0%	-14.3%	-14.8%
2006	-12.5%	-13.5%	-9.0%	-12.4%	-13.5%	-12.8%
2007	-12.1%	-12.3%	-9.2%	-11.5%	-12.5%	-13.6%
2008	-11.5%	-11.3%	-9.4%	-11.6%	-11.4%	-12.8%
2009	-10.6%	-10.3%	-8.8%	-11.0%	-10.4%	-12.1%
2010	-10.2%	-10.5%	-8.6%	-10.7%	-9.8%	-11.8%
2011	-9.5%	-10.1%	-8.3%	-10.2%	-9.3%	-11.0%
2012	-9.2%	-9.8%	-7.7%	-10.1%	-9.3%	-10.4%
2013	-8.8%	-9.2%	-7.2%	-9.6%	-8.6%	-9.6%
2014	-8.1%	-8.4%	-6.2%	-9.1%	-7.8%	-9.1%
2015	-7.6%	-7.8%	-6.0%	-8.8%	-7.1%	-8.3%
2016	-7.3%	-7.4%	-6.5%	-8.9%	-6.6%	-7.9%
2017	-7.1%	-7.1%	-7.2%	-9.3%	-6.2%	-7.6%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

Appendix IV: Overall and Unexplained Pay Gaps by Agency

Table 9 shows the overall and unexplained pay gaps between men and women employed by each of the 24 Chief Financial Officers (CFO) Act agencies in 2017.[1] Specifically, it shows several measures of the pay gap for each agency, including the overall gaps in average and median pay (which do not control for factors that affect pay), and the overall and unexplained gaps estimated by our regression and decomposition analyses (the unexplained gaps reflect controls for factors that affect pay). We estimated these results using our main model; for a description of our main model, see appendix II.[2] In our report, we chose to focus on the unexplained pay gap estimated by our decomposition analysis. In addition, table 8 presents the percentage of women employed by each agency, as well as the percentage of the federal workforce that the agency represented, in 2017.

Our analysis could not determine the reasons for these differences in the pay gap across federal agencies. For example, differences in the unexplained pay gap across agencies may be due to factors that we did not or could not measure. In addition, the size of an agency's pay gap does not necessarily reflect the extent to which it has taken steps to reduce the pay gap. It is also important to note that the existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[1]The 24 agencies are those identified in the Chief Financial Officers (CFO) Act of 1990, 31 U.S.C. § 901(b), and are generally the largest federal agencies.

[2]In addition to our main model, we also estimated the unexplained gap controlling for detailed occupation for each agency. Of the 25 agencies we examined (the 24 CFO Act agencies, plus the remaining employees grouped together), our analysis found that including detailed occupation reduced the unexplained gap for 23 of the agencies, but in all cases there still remained an unexplained gap. Of the agencies for which the unexplained gap was reduced, the average and median reduction was about 1 percentage point. The largest reductions were for the Department of Defense and the Department of Transportation, with reductions of about 4 percentage points each (about 40 percent and 34 percent of the gap under our main model, respectively).

Table 9: Overall and Unexplained Pay Gaps between Men and Women Employed by Chief Financial Officers (CFO) Act Agencies, 2017

	Not controlling for factors			Controlling for factors		Other	
Agency	Overall pay gap (average pay)	Overall pay gap (median pay)	Overall pay gap (decomposition analysis)	Unexplained pay gap (regression analysis)	Unexplained pay gap (decomposition analysis)	Percent women	Percent of federal workforce
Agency for International Development	-4.1%	-6.9%	-4.3%	-1.4%	-2.1%	53.7%	0.17%
Dept. of Agriculture	1.9%	2.4%	3.2%	-3.3%	-3.6%	42.5%	4.46%
Dept. of Commerce	-21.1%	-24.6%	-25.2%	-5.0%	-5.1%	45.2%	2.29%
Dept. of Defense	-7.6%	-4.7%	-8.8%	-9.9%	-9.9%	32.8%	35.07%
Dept. of Education	-4.7%	-5.1%	-4.1%	-2.4%	-2.1%	62.7%	0.19%
Dept. of Energy	-6.6%	-5.0%	-7.2%	-8.6%	-9.4%	36.6%	0.70%
Dept. of Health and Human Services	-9.3%	-7.0%	-9.0%	-4.8%	-4.3%	60.6%	4.07%
Dept. of Homeland Security	-9.6%	-20.6%	-11.9%	-3.5%	-3.3%	34.0%	9.51%
Dept. of Housing and Urban Development	-6.5%	-6.7%	-6.8%	-3.7%	-4.3%	58.9%	0.38%
Dept. of the Interior	-2.7%	-1.8%	-2.4%	-4.0%	-3.6%	40.2%	3.23%
Dept. of Justice	-3.0%	-3.8%	-3.3%	-6.3%	-6.5%	39.0%	5.56%
Dept. of Labor	-4.0%	-0.8%	-5.3%	-3.3%	-4.0%	48.3%	0.72%
Dept. of State	-9.4%	-11.4%	-9.6%	-4.4%	-4.5%	53.4%	0.58%
Dept. of Transportation	-8.5%	-10.1%	-9.6%	-9.9%	-11.0%	26.1%	2.62%
Dept. of Treasury	-17.8%	-30.3%	-18.1%	-4.8%	-4.3%	60.9%	4.20%
Dept. of Veterans Affairs	-9.9%	7.0%	-2.1%	-4.9%	-3.8%	59.8%	18.25%
Environmental Protection Agency	-5.9%	-5.2%	-6.7%	-3.0%	-3.5%	51.1%	0.72%
General Services Administration	-2.1%	-0.9%	-2.3%	-4.8%	-4.9%	46.5%	0.55%
Non-CFO Act agencies[a]	-8.5%	-12.3%	-8.1%	-7.4%	-7.0%	49.3%	2.16%
National Aeronautics and Space Administration	-8.6%	-10.7%	-9.4%	-5.4%	-5.9%	34.2%	0.83%
National Science Foundation	-17.2%	-24.2%	-19.8%	-3.6%	-5.0%	60.7%	0.07%
Nuclear Regulatory Commission	-16.6%	-16.4%	-19.6%	-4.0%	-5.0%	39.2%	0.15%
Office of Personnel Management	-6.1%	-3.9%	-6.5%	-4.4%	-5.2%	57.1%	0.26%
Small Business Administration	-9.3%	-13.4%	-9.7%	-4.3%	-4.4%	52.0%	0.25%

Agency	Not controlling for factors			Controlling for factors		Other	
	Overall pay gap (average pay)	Overall pay gap (median pay)	Overall pay gap (decomposition analysis)	Unexplained pay gap (regression analysis)	Unexplained pay gap (decomposition analysis)	Percent women	Percent of federal workforce
Social Security Administration	-6.3%	-3.6%	-4.2%	-3.1%	-3.0%	64.8%	2.99%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: Our analysis did not establish a causal relationship between the percentage of women and the size of the unexplained pay gap at federal agencies. The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[a]The Non-CFO Act agencies are the other federal agencies that are captured in the Office of Personnel Management's Enterprise Human Resources Integration data but are not among the 24 agencies identified in the Chief Financial Officers (CFO) Act of 1990, 31 U.S.C. § 901(b), which generally are the largest federal agencies.

Appendix V: Overall and Unexplained Pay Gaps by Subgroups, 2017

Table 10 shows the overall and unexplained pay gaps for various subgroups of federal workers in 2017. Specifically, it shows the percentage difference in women's annual pay, compared to men's annual pay, including results from our decomposition and regression analyses. We estimated these results using our main model; for a description of our main model, see appendix II.

Table 10: Overall and Unexplained Pay Gaps between Men and Women in the Federal Workforce, by Subgroups (Percentage Difference in Women's Annual Pay Compared to Men's Annual Pay), 2017

		Not controlling for factors			Controlling for factors	
Factor	**Sub-group**	**Overall pay gap (average pay)**	**Overall pay gap (median pay)**	**Overall pay gap (decomposition analysis)**	**Unexplained pay gap (regression analysis)**	**Unexplained pay gap (decomposition analysis)**
Total	**N/A**	**-7.1%**	**-7.1%**	**-7.2%**	**-7.1%**	**-6.1%**
Race/ ethnicity (compared to White men)	American Indian or Alaska Native	-28.4%	-34.2%	-28.4%	-11.0%	-11.7%
	Asian, Native Hawaiian, or Pacific Islander	4.2%	6.2%	2.4%	-4.5%	-4.2%
	Black	-17.0%	-18.5%	-16.7%	-12.5%	-11.8%
	Hispanic/Latina	-18.6%	-19.5%	-18.4%	-9.4%	-9.1%
	White	-7.3%	-6.4%	-7.7%	-7.7%	-7.1%
Race/ ethnicity (compared to men of own race/ ethnicity)	American Indian or Alaska Native	-12.5%	-14.3%	-11.5%	-6.7%	-4.9%
	Asian, Native Hawaiian, or Pacific Islander	-3.0%	-0.8%	-3.2%	-7.1%	-6.9%
	Black	1.3%	3.7%	1.8%	-5.5%	-4.4%
	Hispanic/Latina	-5.9%	-10.6%	-6.6%	-6.2%	-5.4%
	White	-7.3%	-6.4%	-7.7%	-7.7%	-7.1%
Education	Less than high school	8.6%	-3.4%	3.1%	-7.0%	0.9%
	High school diploma	-7.2%	-11.0%	-8.7%	-8.1%	-6.8%
	Associate's degree/ Occupational training/Some college	-6.7%	-9.1%	-6.6%	-7.4%	-5.9%
	Trade degree	-10.6%	-15.0%	-10.3%	-7.6%	-5.0%
	Bachelor's degree	-7.7%	-8.8%	-8.1%	-5.3%	-4.2%
	Master's degree/ Advanced Certificate	-9.3%	-9.8%	-9.6%	-4.7%	-3.1%
	Professional	-12.2%	-9.0%	-11.5%	-5.9%	-5.5%
	Doctoral degree	-9.1%	-8.6%	-9.2%	-4.2%	-4.2%
	Missing/Unknown/ Did not state	1.2%	-0.4%	0.9%	-3.0%	-2.9%

		Not controlling for factors			Controlling for factors	
Factor	Sub-group	Overall pay gap (average pay)	Overall pay gap (median pay)	Overall pay gap (decomposition analysis)	Unexplained pay gap (regression analysis)	Unexplained pay gap (decomposition analysis)
Occupation (PATCOB)	Professional	-12.3%	-13.0%	-12.0%	-6.9%	-7.1%
	Administrative	-4.4%	-5.0%	-4.5%	-7.5%	-7.3%
	Technical	-10.0%	-3.2%	-7.4%	-8.2%	-7.4%
	Clerical	6.3%	5.9%	5.6%	1.8%	2.5%
	Other white-collar	-16.2%	-17.5%	-18.7%	-3.4%	-3.3%
	Blue-collar	-18.1%	-19.5%	-19.3%	-10.5%	-10.8%
Age	16 to under 25	-8.2%	-10.7%	-8.1%	-2.1%	-0.9%
	25 to under 35	-1.7%	-1.6%	-3.1%	-3.1%	-2.1%
	35 to under 45	-3.2%	-4.1%	-4.6%	-5.9%	-5.1%
	45 to under 55	-6.5%	-6.8%	-7.2%	-7.7%	-6.8%
	55 to under 65	-11.1%	-12.9%	-10.6%	-8.2%	-7.3%
	65 and over	-17.6%	-20.0%	-15.5%	-7.8%	-7.2%
Bargaining unit status	In a union	-3.5%	-0.5%	-3.3%	-5.8%	-4.4%
	Eligible but not in a union	-12.0%	-13.9%	-13.3%	-8.1%	-7.6%
	Ineligible to be in a union	-7.0%	-6.3%	-8.1%	-8.2%	-8.1%
Disability status	Disability	-6.1%	-7.7%	-5.6%	-5.5%	-4.5%
	No disability	-7.7%	-7.1%	-8.1%	-7.4%	-6.3%
	Missing, unknown, or declined to state	-4.5%	-5.6%	-4.6%	-5.3%	-4.7%
Federal work experience (in years)	0-4	-6.7%	-6.9%	-6.0%	-6.2%	-5.0%
	5-9	-3.3%	-2.8%	-3.2%	-6.7%	-5.7%
	10-14	-4.0%	-4.3%	-4.5%	-6.9%	-5.8%
	15 -19	-5.2%	-6.2%	-5.9%	-7.0%	-6.2%
	20-24	-7.3%	-8.7%	-8.1%	-7.6%	-7.4%
	25-29	-11.9%	-13.8%	-12.3%	-7.6%	- 7.2%
	30-34	-12.8%	-15.5%	-12.9%	-8.1%	-7.6%
	35-39	-10.3%	-9.4%	-9.6%	-8.2%	-7.4%
	40 +	-11.2%	-11.0%	-10.2%	-7.6%	-6.8%
Region	East North Central	-11.0%	-10.4%	-10.6%	-7.4%	-6.2%
	East South Central	-13.3%	-12.9%	-12.2%	-8.8%	-7.3%
	Middle Atlantic	-8.7%	-9.9%	-8.4%	-6.3%	-5.4%
	Mountain	-8.8%	-11.6%	-9.0%	-6.7%	-5.4%
	New England	-5.8%	-4.8%	-5.5%	-6.4%	-5.0%
	Outside the 50 states[a]	-12.2%	-11.6%	-15.8%	-7.6%	-8.2%

		Not controlling for factors			Controlling for factors	
Factor	Sub-group	Overall pay gap (average pay)	Overall pay gap (median pay)	Overall pay gap (decomposition analysis)	Unexplained pay gap (regression analysis)	Unexplained pay gap (decomposition analysis)
	Pacific	-3.9%	-5.1%	-4.6%	-6.3%	-5.2%
	South Atlantic	-5.9%	-6.8%	-5.7%	-6.8%	-6.1%
	West North Central	-11.7%	-11.1%	-10.6%	-6.3%	-4.8%
	West South Central	-8.8%	-10.3%	-9.3%	-7.5%	-6.1%
Supervisory status	Manager/supervisor	1.4%	2.3%	1.8%	-5.7%	-5.5%
	Not a manager/ supervisor	-6.2%	-5.7%	-6.2%	-7.0%	-5.9%
Veteran status	Veteran with preference in hiring	-8.2%	-9.9%	-8.2%	-6.2%	-5.7%
	Veteran without preference in hiring	-12.2%	-12.5%	-12.0%	-7.5%	-6.6%
	Not a veteran	-11.9%	-11.5%	-11.5%	-7.5%	-7.1%
Work schedule	Full-time	-6.1%	-5.7%	-6.1%	-6.8%	-5.8%
	Part-time	-18.0%	43.5%	-3.2%	-5.7%	-2.9%
	Other schedule	-15.6%	-14.1%	-13.7%	-6.8%	-6.9%
Other	Senior Executive Service (SES)	-0.2%	0.2%	-0.2%	-0.4%	-0.4%

Source: GAO analysis of the Office of Personnel Management's Enterprise Human Resources Integration (EHRI) data. | GAO-21-67

Note: The existence of a pay gap, taken alone, does not establish whether unlawful discrimination has occurred.

[a]This category included records that were missing data for the state, and therefore could not be assigned to a region.

Appendix VI: The Office of Personnel Management's (OPM) Strategy for Advancing Pay Equality in the Federal Government

Table 11 lists the elements of OPM's strategy for advancing pay equality in the federal government, as well as OPM's related actions.[1] As noted in the report, OPM was required to develop this strategy by a 2013 Presidential Memorandum, and OPM officials told us that they completed all activities supporting this strategy between 2014 and 2016.[2]

Table 11: The Office of Personnel Management's (OPM) Strategy for Advancing Pay Equality in the Federal Government and OPM's Related Actions

Elements of OPM's Strategy on Advancing Pay Equality in the Federal Government	OPM's Related Actions
Issue Area 1: Analysis of whether changes to the General Schedule (GS) classification system would assist in addressing any gender pay gap.	
1. OPM will work with agencies to review their internal classification policies and application of the GS classification system in compliance with the principle of equal pay for substantially equal work.	According to OPM officials: • In 2014, OPM held an Interagency Classification Policy Forum with federal agencies to identify agency needs, including guidance and training on applying the GS classification system, and identify gender pay gap issues as they pertain to classification practices. • In 2015, OPM briefed agencies on the results of the prior session and identified areas for future exploration, including gender disparities across occupations. • In 2015, OPM completed efforts to partner with agencies to review their internal classification policies and application of the GS classification system. • In 2016, OPM gave presentations to multiple agencies on the importance of collaboration between Human Resources and Hiring Managers during the hiring process.
Issue Area 2: Proposed guidance to agencies to promote greater transparency regarding starting salaries.	
2. OPM will work with agencies to ensure GS equivalent-level salary tables or rate ranges are made available to job candidates.	• In 2014, OPM officials worked with agencies to ensure that salary tables or rate ranges outside of the General Schedule were posted on their websites, including asking agencies to certify that they had done so.
3. OPM will explore ways to ensure pay-setting options and other salary information is made readily available to job candidates.	• In 2015, OPM posted answers to frequently asked questions about how pay is set for new hires on USAJOBS for job candidates.

[1]See OPM, *Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014.

[2]See *Presidential Memorandum—Advancing Pay Equality in the Federal Government and Learning from Successful Practices*, The White House, May 10, 2013.

Elements of OPM's Strategy on Advancing Pay Equality in the Federal Government	OPM's Related Actions
Issue Area 3: Recommendations for additional administrative or legislative actions or studies.	
4. OPM will work with agencies to clarify the range of GS pay-setting flexibility and share best practices on setting starting salaries in gender-neutral ways.	• In 2013, OPM collected information from agencies on their pay-setting and promotions policies and practices as a starting point for identifying and developing guidance, and found that some agencies were relying on existing salary alone to set pay above the minimum rate for new hires. • In 2015, OPM revised its fact sheet on the General Schedule superior qualifications and special needs pay-setting authority to remind agencies that existing salary is only one factor an agency may use when setting pay under this authority.
5. OPM will develop guidance for agencies to conduct their own gender data analyses, review their starting salary trends and use of pay-setting flexibilities, and review their promotion data to determine if gender equity issues are apparent so that they can develop approaches to address any issues.	• In 2015, OPM issued guidance to agencies recommending that they conduct their own gender pay gap analyses. This guidance included information about how OPM conducted its own analysis, and encouraged agencies to develop plans for conducting ongoing data analysis and measuring progress in closing any gender pay gaps. OPM officials said they gave further guidance and technical assistance to agencies that requested it, including sharing detailed information about OPM's own analysis methods.
6. OPM will explore the need to conduct additional government-wide statistical analyses to obtain a better understanding of gender pay trends for specific categories of employees not covered by OPM's initial analysis.	• After issuing the 2014 report, OPM officials said they conducted additional data analysis, including regression analyses that examined the gender pay gap for blue-collar and part-time workers.
7. OPM will work with agencies to share best practices and develop recruitment and outreach strategies for growing female populations in occupations where they are underrepresented, such as science, technology, engineering, and mathematics (STEM) occupations, non-traditional, supervisory, and managerial jobs.	According to OPM officials: • In 2014, OPM held webinars focused on recruiting and hiring women, such as webinars on Women in STEM and women in leadership positions. In 2014 and 2015, OPM staff also participated in the development of a Women Veterans Workgroup. • Between 2014 and 2016, OPM provided presentations and held panels with minority professional organizations, colleges and universities, and other organizations, and created multiple videos related to obtaining federal employment. • Starting in 2015 and continuing to the present, OPM has held sessions for college and university students on topics such as navigating USAJOBS, preparing federal resumes, and interviewing skills. • In 2016, OPM held three cyber talent summits, which focused on challenges and solutions for hiring cybersecurity professionals.
8. OPM will work with agencies to share best practices and develop guidance for when to consider work schedule changes to part-time.	• In 2014 and 2015, according to OPM officials, OPM provided guidance on part-time employment policies and practices through several workplace and work/life flexibility initiatives. In 2015, OPM issued two handbooks on leave and workplace flexibilities for childbirth, childcare, and elder care.

Sources: GAO analysis of OPM documentation (*Governmentwide Strategy on Advancing Pay Equality in the Federal Government*, April 2014) and information provided by OPM officials. | GAO-21-67

Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

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