Beyond the War: Public Service and the Transmission of Gender Norms*

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Abstract

This paper combines personnel records of the U.S. federal government with census data to study how shocks to the gender composition of an organization can persistently shift the gender norms of its workers. We exploit city-by-department variation in the sudden expansion of female clerical employment driven by America's entrance into World War I, and find that daughters of civil servants exposed to female co-workers are more likely to work later in life, command higher income, and have fewer children. The effects are driven by exposed fathers and daughters in their teenage years at the time of exposure. We also show that cities exposed to a larger increase in female federal workers saw persistently higher female labor force participation in the public sector, as well as modest increases in private sector labor force participation. Collectively, the results are thus consistent with both the vertical and horizontal transmission of gender norms, and highlight how increasing gender representation within an organization can have broader labor market implications.

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1 Introduction

Outcome gaps by gender remain widespread despite significant progress (Goldin, 2006). A growing literature has documented the importance of gender norms in shaping differences in labor supply and occupational choice (Alesina et al., 2013; Giuliano, 2021). While these norms can be deeply rooted and persistent, policy design requires a better understanding of how such norms have shifted over time. Despite this, micro-level evidence on how temporary labor market shocks can persistently shape gender norms remains limited.

In this paper, we study how gender norms can persistently shift in response to sudden shocks to the gender composition of an organization. We do so by documenting the long-term effects on gender norms brought about by World War I (henceforth, WWI) and the sudden increase in female workers within the nation's largest employer, the U.S. federal government.[1] This period of wartime mobilization witnessed increased demand for civilian labor throughout the bureaucracy, including new openings for stenographers, typewriters, and other clerical positions (Smith, 1928). Moreover, because mobilization occurred against the backdrop of an emerging female clerical workforce (Goldin, 1990), new openings for government workers were for the first time disproportionately filled by female workers (Gavin, 1997). From 1917–1919, the share of female civil servants more than doubled in the federal workforce (Figure 1). In addition to providing new economic opportunities for women, the influx of new civil servants exposed incumbent (predominantly male) workers to female co-workers, often for the first time.[2] Moreover, even after WWI ended, women played an increasingly prominent role in government work (Figure A1).

To study the effects of WWI on gender norms, we use the U.S. Official Registers, which allow us to construct a rich personnel dataset of the near-universe of federal government workers for 1913–1921. These biennial records provide detailed information on the city and departments where civil servants worked, allowing us to construct a granular measure of gender composition at the city-by-department level (*office-level*). Using precise measures of gender composition for city-level department offices, we study how gender norms for incumbent civil servants change in response to exogenous wartime increases in the presence of female co-workers.

To test for the transmission of gender norms to children of civil servants affected by this sudden change in gender composition, we link our personnel records to the US full count population census rounds for 1900–1940. We can then measure long-term changes in gender norms by observing gender gaps in outcomes among children of exposed vs. non-exposed civil servants. Using census data, we can adopt the convention of other seminal papers on gender norms, which use female participation in the labor market as a primary measure of gender norms (Alesina et al., 2013; Fernández, 2013). Comparing cities with different degrees of exposure to female wartime entrants, we can also study any contemporaneous effects at the local labor market level.

[1] A small number of studies document the U.S. government as an occupational niche for women. Li (2023), for instance, describes postmasters as a particular early 20th century public service occupation that was a unique niche for women.

[2] Prior to WWI, women were often explicitly excluded from white-collar civil service jobs (Nienburg, 1920).

The key empirical challenge in this setting is that the temporary increase in female workers may be correlated with geographical or workplace differences that directly affect gender-related outcomes. This is a general limitation in the study of how historical shocks can reshape gender norms (Giuliano, 2021). Our setting allows us to overcome this limitation in several ways. The availability of *office-level* variation in exposure allows us to not only compare outcomes within the same city but also within departments. In addition, we can leverage the historical setting to only exploit exposure variation driven by pre-existing differences in office structures: war-related offices and offices with a large share of the clerical workforce in 1915 saw larger increases in the female workforce, allowing us to complement our fixed effects design with an instrumental variables strategy.

We organize our results into three parts. First, we document for the first time using high-frequency personnel records how WWI led to the emergence of a new female workforce within the federal bureaucracy. Using biennial personnel records, we show that WWI increased the share of the female federal workforce by 13 p.p. – a doubling between 1917–1919. Compared to women entering before WWI, these female wartime entrants are younger, less likely to be married, more mobile and more educated. At the same time, they are less likely to have been part of the labor force prior to entering the civil service, suggesting that the war helped mobilize a previously untapped source of labor.

Our main finding shows that exposure to wartime female entrants decreases the gender gap in labor force participation for children of exposed civil servants. Comparing labor force participation decisions of children of exposed and non-exposed civil servants in 1940, we find that a 1 standard deviation (SD) increase in exposure decreases the gender gap in labor force participation by 8–14%. The decrease in this gender gap is driven by a higher propensity of exposed daughters to work, consistent with the intergenerational transmission of gender norms (Bisin and Verdier, 2001). In contrast, parental exposure to female co–workers does not affect the labor supply decisions of sons. The results hold using a stringent set of fixed effects restricting the identifying variation to within-city and within-department differences in exposure. The results are comparable using pre-existing differences in office structure as the identifying source of variation in an instrumental variable design.

We explore sources of heterogeneity to better understand the mechanism underlying this finding. We find that the exposure effects are strongest for children in teenage age, consistent with existing findings that experiences during "formative years" can shape lifetime economic behavior (Olivetti et al., 2020). In contrast, we do not find clear exposure effects for older children of civil servants, who are more likely to have left home and already formed a set of rigid preferences and beliefs. We also find that the wartime exposure effects are driven by working fathers, consistent with the exposure to female co–workers disproportionately changing men's beliefs about female work. Finally, we find that the exposure effects are larger for children whose parents were working as clerks and more likely to be close co–workers of the newly-employed female clerical workers.

Our main results are robust to a wide range of robustness checks. To ensure that our results are not driven by

sample selection, we show that our results remain virtually identical after reweighting the matched sample to be balanced across a wide range of observable baseline characteristics. We also probe the robustness of our results with respect to outliers, showing that the employment effects are not exclusively driven by Washington, D.C., or particular offices such as the war department. Our results likewise hold when accounting for changes in federal employment levels correlated with an increase in exposure, suggesting that our effects do not reflect an increase in war-driven employment levels per se.

After establishing evidence for intergenerational effects on labor force participation, a key measure of gender norms, we report a range of secondary results. Consistent with exposure to female co–workers affecting descriptive norms – beliefs about the extent to which women work as civil servants – we find that the exposure effects are strongest for selection into federal work. While we find no impacts of parental exposure to female co–workers on the gender gap in hours worked, parental exposure closes the gender earnings gap by 8 log points, reflecting the move of women into higher earning positions in the labor market. Turning to human capital accumulation, we find suggestive evidence that parental exposure to female co–workers increased the education level of daughters relative to sons, especially at the college level. Finally, we find that daughters of exposed parents are less likely to be married and more likely to have fewer children, consistent with the fact that female work during our study period was dominated by unmarried women (Goldin, 1991).

In the last part, we conclude the analysis by asking whether the increased entry of female workers into the federal government had impacts beyond the vertical transmission through children we identified. Moving to the local labor market level, we ask whether cities experiencing an increase in female representation in the government also see overall increases in female labor force participation. We do this by leveraging cross-city variation in female exposure before and after WWI using census data in a difference-in-differences. While wartime exposure is uncorrelated with labor force participation before the war, we find that cities with greater female exposure during WWI see a persistent increase in female labor force participation (but no comparable increase in male labor force participation). While this increase is concentrated in the public sector, we also find economically and statistically significant increases in female employment in the private sector – suggestive evidence for spill-over effects beyond the public sector. Finally, we show that the exposure effects on female labor force participation are concentrated in neighborhoods where female wartime workers resided, consistent with social learning through which gender norms may be transmitted horizontally.

Related literature. Our results have important implications for several strands of the literature. First we contribute to research on the evolution of (gender) norms and economic disparities (Giuliano, 2021). Several studies show that inherited gender norms are a key determinant of women's labor market outcomes (Fernández et al., 2004; Betrand, 2011; Olivetti et al., 2020) and more broadly, gender disparities (Tur-Prats, 2019; Ashraf et al., 2020). Such norms are often deeply engrained and slow to change (Alesina et al., 2013), raising the question of how they are transmitted across space and over time and how they can be altered. Our paper makes

progress along both directions. The richness of our historical data gives us the opportunity to add to the scant empirical evidence disentangling vertical and horizontal transmission of gender norms (Bisin and Verdier, 2001; Di Miceli, 2019). On the former, we provide evidence at the individual level. On the latter, our city-level analysis provides micro-level evidence consistent with models of social learning.[3] Moreover, a growing literature has sought to understand how best to change gender norms (Dean and Jayachandran, 2019; Bursztyn et al., 2020; Lowe and McKelway, 2021). For instance, Bursztyn et al. (2020) show that an informational intervention that corrects misperceptions of the extent to which male peers support women working outside the home increased women's labor force participation. Our paper adds to this literature by showing how workplace diversity and, in particular, parental exposure to female co–workers affects the gender norms of the next generation.

Second, our paper contributes to research on historical labor markets and women's economic status (Goldin, 1990, 2006; Bailey, 2006). By documenting the rise of female clerks within the federal government, we complement existing research on the clerical sector as one of the gateways to white-collar work in the labor force during the late 19th and early 20th centuries (Goldin, 1980; Costa, 2000; England and Boyer, 2009). We add to this rich literature by documenting how the labor demand shock brought about by WWI contributed to the rise of female clerks in the economy. We also contribute to a literature that documents how historical periods of military mobilization affect female labor force participation (Goldin, 1991). A large literature examines the impact of mobilization during World War II on women in the U.S. (Schweitzer, 1980; Acemoglu et al., 2004; Doepke et al., 2015). Our study is – to our knowledge – the first to document how the *First* World War affected the labor market outcomes of American women.[4] Our study also departs from these studies by focusing on how war mobilization affected demand for public servants – a distinct and important sector of the economy.

Finally, we contribute to research on the drivers and consequences of diversity within bureaucracies. Much of the existing literature on bureaucratic personnel focuses on selection (Dal Bó et al., 2013) and incentives for improved performance (Khan et al., 2015, 2019). A small but growing body of research investigates the impacts of public sector diversity on the performance of public organizations (Neggers, 2018; Miller and Segal, 2018; Alsan et al., 2019; Xu, 2023). Relatedly, studies examine the causal factors underlying the demographic composition of the bureaucracy (McCrary, 2007; Moreira and Perez, 2022). While the existing literature on bureaucratic representation and diversity focuses on its implications for public sector performance, our paper shows that the benefits of increased gender representation extend beyond the workplace by affecting the transmission of norms both vertically across generations as well as horizontally across cities. To our knowledge, there is virtually no work on the causal factors that underlie the sea change in women's representation within the federal government that occurred during the 20th century.

[3] For instance, Fogli and Veldkamp (2011) develop a model in which the change in female labor force participation emerges as the result of local interactions, in which women learn about the effects of maternal employment by observing nearby employed women.

[4] Among the few papers studying WWI, Boehnke and Gay (2022), who study how WWI affected women's aggregate labor force participation (LFP) in France. Our study, in contrast, provides evidence using granular variation at the individual-level.

2 Background and Data

2.1 Context: women and war mobilization in the early 20th century

To study how the changing gender composition of the American government persistently shifted gender-specific attitudes toward public service and work, we focus on the early 20th century.

The United States entered WWI in April 1917. This conflict necessitated a nationwide economic mobilization, and drew women into new fields and occupations, particularly within the federal government. The increased presence of women in federal government work occurred against the backdrop of ongoing changes within the broader labor market, though. While most working-age women were still engaged in household production at the turn of the century, clerical work was on its way to becoming the "archetypal paid job" for women entering the labor force (England and Boyer, 2009). Indeed, women's share of clerical employment increased from 2.5% in 1870 to 52.5% in 1930 (Goldin, 1984), due to both demand and supply-side factors. On the demand side, technological shocks like the emergence of the typewriter and organizational changes related to accounting and bookkeeping allowed more women to compete for clerical jobs in office work (Rotella, 1981; Strom, 1989; Feigenbaum and Gross, 2020).[5] On the supply side, access to secondary school also played a role in driving increasing numbers of young females into clerical work (Goldin, 1990).[6]

Against the backdrop of women's gradually increased presence in the workforce (particularly single women), WWI provided new opportunities for female workers within the federal government workforce (Dumenil, 2017). America's entrance into this global conflict led to substantial spending on war-related government production activities (Rockoff, 2004). Wartime demands thus changed the size and structure of the federal government. Thousands of new artisans and laborers were needed to meet the demands of a growing bureaucracy (Osborn, 1917). Across the country, the number of civil servants increased dramatically. For instance, the number of civilian employees in Washington, D.C. increased dramatically between 1917 and 1920 (Morgan, 1919). Nationwide, the civilian naval workforce increased from less than 21,000 to more than 100,000, and in government ordnance plants from 11,000 to about 40,000. Other branches were likewise greatly augmented (Morgan, 1919). The United States Civil Service Commission – as the agency responsible for personnel administration – was in turn responsible for allocating workers during this era of sudden expansion (Osborn, 1917).

Tasks like the rapid administration of government contracts increased the need for office workers at all levels of government. The first year of the war saw 100,000 new government job openings, all of which needed to be filled quickly. While women had often been explicitly excluded from many positions for decades during the late 19th and early 20th centuries, wartime demands led government bureaus to open up civil service exams

[5] Other institutional features – such as so-called "marriage bars" that limited the hiring of married women – were instituted in the 19th century, and limited clerical demand to primarily single women (Goldin, 1988).

[6] WWI occurred during the America's High School Movement, a period when the educational attainment of women grew from an average of 8 years (for the 1890 birth cohort) to nearly 11 years (for the 1925 cohort) (Goldin and Katz, 2008).

to women for the first time. Women who could do the work found themselves readily accepted even by those departments that had been hesitant to employ them. Women made particularly important inroads into clerical jobs. In the 1918 Annual Report of the Civil Service Commission, U.S. Chief Examiner George R. Wales writes of the effect of WWI: "The most notable change in Government personnel brought about by the war is in the employment of women... many of the examinations for technical and scientific positions which in past years have been limited to men may now be taken by women; and the departments are appointing women to these positions. Among the general examinations which war conditions have opened to women are elevator conductor, messenger, junior chemist, computer, bookkeeper, and minor positions in the Ordnance Service at Large" (United States Civil Service Commission, 1918).

2.2 Data sources

We combine multiple sources of administrative and personnel data to document the changing patterns of female work in the public sector. In this section, we briefly describe the main sources of this data.

Official Registers of the United States. To study how the war shapes the composition of the civil service, we rely on the personnel records published in the "Official Registers of the United States" ("Official Registers" or "Registers"). The Registers are biennial rosters of the entire workforce of the U.S. federal government, and provide detailed information on a government worker's job title (occupation), salary, department, birthplace, and work location (city).[7] We build on the prior digitization effort by Aneja and Xu (2022), enriching the data to include worker's sex (details discussed in Section 2.3), appointment locations (counties), and harmonized work locations (cities). The latter allows us to identify the department–city of each civil servant, enabling us to construct a granular measure of exposure to female wartime entrants. Figure A2 provides a sample of the records in the Official Registers. We restrict the sample period to President Woodrow Wilson's term (1913–1921), yielding a dataset of 1,041,521 individual-year observations.

Our dataset offers several advantages over data used in previous analyses of gender and labor markets during the pre-1940 period. First, relative to other recent studies, we observe detailed information about workers at a greater frequency, as the Registers were published every other year (Withrow, 2021; Eriksson et al., 2022). These data thus increase our confidence that sudden changes in labor market outcomes are due to WWI, rather than other time-varying confounding factors, such as the Great Migration or the 1918 influenza epidemic. Second, we observe the salary of each civil servant. Standard data sources for this period – in particular, population censuses – typically offer coarser measures of earnings that are imputed from occupational data, which typically rely on Decennial Census data.[8] As discussed in Aneja and Xu (2022), this can be an important advantage,

[7] The Official Register was initially compiled by the Department of the Interior, and later by the Census Bureau. Temporary employees who have served for less than six months are not included. In 1923, the Official Register was not published due to federal pressure to reduce costs. The Register resumed in an annual form in 1925, but in a much more reduced form, owing to the growing size and cost of describing the entire federal government.

[8] Since the U.S. Census did not record a person's income before 1940, analyses of economic status typically rely on imputed incomes

given the potential for discrimination within occupations (Margo, 1990).

Civil Service Commission Reports. We digitized the Civil Service Commission (CSC) reports from 1907 to 1931 to shed light on the entry patterns into the civil service. Published annually, the CSC reports contain statistical tables documenting the selection process of federal workers. We digitize occupation-specific statistics on the number of individuals by gender who applied and appeared in the civil service exam, passed the exam, and were ultimately appointed. Figure A3 provides a sample of the relevant table.

US decennial full count census. We also make use of the US decennial full count population censuses (1900-1940) in all parts of our analysis (Ruggles and Meyer., 2019). In the descriptive part, we use the 1910 Full Count Census to study the traits of civil servants *before* entering the service. In the main part of the analysis, we leverage census data to both identify the children of serving civil servants, as well as to examine their outcomes in adulthood as a function of parental exposure to female co–workers.[9] For the latter part, we use the rich socioeconomic outcomes that the Census Bureau included in the 1940 Decennial Census. Finally, we also use US full count censuses to study the aggregate effects of exposure on city-level female labor force participation, as well as spatial heterogeneity within a city.

2.3 Identifying women and gender norms

Identifying female civil servants. The Official Registers do not always report female pronouns of individuals, making it difficult to consistently identify the sex of civil servants. To overcome this limitation, we use first names to predict a worker's likely sex. We predict an individual to be female if more than half of the individuals sharing the same first name in the 1910 Census self-report to be female, $\Pr(\text{Female}|\text{First name}) > 0.5$. This allows us to impute sex for 87.9% of our sample. For the remainder, the first name is either only recorded with initials (92.6%) or cannot be found in the census, likely due to transcription errors or unique spelling.

To validate our measure, we also matched civil servants directly to the 1910 Census based on their full name and birth state following Aneja and Xu (2022). While the exact census-linked matches are more accurate, they are only available for the subset (19.8%) of civil servants that could be successfully linked base on name and birth state. When comparing our imputed sex measure with the census-linked measure, both measures coincide with a correlation of 0.97. This high correlation gives us confidence in the validity of our imputation.[10]

Measuring changes in norms. Our primary outcome of interest is labor force participation (LFP), which comes from the decennial population censuses. In recent years, studies have examined how culture and norms regarding the role of women in society could help explain gender differences in labor market outcomes.[11] Fernández and

based on the linkage of a person's occupation to future censuses (Sacerdote, 2005; Collins and Wanamaker, 2021).

[9] We describe the linking of civil servant parents to children in Section 4.2.

[10] When available, we impute the census-linked sex measure to civil servants with missing predicted sex measures (0.7% of the entire 1913-1921 sample).

[11] A large literature on gender differences in LFP has also considered the role of other factors, such as the level of development, women's

Fogli (2009) show, for instance, that female LFP among immigrants in the US is strongly correlated with female LFP in the country of origin, and suggest that the cross-generational correlation is consistent with cultural transmission. Similarly, Alesina et al. (2013) document a strong negative correlation between the traditional use of the plow in agriculture and today's female LFP, and interpret their estimates as evidence of the transmission of norms around female work from pre-industrial societies.

Following this literature, we define "norms" as beliefs and values that social groups transmit "from *generation to generation*" (Guiso et al., 2006). We thus interpret our results on how shocks affect economic decision-making of the *next* generation along gender lines to be indicative of a change in gender norms, consistent with this definition of "norms" within the literature. Our approach is similar to studies like Bertrand et al. (2000) or Dahl et al. (2014), who identify within-group norms by studying the transmission of economic decision-making within families or other networks. This literature is premised on the assumption that culture can operate through information, beliefs, or norms that are transmitted from contact within groups or networks.

3 Descriptive evidence – the rise of women during World War I

3.1 Expansion of federal employment and female representation

Our first objective in documenting how WWI transformed norms towards women's work is to document the rise of women within the federal government. To this end, we demonstrate quantitatively how wartime economic mobilization suddenly and substantially increased the female labor supply within the federal government. We then show that women's presence in the federal service persisted, and in fact, continued to grow for at least a half century *after* WWI ended. The episodic increase followed by persistent growth provides suggestive evidence that WWI was a tipping point in women's service in the U.S.

We begin by showing the sharp increase in the hiring of civil servants that occurred at the onset of WWI. Using our high-frequency personnel sample from the Official Registers - the universe of (non-postal) government workers - Figure 1, Panel (a) shows that the size of the federal government employment was relatively stable in size between 1907 and 1917. This period of stability was followed by a near *doubling* in total federal employment between 1917 and 1919 (from around 150,000 to over 300,000 workers) after the U.S. entered the conflict in April 1917 (vertical bar). Notably, this increase in federal employment occurred nationwide, and the growth was not restricted to Washington, D.C.. When we omit D.C. from the time series, we again see rapid bureaucratic expansion at the point at which the U.S. entered the war (dashed line).

The raw data presented here also highlights that the growth of the bureaucracy was remarkably persistent. As Figure 1 highlights, federal employment declines slightly between 1919 and 1921. However, the federal

education, and family choices such as and divorce (see, e.g., Goldin (1990) for a review).

workforce remains significantly higher than the pre-1917 level even several years after the war concludes. This persistence is evident when using data from the decennial censuses, which allows us to explore federal employment through 1930 (light-gray squares in Figure 1, Panel (a)).[12] The pattern is qualitatively similar, showing a gradual expansion in federal employment over time, a sharp increase in the aftermath of WWI, and a subsequent contraction towards a higher employment level. The comparison of the census measures with those derived from the personnel records also highlights the value of using the Official Register data: not only does it deliver a higher frequency, but it allows us to pinpoint the expansion in federal employment to the entry of the U.S. into WWI; it also reveals significant undercounting of federal employment by the U.S. Census.

Having demonstrated empirically the increased demand for workers, we next use these data to document the change in the gender composition of the federal government during WWI. Figure 1, Panel (b) shows the share of female civil servants derived from the personnel records over time. The solid line shows the share of female civil servants using our preferred data, based on the probabilistic measure of a civil servant's sex. The dashed line plots the share of female civil servants using the census-linked subsample, with an exact measure of (self-reported) sex. Using both measures of sex, we observe a constant share of female workers between 1913 and 1917, and a subsequent jump in the female share coinciding with the entry of the U.S. into the WWI conflict. The increase in female share is economically sizable, reflecting an increase of 13 p.p. Compared to the average pre-war share of female civil servants, this increase – within only two years – corresponds to a doubling of the female share among federal workers.[13]

Figure 2 breaks down the gender composition by clerical vs. non-clerical positions. Consistent with the historical literature (Dumenil, 2017), the expansion of the female workforce was driven almost exclusively by clerks. As panel (a) shows, the share of women in the federal clerical workforce jumped from around 30% to almost 70% within two years.[14] Panel (b) shows the share of women hired via civil service exams each year, using the newly digitized data from the Civil Service Commission. Consistent with the sudden increase between 1917 and 1919, the share of women among clerical hires spiked in 1919, remaining high even after the war.

3.2 Characterizing women's wartime service

While we aim to understand how the nation's first large-scale entry of women into government service changed gender norms, the rapid change in gender composition raises a preliminary question: did WWI change the type of women who became civil servants? Answering this question is challenging using only data from the Official Registers, since biographical information is limited. We thus match these records to the decennial census

[12] Federal workers are identified using the industry code (`IND1950=916`) provided by IPUMS.

[13] The graph also suggests a potential benefit of using the imputed measure. While imputed and census-linked measures track each other well pre-war, the census-linked measure begins significantly undercounting female employment during the rapid expansion of federal employment starting in 1919. As Appendix Figure A4 shows, the rapid influx of new workers coincides with a slight decline in census match rates. With men typically matched at a higher rate, the decline in match rate is likely to be a driver of the undercounting observed in the census-linked measure. Our imputed measure, in contrast, does not suffer from this type of selection bias.

[14] As Figure A5 shows, this increase is driven by the expansion of the clerical workforce to meet the administrative demands of war.

data to be able to study how characteristics of female workers changed during the war, relative to their male counterparts. From the censuses, we obtain information about workers' socioeconomic backgrounds, including age, labor force status, marital status, and education.

To study changing selection during WWI, we restrict our personnel panel to entrants into the American civil service.[15] We then examine how gender gaps in pre-determined individual characteristics differ for wartime vs. non-wartime entrants.[16] Table 1, Panel (a) presents descriptive evidence of differential changes in selection into civil service based on the census-based characteristics. On average, female civil servants tend to enter government service younger than their male counterparts, particularly during wartime. Female wartime entrants are also much more likely to be single and less likely to have been in the labor force.[17] This suggests that the female wartime entrants may be coming from a previously untapped pool of labor.[18]

We also test for differences in human capital. Unfortunately, pre-1940 censuses contain only a coarse measure of human capital: literacy. As such, we follow Aneja and Xu (2022) by linking the Registers forward to the 1940 Decennial Census, which contains a detailed measure of educational attainment – the years of schooling. Table 1, Panel (a) shows that for the matched sample there is no pre-WWI gender gap in education, but female wartime civil servants have significantly higher levels of education than their male counterparts.

Next, we study another aspect of selection, which is from where civil servants come. We use the information on the county of appointment recorded in the personnel records to examine geographic background characteristics. Mean differences for these characteristics are reported in Table 1, Panel (b). While female civil servants tend to come from more urban areas, this difference is muted during WWI. We also investigate whether individuals were more likely to move for civil service jobs. We define a civil servant to be from the *same state* if the state of the first working position is the same as the state of appointment. While the gender difference before WWI is small, female wartime entrants are less likely to hail from the same state.[19]

Overall, the descriptive evidence allows us to characterize the large number of women who joined the civil service during the war: they are younger, more likely to be single, and less likely to have previously been part

[15] We define entrants as individuals that are observed the first time in the data.

[16] To study changes in selection, we estimate the following regression for individual i who enters in year $t = T(i)$:

$$y_i = \beta_0 \text{Female}_i + \beta_1 \text{Post WWI}_{T(i)} + \beta_2 \text{Female}_i \times \text{Post WWI}_{T(i)} + \varepsilon_i \quad (1)$$

Here, y_i is the individual-level characteristic of the civil servant, $\text{Female}_i = 1$ if the individual is predicted to be female, and 0 otherwise. We define the indicator variable $\text{Post WWI}_{T(i)} = \mathbb{1}[t \geq 1919]$, corresponding to the first year after the U.S. entry into WWI for which we have personnel records. ε_i is the error term.

[17] This difference is not mechanically driven by the fact that female wartime entrants are younger. The coefficient remains of comparable magnitude when conditioning on entry-age fixed effects.

[18] We also study the origin industries from which *previously working* wartime entrants (i.e., those in the labor force, but outside the government in 1910) came (Table A1). Consistent with increased manufacturing in response to war, fewer manufacturing workers enter the civil service during WWI. We then focus on a common sector for female employment in the 1910s – professional workers, mainly comprised of teachers and clerks (Goldin, 1990). We see that woman civil servants are more likely than men to come from professional service jobs, and more so during WWI. Interestingly, this selection is driven by female teachers.

[19] Results shown in Table 1, Panel (b) hold if we restrict the sample to civil servants linked to the 1910 Decennial Census and we consider their 1910 county of residence rather than their county of appointment as in the personnel records.

of the labor force. At the same time, they are more likely to have moved from rural areas or from a different state.[20] Most importantly, female wartime entrants were significantly more educated, suggesting that WWI helped mobilize a previously untapped and positively selected pool of talent. We now study how their influx into the federal government reshaped the gender norms within co–workers and future generations.

4 Empirical strategy

We now turn to our main research question: did the large influx of female civil servants change gender norms within the federal government? The study of historical norms is hampered by the lack of direct measures of attitudes or norms (given the lack of survey data in historical settings). We thus infer a change in norms by measuring the impact of increased exposure to female workers on the labor force participation of the *daughters* of co–workers exposed to this compositional shock. This approach indicates whether information (in this case, about women's prospects) is transmitted to members of families and social networks.

Models of intergenerational transmission often highlight mechanisms such as transmission from parents to daughters (Fernández et al., 2004; Fernández, 2011) or through social interactions (Fogli and Veldkamp, 2011). Our setting allows us to explore both channels of transmission. We first study if parental exposure to female co–workers affects the propensity of their daughters (relative to sons) to work as adults – an indirect outcome consistent with vertical norms transmission. In Section 6, we then study horizontal transmission via social interactions by examining spatial heterogeneity in the exposure effects across neighborhoods.

4.1 Measuring exposure to women workers.

We first describe cross-sectional variation in exposure to female workers, which gives us traction on our primary research question. Using the differential intensity of the war-driven increase in women employees across cities and within departmental offices, we can study the intergenerational responses of civil servants in offices that were more and less affected by the sudden influx of women. To measure variation in exposure to female civil servants, we compute exposure intensity for each city-department – or *office* – as follows:

$$\Delta\text{Exposure}_{jk} = \left(N^f_{jk1919}/(N^m_{jk19}+N^f_{jk19})\right) - \left(N^f_{jk15}/(N^m_{jk15}+N^f_{jk15})\right) \tag{2}$$

where j denotes the city and k the department. N^f_{jk19} denotes the number of female civil servants in the given office and N^m_{jk19} in 1919 and denotes the corresponding number of male civil servants. Equation 2 thus captures the change in the share of female civil servants across offices between 1915 and 1919.

[20] While the focus of our study is identifying the long-run consequences of women's increased presence rather than the determinants of this compositional change, Table A2 further considers a range of additional factors potentially related to selection into government service, ranging from the role of military mobilization (Acemoglu et al., 2004; Goldin and Olivetti, 2013), patriotism (Kang and Rockoff, 2015; Caprettini and Voth, 2022) and the 1918 Influenza pandemic.

For our main analysis, we restrict our analysis to cities with at least 20 civil servants in a given office in 1915 and in 1919. Because our empirical strategy will rely on both city and department fixed effects, we further limit the sample to cities that have at least two federal government departments. This leaves us with 70 cities and 8 unique federal departments in our sample.[21] Figure A7 plots the distribution in the exposure measure across offices. The figure shows significant department-by-city variation in the changing gender composition of government offices, with an interquartile range of 11.8 p.p. Variation in exposure in our main analysis sample is very comparable to the variation in the full sample, reducing concerns about sample selection.

4.2 Linking parental exposure to children

While the focus on intergenerational gender gaps in labor force participation allows us to obtain an indirect measure of gender norms, it requires identifying the children of civil servants and tracking them through time. The focus on both daughters and sons further complicates tracking children into adulthood as women traditionally changed their names after marriage. We rely on a range of "best practices" from the census linking literature to maximize the linkage rates of children over time.

We proceed in several steps. First, we identify the children of civil servants in the US decennial censuses. We restrict the sample of potential parents to civil servants serving in 1915 who can be linked to the 1900, 1910, or 1920 censuses. In each census round, we define a "potential child" as a household member who shares the same last name, is at least 18 years younger than the parent, and is aged 18 or younger in that census year. We restrict the sample to children born before 1918. These restrictions yield a sample of 30,270 civil service parents and 77,699 unique children.

In the second step, we match the children from the previous step to the 1940 Census, which allows us to observe the individuals in adulthood. We combine three linking approaches to maximize the linkage rate. First, we leverage genealogical data from "Census Tree" to match 45,712 children to the 1940 census. The Census Tree dataset is a cross-census linkage developed by Buckles et al. (2023) that relies on genealogical information to create hundreds of millions of new links. Second, we rely on the crosswalk created by the Census Linking Project to link 14,179 sons to 1940 Census records.[22] Finally, we rely on our direct matching approach, matching 4,631 children based on their full name and birth state.[23] Combining these approaches, we can track 48,571 children (62%) of 24,676 civil service parents (81%) to the 1940 census.[24]

In the third step, we restrict the analysis sample to larger cities (locations with at least two departments and offices of at least 20 civil servants), as described in Section 4.1. This results in a sample of 22,439 children. To

[21] Figure A6 shows the spatial distribution of cities in our sample. Cities with federal departments are spread throughout the country.

[22] The Census Linking Project provides a crosswalk that allows researchers to link census respondents across time based on the well-tested approach developed by Abramitzky et al. (2020).

[23] See Aneja and Xu (2022) for details.

[24] These match rates appear high as they are conditional on parents being matched to the census in the first place.

focus on the younger children who are more likely to be affected by the exposure, we further restrict the sample to those who are younger than 20 in 1917. This results in a final sample of 13,502 children.

4.3 Regression model

Using the measure of female exposure we just defined, we examine whether daughters were more likely to work in adulthood when their civil servant parents were exogenously exposed to an influx of female workers.[25] To assess the long-run impact of exposure to female civil servants on female labor outcomes of the next generation, we estimate the following regression:

$$y_{ijk} = \beta_1 \text{Female}_i + \beta_2 \Delta \text{ Exposure}_{jk} + \beta_3 \Delta \text{ Exposure}_{jk} \times \text{Female}_i + \theta_j + \tau_k + \gamma' x_{ijk} + \varepsilon_{ijk} \quad (3)$$

where y_{ijk} is the outcome for child i, in city j and department k. Female_i is a dummy variable that is 1 if the child of interest is female and 0 otherwise. Equation 3 relates outcomes to the change in the share of female civil servants, $\Delta\text{Exposure}_{jk}$, which varies at the office (i.e., city-department) level and is defined in Equation 2. β_1 captures the gender gap in outcome (such as labor force participation), and β_2 captures the extent to which exposure to female co–workers affects male outcomes. We are interested in whether parental investments and norms change in a gender-specific manner. As such, the key parameter of interest is β_3, capturing how parental exposure to female co–workers differentially affects daughters relative to sons. In line with gender-specific transmission of norms, we hypothesize that parental exposure to female co–workers increases the likelihood of daughters working later in life, i.e. $\beta_3 > 0$. x_{ijk} is a vector of additional controls that will be discussed when relevant, and ε_{ijk} is the error term. We cluster the standard errors at the office-level jk, coinciding with the level at which the treatment exposure varies.

A concern for ascribing a causal interpretation to the OLS estimates in Equation 3 is the possible presence of confounding factors that are correlated with both the outcomes like labor force participation, and which also influence degree to which certain places or departments were more likely to hire women. The empirical challenge we face is that exposure to female co–workers $\Delta\text{Exposure}_{jk}$ might be correlated with unobservable location or department-specific factors. For example, urban areas may have a greater supply of female workers and thus see greater entry of female federal workers. These locations may also have more progressive gender norms to begin with, making it hard to causally attribute any differences in outcomes to differences in exposure.

Relative to other studies of the effects of exogenous shocks to gender norms, a distinct advantage of our setting is that identifying variation in exposure varies within-city, at the *department*-level. We can thus introduce both city fixed effects θ_j and department fixed effects τ_k to allay concerns over time-invariant confounders that vary

[25] In addition to being consistent with the culture literature we discuss above (see Section 2.3), our test is consistent with research such as Hellerstein and Morrill (2011), who document a substantial degree of occupational transmission from fathers to daughters during the 20th century as women's labor force participation rose.

at the city- or department-level.[26] City fixed effects allow us to distinguish the effect of increased exposure of civil servants to women employees from unobservable factors that may shape gender norms within a given area (certain cities, for example, may be more friendly to female workers, and these attitudes may, in turn, have shaped the investments of daughters during the late 1910s). Similarly, certain departments were more likely to employ women in the decades before WWI, such as the Departments of Treasury or Interior (Aron, 1981). Department FEs then remove the unobserved heterogeneity related to differences across departments.

Identification of the effect of exposure to women co-workers relies on the standard conditional independence assumption – namely, that the remaining variation in female exposure is exogenous after conditioning on city and department fixed effects (FEs). While we cannot directly test this assumption, we provide evidence in support of the assumption by examining how our treatment variable relates to pre-treatment observable characteristics. In Table A3, columns 1–2, we show that within a city-department cell (i.e., conditional on fixed effects), there is little consistent evidence of a relationship between the increased presence of women and the characteristics of civil servants. We observe that – conditional on city and department fixed effects – exposure to female co–workers is not strongly correlated with any baseline characteristics of interest, consistent with the quasi-random nature of this pre-determined institutional variation.[27]

5 Impact of female civil servants on gender norms

5.1 Main results on labor force participation

We now turn to a discussion of our results. We first focus on the OLS results from Equation 3, before turning to the IV estimates which reduce concerns about the endogeneity of the change in gender composition within federal departmental offices. Table 2 reports our main results, based on Equation 3 (and the corresponding IV analog). Each column presents a separate regression in which the dependent variable, *Labor force participation*, is a dummy equal to 1 if the child is in the labor force and 0 otherwise, as reported in the 1940 Census.

We find consistent evidence that parental exposure to female civil servants increases the LFP of women, relative to men. In other words, the female children of civil servants are relatively more likely to be working in adulthood in those city-department offices that experienced greater increases in the fraction of federal workers that were women. On average, daughters of civil servants are 48 percentage points (p.p.) less likely than sons to be in the labor force. This female-male LFP gap, however, shrinks with greater exposure to female co–workers. Examining the baseline specification (column 1), we observe that a 1 SD increase in a civil servant's exposure

[26] It is common in the literature for papers on gender norms to study geography-level shocks to female outcomes. See, for example, Gay (2023) and Teso (2019). We instead use on within-city variation.

[27] As indicated by the p-values, we fail to reject the null hypothesis in our F-test that all coefficients of the excluded variables are equal to zero. This is true for both a parsimonious test in which we just include the listed regressors as well as city and federal department fixed effects (Table A3, column 1) as well as a specification in which we also allow these intercepts to vary by gender (Table A3, column 2).

to females increases the likelihood that a female child works (relative to a male child) by 2 p.p. For the sake of expositional clarity, we note that an increase in female LFP *relative to men* is equivalent to a reduction in the gender LFP *gap*.[28] As indicated by the level coefficient of $\Delta\text{Exposure}_{jk}$, parental exposure to female co–workers has no statistically discernible impact on the labor force participation of male children. Thus, the decline in the gender LFP gap is driven by a greater propensity for daughters of exposed civil service parents to work.

The remaining columns gradually make this baseline specification more demanding to demonstrate the robustness of the results. In column 2, we show results where we include city-by-department FEs to account for unobserved differences in labor force participation within federal departments of a given city; this fully absorbs the exposure variation in levels, but still allows us to identify the differential gender effect of exposure to parental exposure to female civil servants by daughter vs. son. Similarly, we add both city-by-sex fixed effects and department-by-sex fixed effects to account for average sex differences in labor force participation, due for example to differences in norms within a given city or department. This set of fully gender-interacted city and department fixed effects restricts the identifying variation in exposure tightly to comparisons within cities and departments. The upshot is that our core finding is strengthened: female children are 4.2 p.p. more likely to work as adults given a 1 SD increase in the share of female civil servants during WWI.

Column 3 makes this specification yet more demanding by including gender-specific age FEs to allow the work-age profile to flexibly differ in unobservable ways for sons and daughters. The inclusion of such fixed effects accounts for the likelihood that women are systematically less likely to work because of child-rearing or other family obligations. Consistent with the overall pattern, the gender gap in labor force participation continues to decline with parental exposure to female co–workers. Women are 4.4 p.p. more likely to work given a 1 SD increase in female civil servants during WWI. This corresponds to a decline of 9% relative to the mean labor force participation gap. In column 4, we introduce the full set of female-interacted individual-level controls for race, the number of siblings, the civil servant parents' gender, age, salary in 1915, and whether the parent held a clerical position. Since the exposure variation is largely uncorrelated with individual characteristics (Table A3), the inclusion of these stringent controls leaves the estimates nearly unchanged.

Instrumental variable strategy. An advantage in our OLS setting is that the personnel records allow us to measure exposure to female civil servants at the *office*-level, thus allowing for tighter comparisons within the same governmental department and city. With this city-department level variation, we can thus address concerns over locational confounders through the inclusion of city fixed effects, which restrict the identifying variation to exposure coming from different departments *within* the same city. Similarly, to the extent that there may be selection into certain departments due to prevailing gender norms, by studying the entire federal government we can also include department fixed effects to alleviate concerns over cross-department comparisons.

[28] For simplicity, we note that for the remainder of the paper, any discussion of a change in female LFP (corresponding to β_3 in Equation 3) should be interpreted as indicating a change in female LFP relative to male LFP, or a change in the female-male LFP gap.

Nonetheless, concerns may remain over whether the remaining within–city and within–department variation is truly exogenous. We thus complement the OLS approach by leveraging an arguably pre-determined and exogenous source of variation that is predictive of the exposure to female workers. We leverage the historical fact that the expansion in the female federal workforce is primarily driven by the increased demand for clerical workers in departments that were heavily affected by wartime demand (Figure 2). Women were already entering the private sector workforce – and clerical jobs in particular – in the years before WWI (Goldin, 2006). As we discuss in Section 2.1, though, the war opened up many new job opportunities for women. As war efforts increased, so did the demand for greater administrative capacity, especially in war-related departments, such as the War and Navy departments. Offices with a greater pre-existing share of clerks were thus much more likely to see an expansion in the clerical workforce, even more so when the department was war-related (Figure A8). This occupational variation allows us to use the interaction of the existing share of the clerical workforce in 1915 and the presence of a war-related department as an instrumental variable.[29]

Our IV specification relies on the interaction between the share of clerical workers in 1915 *and* a dummy for being a war-related department (i.e., the Departments of War and Navy) as an instrument. Specifically, we instrument $\Delta\text{Exposure}_{jk} \times \text{Female}_i$ with $\text{Share of clerks 1915}_{jk} \times \text{War-related dept}_k \times \text{Female}_i$, controlling for $\text{Share of clerks 1915}_{jk} \times \text{Female}_i$ and including the female-interacted department and city FEs. As we show in Table A3, columns 3–4, this instrument appears – conditional on the lower-order interaction and FEs – not strongly correlated with any baseline characteristics of interest, consistent with the quasi-random nature of this pre-determined institutional variation.[30]

For the 2SLS results, one of the core identification assumptions is that the interaction of being a war-related department and having a greater share of clerks is unrelated to our outcomes of interest, except through the increase in female exposure (conditional on the lower order interactions share of clerical workers $\times$ female and FEs). In Table 2, column 5, we show the instrumental variables estimates which predict exposure using an office's initial share of clerks, and whether it is a war-related department. While somewhat less precisely estimated, the 2SLS estimate remains positive and significant, with the point estimate doubling in terms of magnitude. A 1 SD increase in exposure (corresponding to an increase in exposure by 10 p.p.) leads to a reduction in the intergenerational labor force participation gender gap by 7 p.p.[31] Since we ex-ante hypothesized the OLS to be upward biased, we interpret the larger IV magnitude as reflecting a particular LATE driven by the

[29] We can confirm the intuition of using clerical and war department-related exposure as an instrument in other ways using our data. Figure A8 breaks down the overall variation in exposure by offices that (i) have an above or below the median share of clerical workers in 1915, and (ii) whether these offices belong to the Department of War or the Navy. As the figure shows, offices with an above median share of initial clerical workers are much more likely to see an expansion in female workers. Similarly, war-related departments with an above-median share of clerical workers see the greatest increase in the share of female federal workers. Table A4 summarizes the raw visual evidence in regression form, regressing the exposure variation (Equation 2) on the initial clerk share and being a war-related department. While both factors predict the increase in the share of female workers (column 1), the interaction of both features has the greatest predictive power (columns 2–4) – consistent with Figure A8.

[30] Like the OLS balance test (Table A3, columns 1–2), we fail to reject the null hypothesis in our F-test that all coefficients of the excluded variables are equal to zero (columns 3–4).

[31] Appendix Table A5 presents the corresponding first-stage and reduced form regressions.

clerical employment structure in war-related departments. For the remainder of the analysis, we thus rely on our fixed effects OLS specification, and report additional IV versions of all major results in the Appendix.

5.2 Channels and sources of heterogeneity

Heterogeneity by intensity of exposure. Our main result shows that parents working in offices exposed to a larger influx of female workers saw greater increases in their daughters' propensity to work in adulthood. We now explore various sources of heterogeneity to better understand the mechanisms underlying this finding. Theories of social interaction often highlight the role of tipping points in cultural change, predicting discontinuities in the relationship between exposure and effects on children's LFP gap (Centola et al., 2018). To investigate this, we flexibly estimate our baseline specification (Table 2, column 4) by intensity bins. As Figure 3 shows, we do not find any discernible effects of exposure for small changes in the share of co–workers (below 15 p.p.). From increases of 15 p.p. and upwards, however, we detect a gradual increase in the exposure effects.

Heterogeneity by children's age. We extend the main analysis by examining how the exposure effects of incumbent civil servants to female workers vary as a function of a child's age. The motivation behind this test draws on work by Malmendier and Nagel (2011), Fuchs-Schündeln and Schündeln (2015), and Roth and Wohlfart (2018) that experiences during so-called "formative years" (childhood and early adulthood) can shape later-life economic behavior. In particular, one might expect to observe a greater transmission of workplace norms and information around women's work to those children who are more likely to be living in the household at the time at which the U.S. entered WWI (i.e., the time of exposure).[32]

We explore heterogeneity by age at the time of exposure, by now also including children that are 20 years and older in 1940, and then flexibly estimating Table 2, column 4 for children for six different age bins. Figure 4 presents the results, plotting the $\text{Exposure}_{jk} \times \text{Female}_i$ coefficient for each age group. We find that the exposure effects are primarily concentrated among children who were teenagers at the time of exposure, coinciding with ages at which children are arguably more malleable in terms of their preferences and views. In contrast, we do not find clear exposure effects for older children of civil servants, though the point estimates are less precisely-estimated given the smaller sample sizes. These children are more likely to both have left the home, and to have more rigid preferences and beliefs. These findings are consistent with findings from Roth and Wohlfart (2018), who find evidence for the lasting effects of events during "formative years."

Testing for direct exposure channels. We also drill down deeper to understand how the wartime increase in women workers may transmit information to the next generation of female workers. We investigate if the exposure effect varied depending on the gender of the exposed parent. If parental exposure to female co–workers changes gender norms, one may expect the effects to be concentrated among civil servant fathers.

[32] see, e.g., Aneja and Xu (2022) for an application of this idea.

Working mothers may already have more equitable gender norms, blunting the potential impact of increased exposure to female co–workers.[33] In columns 1 and 2 of Table 3, this is in fact what we observe. We find that the effect of wartime exposure to female workers on daughters' labor force participation is precise and sizable for incumbent men; a 1 SD increase in female co–workers increases the likelihood of daughters working by 4.2 p.p. ($p < 0.01$). The effect for women is statistically insignificant, in part due to the small sample size.

Finally, recall from Figure 2 (which in part motivated our IV robustness specification) that the increased presence of women was driven by clerical jobs. As such, one might predict incumbent clerical workers to be more exposed to new clerical hires than federal employees working in other roles. As columns 3–4 of Table 3 show, that is indeed the case. We split our civil servant sample into clerical and non-clerical workers. While daughters are much more likely to work when both clerk and non-clerk parents work within war-affected departments, the point estimate is larger for the daughters of clerks, though less precisely estimated given the small sample size. This source of heterogeneity provides suggestive evidence that direct parental exposure to the influx of newly employed women – which was arguably more likely to happen within the affected occupation – may be a channel through which gender norms are changing across generations.

5.3 Robustness checks

We conduct a range of robustness checks to strengthen the credibility of our main findings, described here.

Selection bias in matching. Although we rely on "best practices" in census-linking, there remains a concern that the results may reflect selection bias. For example, if "positively" selected daughters are more likely to be matched, working, and exposed through their parents, the resulting matched sample may be biased towards smaller gender gaps. Assuringly, we do not find that the match rate to the 1940 Census is systematically correlated with our exposure variation of interest (Table A6). To further allay concerns over selection bias, we use inverse probability weighting (IPW) to ensure that the matched and unmatched samples are statistically balanced in terms of parental city, parental department, the share of initial clerical workers, and whether the child is female or not (Table A7). Table A8 shows the reweighted point estimates for the exposure effects. As the table shows, the results remain very comparable. Finally, we attempt to also allay concerns over unobservables that IPW cannot balance on. Table A9 presents a bounding exercise where we assume that all unmatched individuals are not working – directly testing for the extent to which this type of selection bias can change our results. Reassuringly, the point estimates remain very comparable.

Addressing outliers. We also assess the extent to which our results are driven by outliers or particular departments and locations (Table A10). The results hold when omitting all employment in Washington, D.C. (column

[33] Aron (1981) suggests, for instance, that women who became federal clerks in the late 19th century often ignored or rejected classical Victorian norms of staying within the household to work. As such, these women may have already had preexisting ideas about the legitimacy of women's work.

2). The results also remain virtually unchanged when restricting the analysis only to the War Department (column 3), or excluding the War Department altogether – though the resulting estimates are less precisely-estimated but the point estimates remain comparable (column 4). Finally, we also winsorized the top 2.5% of observations on both tails of our exposure measure (column 5) – as before, the results remain comparable throughout.

Changes in federal employment levels. A limitation of the observational setting is that exposure to a greater share of female co–workers is invariably correlated with an increase in an office's workforce. While making it difficult to disentangle both factors, this "joint treatment" is in our view natural: in terms of policy, it is difficult to think about shifting the composition of a workforce without changing the size of it. This is especially the case in the public sector, where firing is limited. Nonetheless, we can provide a range of tests to help separate both factors. Table A11 provides a mediation exercise by directly controlling for the increase in workforce.[34] The exposure effect remains significant and of comparable magnitude across specifications. We thus argue that greater female representation is the dominant channel in our setting. Overall, we conclude that the results provide evidence that parental exposure to female co–workers helped reduce the intergenerational gender gap in labor force participation.

5.4 Additional effects of parental exposure

We conduct several additional analyses to paint a more comprehensive picture of how this shift in the composition of the bureaucracy changed gender norms. We consider how the large-scale entrance of female civil servants affected several additional individual-level economic outcomes beyond labor force participation.

Sectoral choice and working conditions. We first examine whether the transmission of workplace norms from civil servants to daughters manifests specifically as work within the federal government (similar to their parents and the female war-time civil servants), or whether transmission manifests as overall participation in the labor market. For the remainder of the paper, we focus on the OLS results. The IV results are similar and reported in the Appendix. Table 4 breaks down the primary effect by whether the individual is employed in the federal government or the non-federal sector (columns 1–2).[35] While parental exposure to female co–workers decreases children's gender gap in labor force participation across both public and private sector, the effects are primarily driven by the greater selection of daughters (relative to sons) into federal government work. We find that a 1 SD increase in the fraction of women working in the federal government leads to a highly precise 2 p.p. increase in the relative likelihood that civil servants' daughters work in the federal government. This magnitude is sizable when compared to the mean gender gap in labor force participation in the public sector (59%). While we observe a similar increase in daughters' likelihood to be working in the private sector, the effect is smaller in magnitude when compared to the mean participation gap (4.5%).

[34] Since both the increase in female share and the increase in the workforce are driven by the same underlying war-driven shock, this exercise is conditioning on an endogenous outcome and should be interpreted with caution as a mediation analysis.

[35] The IV results are presented in Table A12.

In column 3, we consider the intensive margin of labor force participation as our outcome of interest, using a measure of hours worked reported in the census. While daughters of civil servants tend to work less than their male peers, we do not find strong evidence for any effects on the gender gap in terms of hours worked. On the other hand, though, we do see a reduction in the gender pay gap. Column 4 restricts our analysis to the sample of children who are in the labor force, and asks whether parental exposure to female co–workers affects the gender pay gap. Conditional on working, we do indeed find evidence for a reduction in the gender pay gap. A 1 SD increase in the fraction of women within a city-department cell leads to a nearly 10% increase in the relative earnings of those civil servants' daughters.

Marriage, fertility, migration, and schooling. If the observed effects on female LFP indeed reflect changes in gender norms transmitted via exposed parents, we may expect to see effects on other socioeconomic outcomes. In Table 5 we explore the impact of exposure on several additional outcomes. We first look at marriage and childbearing. Several influential papers have explored the marriage and fertility implications of changing labor markets as well as other economic shocks (Easterlin, 1971; Becker, 1973; Goldin, 2006; Stevenson and Wolfers, 2007). We indeed find evidence that parental exposure does have statistically discernible impacts on marriage and fertility choices. In column 1, we see that exposed daughters are less likely than their male counterparts to marry, mirroring the greater likelihood of wartime female civil servants to be unmarried themselves (Table 1). A 1 SD increase in exposure to female civil servants reduces the relative likelihood of female children being married (in 1940) by 3.6 p.p. Exposed daughters are also relatively less likely to have children in 1940 (Table 5, column 2).[36] Along the intensive margin, we see a reduction in the number of children for women (Table 5, column 3), although this estimate is imprecise. These results are collectively consistent with the broader pattern of female work in this period, where working women were primarily unmarried (Goldin, 1991).

The early half of the 20th century was also a period of substantial internal migration in the United States (Hall and Ruggles, 2004; Rosenbloom and Sundstrom, 2004; Collins and Wanamaker, 2014). Given the expansion of new employment opportunities in cities with federal jobs, one might expect some movement in order to work in these jobs, and as such we also look at migration as an outcome. We use a proxy for migration based on whether the individual works in the same state as their parent's state of residence in 1915 ("Same state"). While daughters are slightly less mobile than their male peers on average, parental exposure to wartime female workers does not significantly contribute to closing this gap (Table 5, column 4).

Finally, we also examine the educational attainment of civil servants' children as an outcome. Indeed, a large literature in development and labor economics has documented gender gaps in parental investments in human capital (Baker and Milligan, 2016; Dizon-Ross, 2019). Guided in part by this literature, we thus study whether parental exposure to female co–workers (who are also higher qualified) affects their children's gender gap in schooling. In column 5 of Table 5, we see little evidence of an overall closure in the educational attainment gap.

[36] The IV results are reported in Table A13.

We do, however, find modest evidence of increased educational attainment at higher levels of schooling, which one may predict given that the jobs driving federal government expansion (clerical jobs) were high-skilled jobs. To explore this, we use the same specification as before to regress levels of education on $\text{Exposure}_{jk} \times \text{Female}_i$. For succinctness, we report the point estimates for each separate regression in Figure 5. As the figure shows, we find evidence that parental exposure to female co–workers disproportionately increases the schooling levels of daughters (vs sons) at the college level. This increase is driven by the lower propensity to have only completed middle school or high school, reflecting a shift towards higher levels of completed schooling.

6 City-level labor market impacts

In the previous section, we presented our central finding, which is a robust increase in the LFP for female children (relative to male children) whose parents' worked in offices where there was a greater increase in the presence of women due to the demands of WWI. We also find additional evidence consistent with a change in gender norms, such as increased college attendance, lower rates of marriage, and reduced fertility.

Cross-city level variation in exposure. We now conclude our analysis by exploring the aggregate effects of this economic shock to women's participation in the federal service. To this end, we ask whether the increased entry of female civil servants had impacts beyond the vertical transmission channel documented in Section 5.1. Moving then from the individual level to the city level,[37] we ask whether cities experiencing an increase in female representation in the government also see overall increases in female labor force participation. Aggregating the exposure variation to the city-level reveals substantial variation (Figure 6). We leverage this cross-city variation to assess whether the overall presence of women affected female labor force participation beyond affected households. We thus use this aggregate measure of female exposure in a difference-in-difference (DID) framework to compare female LFP in more versus less-affected cities, before and after WWI:

$$y_{jt} \quad = \quad \beta_1 \Delta\text{Exposure}_j \times \text{Post WWI}_t + \theta_j + \tau_t + \varepsilon_{jt} \tag{4}$$

Here y_{jt} is the outcome in city j in year $t = \{1900, ..., 1940\}$. $\Delta\text{Exposure}_j = \Sigma k \Delta\text{Exposure}_{jk}$, aggregating the office-level exposure as defined by Equation 2 to the city level. Post WWI_t is 1 for census years after 1910 and 0 before. θ_j are city fixed effects and τ_t are census year fixed effects. ε_{jt} is the error term, with standard errors clustered at the city level. Note that given the construction of our treatment variable, $\Delta\text{Exposure}_j$, we estimate the continuous version of the standard DID estimator (Callaway et al., 2024; Aghion et al., 2020).

While moving to the city-level allows us to explore impacts beyond vertical transmission, exploiting cross-city variation in exposure raises different potential identification concerns. Unlike our previous results, which

[37] We focus on cities because they are arguably a relevant characterization of the local labor market.

rely on within-city and within-department variation in exposure, using cross-city variation may raise concerns about local labor market shocks that are correlated with exposure. To ameliorate concerns, we conduct a few important supplementary analyses. First, we estimate more flexible versions of Equation 4 where we include time-interacted controls for (log) city size as well as federal employment levels. Second, we test for the presence of pre-trends using a standard event study design.

Table 6 shows our results for aggregate city-level effects of the increased presence of women in federal work. On average, we find that a 1 SD increase in exposure at the city-level increases female labor force participation by 0.8–1.1 p.p. (columns 1–3). The point estimates remain comparable when introducing controls to hold constant changes in the federal workforce size (column 2) or differences in city sizes (column 3). These robustness tests suggest that the effects are unlikely to reflect changes driven by the expansion of federal employment or the fact that larger cities see a general increase in labor force participation after WWI. Finally, in column 4, we do not observe similar effects on male labor force participation, suggesting that the results indeed reflect a gender-specific shock as opposed to generic city-level employment shocks.

Figure 7, panel (a) presents the flexible difference-in-difference estimates. As the figure shows, the impact on female labor force participation persists until 1940. In contrast, city-level exposure to female federal workers is uncorrelated with female LFP prior to WWI. For comparison, panel (a) also shows the corresponding estimates for male LFP, which reveals a flat, statistically insignificant effects of female exposure over time.

In Table 6, columns 5–6, we break down female labor force participation separately for the public and private sector. As the results show, the largest effects are concentrated in the public sector (column 5). While part of the short-run effect is arguably mechanical, the persistence and increasing magnitudes well into 1940 are striking (Figure 7, panel (b)). In column 6, we focus on the effects on the private sector female labor force participation. Interestingly, we find that exposure to female federal workers also increases female labor force participation in the *private* sector. The magnitude of this spillover is smaller, but remains persistent throughout 1940 (Figure 7, Panel (b)). These results provide suggestive evidence for a wider effect of female exposure at the local labor market level, consistent with the horizontal transmission of gender norms.

6.1 Neighborhood-level cohort analysis

The effects uncovered at the city-level suggest the presence of private sector spillovers, raising the question about the underlying mechanism through which an increase in the female workforce in the public sector can also raise female work in the private sector. While identifying the exact channel of spillover is beyond the scope of this paper, we provide evidence for one plausible channel – social spillovers. A large literature in economics has highlighted the role of social learning in disseminating information and changing norms (Fogli and Veldkamp, 2011; Schmitz and Weinhardt, 2019; Bursztyn et al., 2020) Such social spillover effects are

often spatially concentrated, reflecting underlying local social networks such as church communities, schools, and local neighborhoods.

Guided by this literature, we ask if gains in female labor force participation within a given city are concentrated in neighborhoods where female wartime civil servants resided. To implement this test, we restrict the sample to those residing in the cities of interest in 1920, differentiating by whether female wartime civil servants resided in the same census enumeration district or not. We then rely on our census–linking approach (Section 4.2) to track the cohorts of interest through the census rounds 1900–1940. Figure 8 summarizes the results.[38] The figure reports the differential increase in female labor force participation in response to a 1 SD city-level increase in female exposure for each census round, broken down by areas with and without female wartime entrants. As the breakdown reveals, the gains in female labor force participation are almost entirely concentrated in census enumeration districts where female wartime civil servants were residing. In contrast, neighborhoods without female war–time entrants do not see a comparable increase in female labor force participation following a similar-sized exposure shock. While arguably suggestive, the presence of this spatial spillover is consistent with social learning as a potential mechanism through which horizontal transmission might operate.

7 Conclusion

In this paper, we have undertaken a comprehensive examination of a pivotal juncture in the history of female participation in the federal government. By leveraging novel personnel records and administrative data, we contributed to studying how WWI played a transformative role in shaping the trajectory of female participation, ultimately moving it toward the path of gender parity.

Our study offers a novel contribution to the understanding of self-reinforcing mechanisms through which temporary shocks can give rise to persistent changes in societal norms. By delving into the historical context of female participation in the federal government, we provide a rich account of how external shocks trigger transformative and lasting effects. Our research thus contributes not only to understanding of gender disparities and labor markets over time, but underscores the significance of studying "critical junctures" and moments of societal change to understand the evolution of economic and social development.

[38] Table A14 shows the corresponding regressions.

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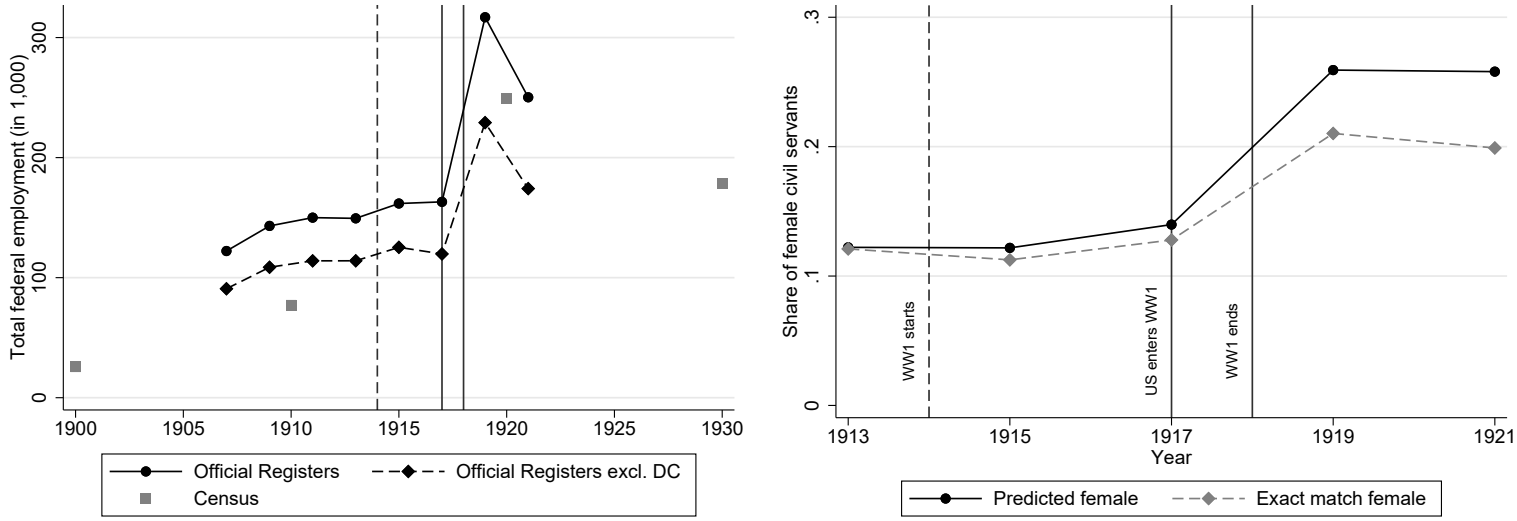
Figures and Tables

Figure 1: Expansion of the federal workforce and increase in female share



(a) Total federal employment

(b) Share of female civil servants

Notes: Panel (a): The figure shows the number (in thousands) of federal wokrers over time. The solid (resp., dashed) line reports the number computed using the Official Register data on the entire (resp., dropping District of Columbia) sample. The light-gray squares report the number derived from the decennial censuses. Panel (b): The figure shows the share of female civil servants over time. The measure is derived from the Official Register data, using our imputed gender measure (solid line) and census-linked gender measure (dashed line). See Section 2.2 for a detailed description of the procedure used to identify female civil servants.

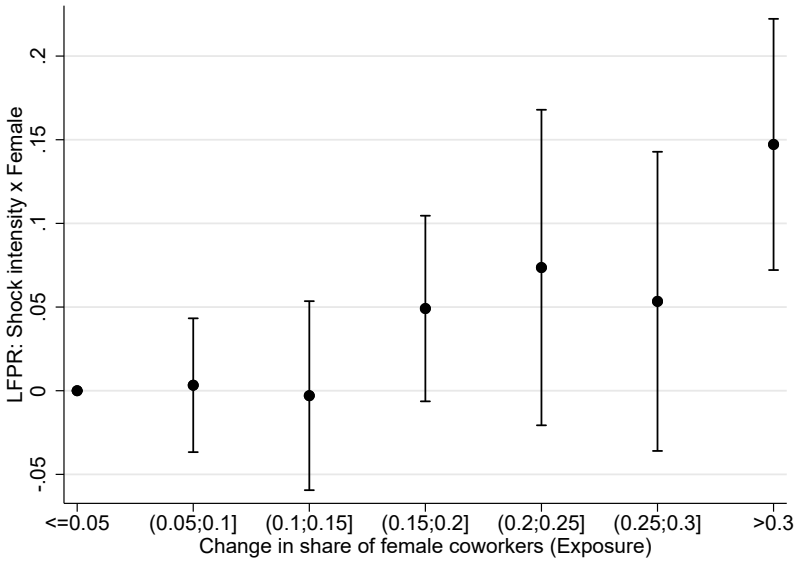
Figure 2: Female share in federal workforce, broken down by clerical vs. non-clerical work

(a) Share of female civil servants (stock) by clerk vs. non-clerk

(b) Share of female appointments (flow) by clerk vs. non-clerk

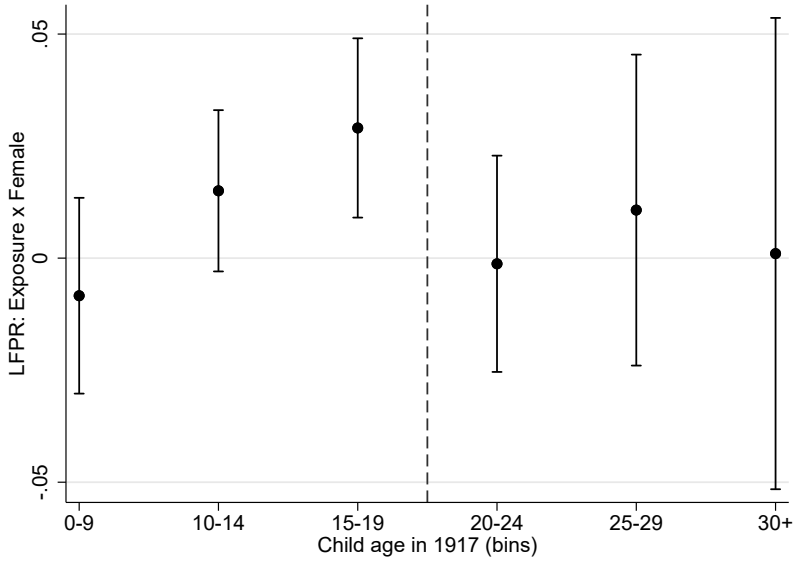
Notes: Panel (a): The figure shows the share of female civil servants by job type over time. The measure is derived from the personnel records and it classifies job types as clerical (solid line) and non-clerical (dashed line). Panel (b): The figure shows the share of female appointed in every year in the 1907-1928 period. The measure is derived from the Civil Service Commission reports and it is computed separately for clerical (solid line) and non-clerical (dashed line) jobs.

Figure 3: Exposure to female civil servants and childrens' LFP gender gap by intensity



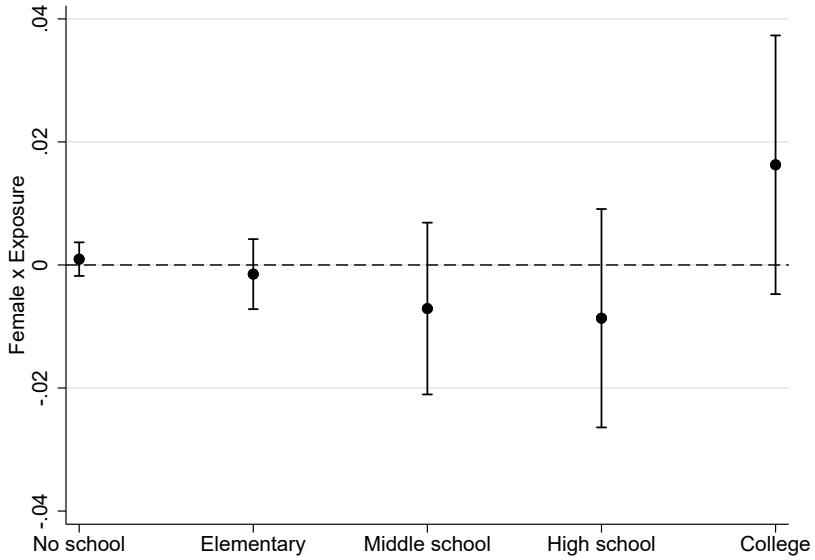
Notes: The figure replicates our baseline specification (Table 2, Col. 4), allowing the coefficient on the interaction term ΔExposure × Female, to vary by the intensity (in seven different bins) of the exposure variable. The sample includes all children of civil servants in 1915 who could be linked to the 1940 census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919. The 95% confidence intervals are based on standard errorsclustered at the office (i.e. city-department) level.

Figure 4: Exposure to female civil servants and childrens' LFP gender gap by age in 1917



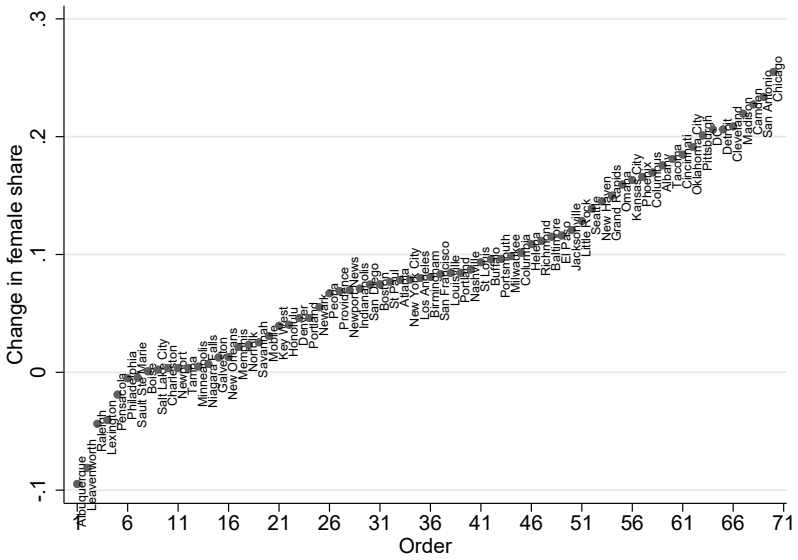
Notes: The figure replicates our baseline specification, (Table 2, Col. 4), allowing the coefficient on the interaction term ΔExposure × Female, to vary according to child's age in 1917. The sample includes all children of civil servants in 1915 who could be linked to the 1940 census with no age restrictions (see Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. The ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919. The 90% confidence intervals are based on standard errorsclustered at the office (i.e. city-department) level.

Figure 5: Exposure to female civil servants and childrens' schooling gap



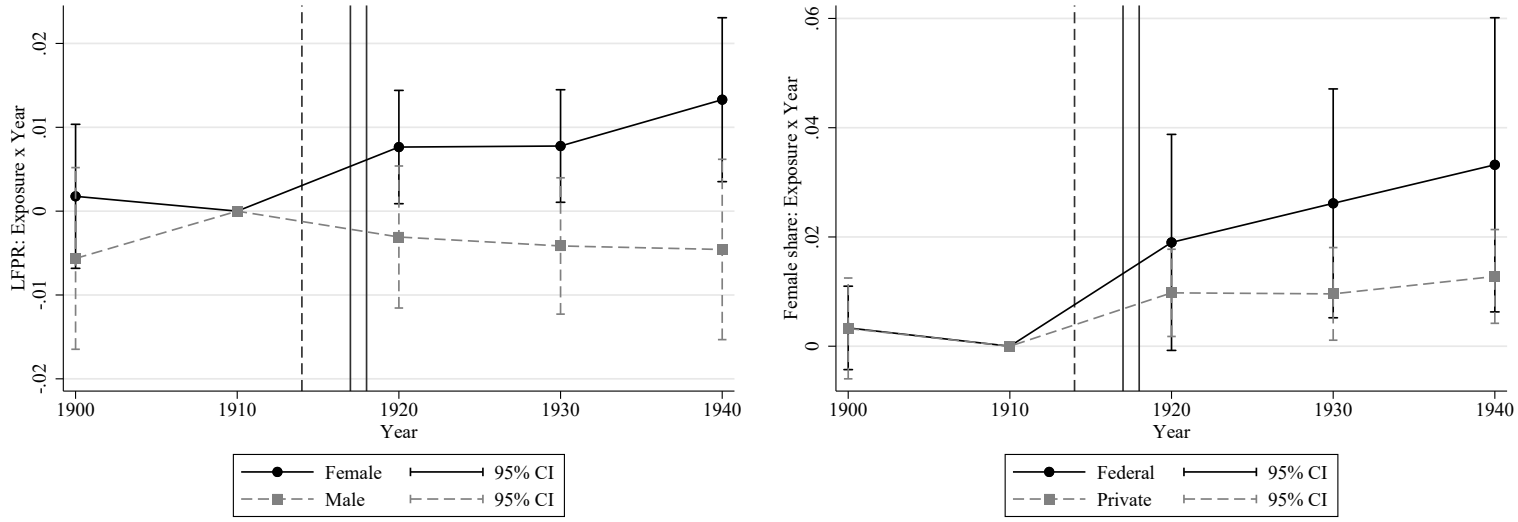
Notes: The figure plots the OLS coefficients on the interaction term ΔExposure × Female (see Equation 3). Each dot represents a different regression with children's level of education as outcome. The sample includes all children of civil servants in 1915 who could be linked to the 1940 census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the highest year of school as in the 1940 Census corresponds to the level of education indicated on the x-axis and 0 otherwise. Δ exposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919. The coefficients are estimated following the baseline specification, reported in Table 2, Column 4. The 90% confidence intervals are based on standard errorsclustered at the office (i.e. city-department) level.

Figure 6: Cross-city variation in exposure to female wartime civil servants



Notes: The figure plots the ranked distribution of the exposure to female civil servants. The eposure measure is computed as the change in the share of female civil servants across cities between 1915 and 1919 (see Equation 2). The sample consists of the 70 cities in our main sample - that is, cities with at least 20 civil servants in a given office in 1915 and in 1919 and with at least two federal government departments.

Figure 7: Exposure to female civil servants and city-level labor market outcomes

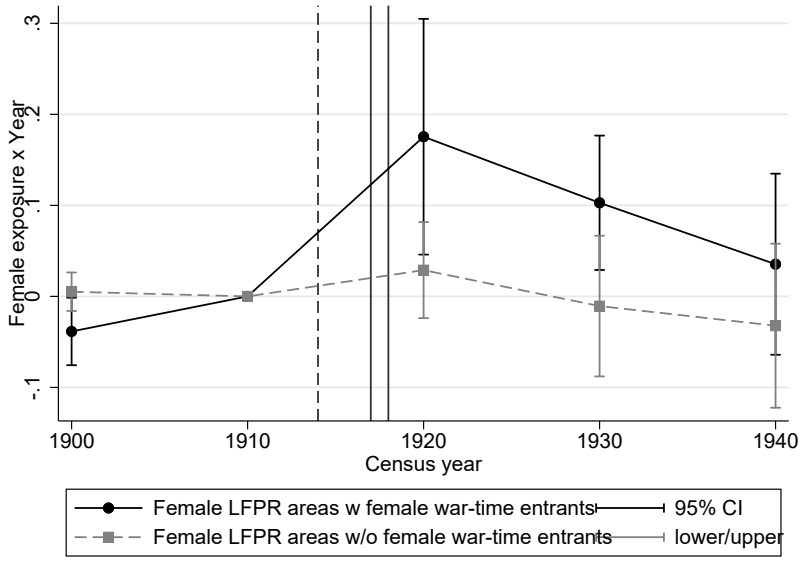


(a) Female – Male LFP

(b) Female share: federal – private

Notes: The figure replicates the full-control specification in Table 6 (Col. 3), allowing the ΔExposure coefficient to vary by each decade. The unit of analysis is the city-year. The sample consists of a balanced panel of 66 cities in our main sample covering the 1900-1940 period. In panel (a), the outcome variable is the city-year-level share of women (resp. men) in the labor force for the solid (resp. dashed) line. In panel (b), the outcome variable is the city-year-level female share in the federal public (resp. private) sector for the solid (resp. dashed) line. All outcome variables are derived from the decennial censuses. ΔExposure is the change in the share of female civil servants across cities between 1915 and 1919. 95% confidence intervals reported.

Figure 8: Exposure to female civil servants and labor market outcomes by neighborhoods



Notes: The figure shows the flexible version of Table A14, columns 3-4, where the exposure coefficients are estimated separately for each census decade. The solid line shows the estimates for the sample is restricted to women who in 1920 lived in a census enumeration district were female wartime civil servants were living. The dashed line shows the estimates for the sample is restricted to women who in 1920 lived in a census enumeration districts without female wartime civil servants. Standard errors are clustered at the city-level. 95% confidence intervals reported.

Table 1: Descriptive statistics of pre-entry characteristics

	(1) Mean	(2) Female-male	(3) WWI-pre	(4) Female × WWI	(5) Obs.
Panel A: Individual traits					
Entry age	38.86	-2.448***	4.074***	-0.572***	70,853
		(0.197)	(0.093)	(0.224)	
Never married	0.465	0.066***	-0.013***	0.051***	74,940
		(0.009)	(0.004)	(0.011)	
In labor force	0.796	-0.441***	0.030***	-0.058***	74,940
		(0.009)	(0.002)	(0.010)	
Literate	0.974	0.002	-0.005***	0.010***	74,940
		(0.003)	(0.001)	(0.003)	
Years of education	11.72	0.557*	-0.574***	0.777***	42,100
		(0.108)	(0.047)	(0.121)	
Panel B: Geographic traits					
Ln(Pop density 1910)	6.298	0.392***	0.461***	-0.340***	353,716
		(0.021)	(0.010)	(0.024)	
Same state	0.728	-0.010***	0.030***	-0.147***	340,441
		(0.004)	(0.002)	(0.004)	

Notes: The table compares the differential changes in selection into civil service between wartime and non-wartime periods and between male and female civil servants. The sample is restricted to civil servants entering into the American civil service, from 1913 to 1921. WWI is a dummy equal to 1 from year 1919 on, corresponding to the first year after the U.S. entry into WWI for which we have personnel records. Each row reports the (difference in) means of a specific characteristic attached to each entrant civil servant. Column 1 reports the mean of each characteristic over the entire sample. Column 2 (resp. 3) reports the female-male (resp. post-pre WWI) difference in means. Column 4 reports post-pre WWI difference of the female-male difference in means. Panel A reports individual-level characteristics and is restricted to civil servants linked to decennial censuses. Entry age is derived from civil servants' age as reported in the 1910 Census, dummies for being in the labor force, never being married, and being literate are derived from the 1910 Census. Years of education is derived from the highest year of completed school as reported in the 1940 Census. Panel B sample consists of all entrant civil servants, regardless of whether they are linked to decennial censuses. Population density in 1910 is at the county-of-appointment level. Same state is a dummy equal to 1 if the civil servant's work location is in the same state as the state of appointment and 0 otherwise. Robust standard errors reported. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 2: Exposure to female civil servants and effect on children's gender gap in labor force participation

	(1)	(2)	(3)	(4)	(5)
	Labor force participation				
Dep. var. mean female-male gap	-0.476	-0.476	-0.476	-0.476	-0.476
Female	-0.475***				
	(0.011)				
Δ Exposure	-0.007				
	(0.005)				
Δ Exposure × Female	0.020***	0.042***	0.044***	0.041***	0.070***
	(0.008)	(0.009)	(0.009)	(0.010)	(0.021)
City FEs	✓	✓			
Department FEs	✓	✓			
City × Department FEs		✓	✓	✓	✓
City FEs × Female		✓	✓	✓	✓
Department FEs × Female		✓	✓	✓	✓
Age FEs × Female			✓	✓	✓
Controls × Female				✓	✓
Kleibergen-Paap F-stat	-	-	-	-	46.184
Estimation method	OLS				2SLS
Observations	13,502	13,502	13,502	13,502	13,502

Notes: The table shows estimated coefficients from Equation 2. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Columns 1-4 report OLS estimates, whereas Column 5 reports 2SLS estimates. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Exposure to female civil servants and labor force participation – by parent gender and occupation

	(1)	(2)	(3)	(4)
	Labor force participation			
Dep. var. mean female-male gap	-0.538	-0.473	-0.454	-0.482
Δ Exposure × Female	-0.060	0.042***	0.071	0.050***
	(0.107)	(0.010)	(0.044)	(0.012)
City × Department FEs	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Sample	Mothers	Fathers	Clerks	Non-clerks
Observations	777	12,662	2,044	11,402

Notes: The table replicates our OLS baseline specification (Table 2, Column 4). The unit of observation is the individual-year. Each column reports coefficients estimated on a different sample of 1940 Census-linked children according to whether the parent working in the civil service in 1915 is (i) female or male (Cols. 1 and 2), or (ii) in a clerical or non-clerical job (Cols. 3 and 4). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Exposure to female civil servants and effect on children's outcome gaps - labor market

	(1)	(2)	(3)	(4)
	Employed in			
	Federal	Private	Log(Hours work)	Log(Income)
Dep. var. mean female-male gap	-0.032	-0.444	-0.085	-0.356
Δ Exposure × Female	0.020***	0.023**	0.013	0.103**
	(0.006)	(0.011)	(0.011)	(0.040)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Sample	Full sample			Working
Observations	13,502	13,502	9,003	9,032

Notes: The table replicates our OLS baseline specification (Table 2, Column 4) with additional children's labor market characteristics as outcome variables. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). In Column 4, the sample is furtherly restricted to individuals who are working in 1940. The outcome variable is a dummy equal to 1 if the child is employed in the federal government (Col. 1) or in the private sector (Col. 2) as reported in the 1940 Census. The outcome variable is (log) hours worked (Col. 3) and (log) working income (Col. 4) as reported in the 1940 Census. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 5: Exposure to female civil servants and effect on children's outcome gaps - socio-demographics

	(1) Never married	(2) Any child	(3) Children	(4) Same state	(5) Education
Dep. var. mean female-male gap	0.098	0.004	0.089	0.029	0.288
Δ Exposure × Female	0.036***	-0.024**	-0.028	0.017	0.043
	(0.012)	(0.009)	(0.032)	(0.013)	(0.081)
City × Department FEs	✓	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓	✓
Observations	13,502	13,502	13,502	13,502	13,179

Notes: The table replicates our OLS baseline specification (Table 2, Column 4) with additional children's sociodemographic characteristics as outcome variables. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). All outcome variables are derived from the 1940 Census. The outcome variable is a dummy equal to 1 if the child is single (Col. 1), has no child (Col. 2), lives in the same state as the one in which the parent was working in 1915 (Col. 4). The outcome variable is child's number of children (Col. 3), and of years of education (Col. 5). ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

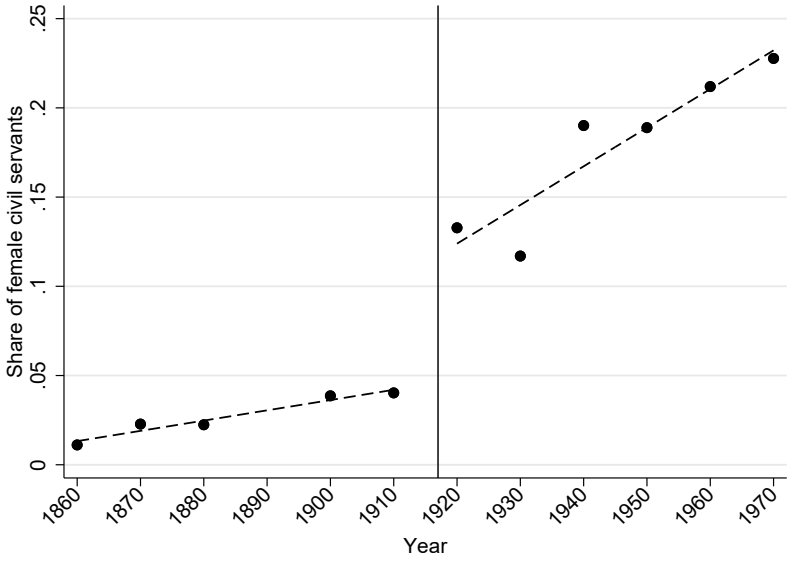
Table 6: Exposure to female civil servants and city-level labor market outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Female LFPR			Male LFPR	Female Share Federal	Female Share Private
Mean dep. var.	0.239	0.239	0.239	0.646	0.100	0.277
Δ Exposure × Post	0.010***	0.011***	0.008***	-0.001	0.024**	0.009**
	(0.003)	(0.003)	(0.003)	(0.004)	(0.010)	(0.004)
Year FEs	✓	✓	✓	✓	✓	✓
City FEs	✓	✓	✓	✓	✓	✓
Year FEs × Δ log(size)		✓	✓	✓	✓	✓
Year FEs × Log(population 1910)			✓	✓	✓	✓
Observations	330	330	330	330	330	330

Notes: The table shows OLS regression estimates from Equation 4. The unit of analysis is the city-year. The sample consists of a balanced panel of (66) cities in our main sample covering the 1900-1940 period. The outcome variable is the city-year level share of women in the labor force (Cols. 1-3), share of men in the labor force (Col. 4), female share in the federal sector (Col. 5), and female share in the private sector (Col. 6) as derived from decennial censuses. ΔExposure is the change in the share of female civil servants across cities between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Post is a dummy equal to 1 for the years 1920 and later and 0 otherwise. Δ log(size) is the 1915-1919 change in the (log) federal workforce size at the city level. Population 1910 is measured at the city level. Standard errors are clustered at the city level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

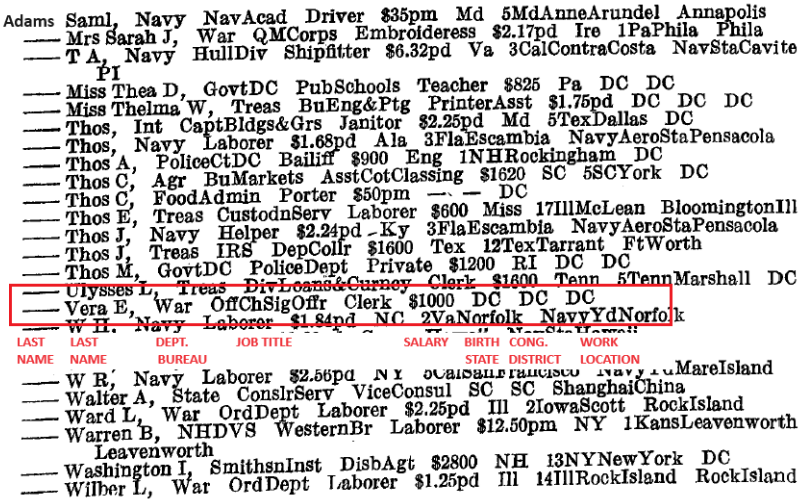
A Appendix – Additional Figures and Tables

Figure A1: Share of female civil servants over the long-run 1880–2020



Notes: The figure shows the evolution of the share of female civil servants from 1860 to 1970 as it results from US decennial censuses. The black vertical line represents the US entry in World War I in 1917.

Figure A2: Example of Official Register records



Notes: The figure shows a sample of the Official Registers for the year 1917 (p. 124). See Section 2.2 for a detailed description of the source.

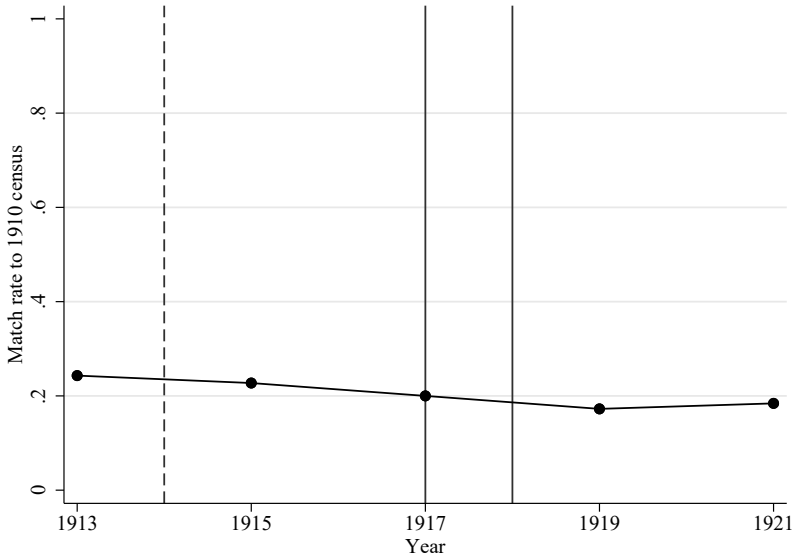
Figure A3: Example of Civil Service Commission Reports

TABLE 1.—*Number of examinations of each kind, number of persons examined, and number appointed during the year ended June 30, 1917, with the number that passed during the preceding year.*

Kind of examination.	Examinations.	Examined.			Passed (year ended June 30, 1916).			Appointed.		
		Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
FIELD SERVICES.										
For entrance:										
Educational tests—										
Accountant, petroleum	.....	9	.....	9	.....	.....	.....	.....	.....	.....
Accounts, examiner of	.....	678	.....	678	78	.....	78	19	.....	19
Agent—										
Commercial	4	10	.....	10	.....	.....	.....	.....	.....	.....
Field	16	28	.....	28	12	.....	12	4	.....	4
Local, Bureau of Fisheries	1	8	.....	8	8	.....	8	1	.....	1
Special	52	77	.....	77	.....	.....	.....	.....	.....	.....
To investigate advertising methods in South America	.....	8	1	9	.....	.....	.....	.....	.....	.....
Qualified as Latin American trade expert	.....	61	.....	61	.....	.....	.....	.....	.....	.....
Agriculture—										
Dry-land, assistant in	16	20	.....	20	.....	.....	.....	9	.....	9
Scientific and practical, expert in	.....	18	.....	18	.....	.....	.....	.....	.....	.....
Agriculturist	.....	9	.....	9	23	.....	23	.....	.....	.....
Agriculturist and field agent	.....	27	.....	27	.....	.....	.....	.....	.....	.....
Aid—										
Aeronautical, expert	.....	4	.....	4	.....	.....	.....	1	.....	1
Bureau of Standards	18	29	.....	29	.....	.....	.....	1	.....	1
Chemist's	24	57	4	61	.....	.....	.....	.....	.....	.....
Coast and Geodetic Survey	53	72	.....	72	36	.....	36	15	.....	15
Electrical and mechanical, expert	.....	82	.....	82	.....	.....	.....	3	.....	3
Field station	7	16	.....	16	.....	.....	.....	10	.....	10
Geologic (and assistant geologist)	25	60	1	61	.....	.....	.....	2	.....	2
Laboratory	.....	.....	.....	.....	.....	.....	.....	6	.....	6
Lighthouse Service	2	2	.....	2	16	.....	16	3	.....	3

Notes: The figure shows a sample table from the Civil Service Commission reports for the year 1916. See Section 2.2 for a detailed description of the source.

Figure A4: Census match rates over time

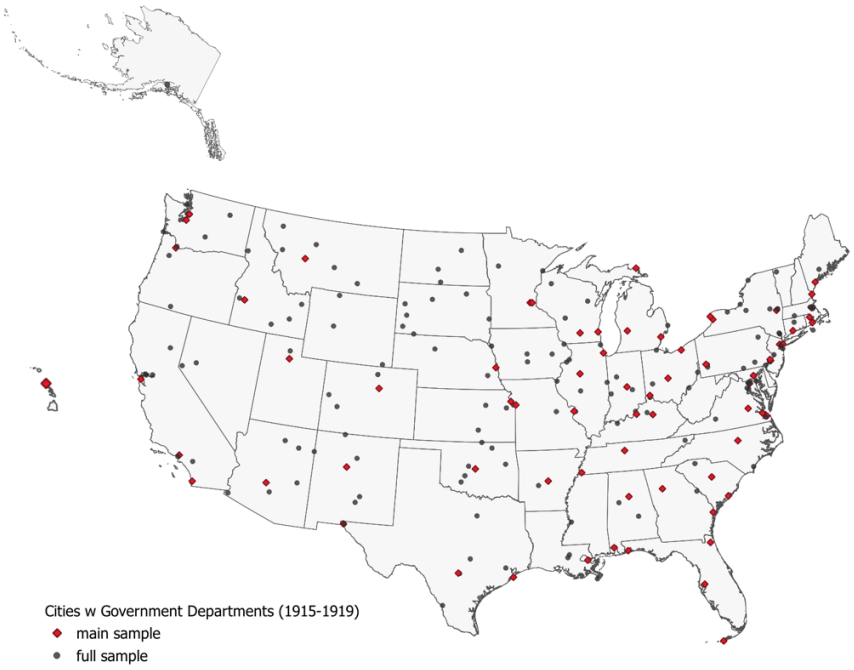


Notes: The figure shows the share of civil servants from the Official Register dataset (covering the 1913-1921 period) who could be linked to the 1910 Census.

Figure A5: Federal employment over time – by clerical vs. non-clerical occupations

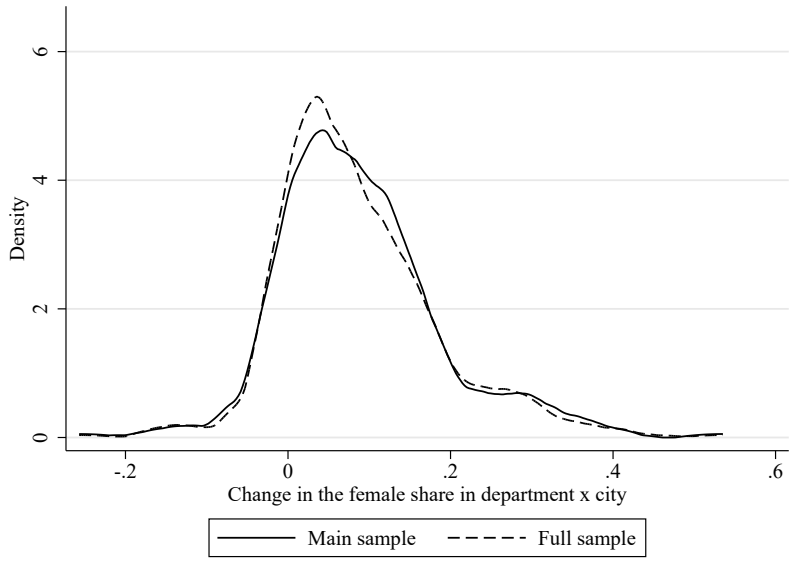
Notes: The figure shows the (log) number of federal civil servants over time from the Official Register dataset (covering the 1913–1921 period), broken down by clerical (solid line) and non-clerical (dashed line) occupations.

Figure A6: Spatial distribution of cities with federal departments



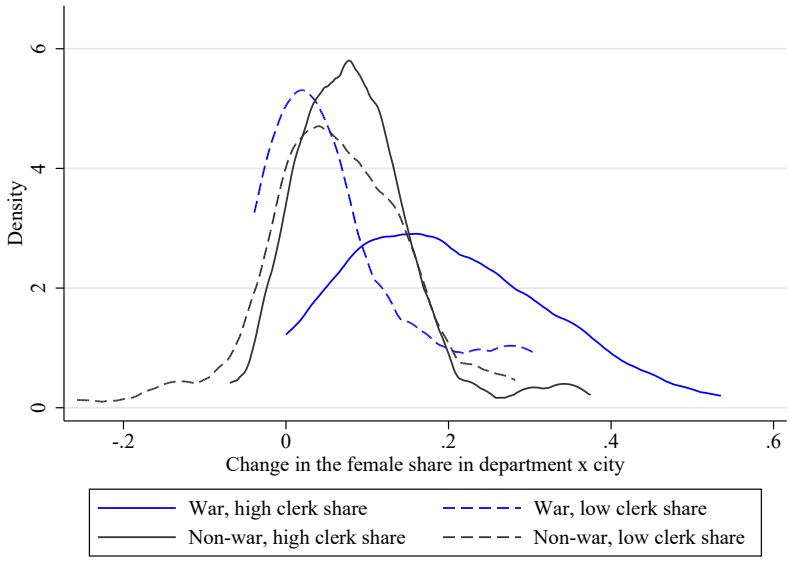
Notes: The figure shows the spatial distribution of cities with federal departments with at least 20 civil servants in a given office in 1915 and in 1919. Main sample (red squares) additionally restricts to cities with at least two departments.

Figure A7: Distribution of change in female share of civil servants at the department-city level



Notes: The figure shows the distribution of the change in the share of female civil servants across offices (i.e., city-department) between 1915 and 1919. The dashed line plots the distribution over the full sample of cities (221) with at least 20 civil servants in a given office in 1915 and in 1919. The solid line plots the distribution over our main sample of cities (70), which additionally restricts to cities with at least two federal departments.

Figure A8: Distribution of change in female share of civil servants – by clerical share and war department



Notes: The figure shows the distribution of the change in the share of female civil servants across offices (i.e., city-department) between 1915 and 1919. Blue (resp., black) lines restrict to offices in war (resp., non-war) departments. Solid (resp., dashed) lines restrict to offices with the share of clerical workers in 1915 above (resp., below) the median.

Table A1: Descriptive statistics of pre-entry characteristics - industries

	(1) Mean	(2) Female-male	(3) WWI-pre	(4) Female × WW1	(5) Obs.
Manufacturing sector	0.184	-0.117***	-0.011**	0.024**	41,616
		(0.009)	(0.004)	(0.011)	
– Light manufacturing	0.037	0.011	0.004	0.000	41,616
		(0.007)	(0.002)	(0.008)	
Professional occupations	0.106	0.221***	-0.026***	0.088***	41,616
		(0.015)	(0.003)	(0.017)	
– Education	0.054	0.184***	-0.008***	0.112***	41,616
		(0.013)	(0.002)	(0.015)	

Notes: The table compares the differential changes in selection into civil service between wartime and non-wartime periods and between male and female civil servants. The sample is restricted to civil servants entering into the American civil service, from 1913 to 1921 and who were in the labor force, but outside the government, as reported in the 1910 Census. WWI is a dummy equal to 1 from year 1919 on, corresponding to the first year after the U.S. entry into WWI for which we have personnel records. Each row reports the (difference in) means of a specific characteristic attached to each entrant civil servant. Column 1 reports the mean of each characteristic over the entire sample. Column 2 (resp. 3) reports the female-male (resp. post-pre WWI) difference in means. Column 4 reports post-pre WWI difference of the female-male difference in means. Manufacturing sector and Professional occupations are dummy variables equal to 1 if the individual is reported to work in the corresponding industry sector in the 1910 Census, according to the `IND1950` classification provided by IPUMS, and 0 otherwise. Light manufacturing is a dummy equal to 1 if the individual is reported to work in textile, paper, and printing sectors in the 1910 Census (`IND1950` = [430;459]), and 0 otherwise. Education is a dummy equal to 1 if the individual is reported to work in educational services in the 1910 Census (`IND1950` = 888), and 0 otherwise. Robust standard errors reported. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A2: Descriptive statistics of additional pre-entry characteristics - WWI and 1918 pandemic

	(1) Mean	(2) Female-male	(3) WWI-pre	(4) Female × WW1	(5) Obs.
Panel A: Patriotism					
Liberty bonds - origin state	0.218	-0.007***	-0.003***	0.009***	290,726
		(0.001)	(0.000)	(0.001)	
Desertion rate - origin state	0.015	-0.001***	-0.001***	0.001***	290,726
		(0.000)	(0.000)	(0.000)	
Enlistment rate - origin county	0.120	-0.003***	0.005***	-0.004***	270,502
		(0.001)	(0.000)	(0.001)	
Panel B: 1918 pandemic					
Influenza excess mortality – origin state	1.136	0.021***	-0.043***	-0.068***	217,269
		(0.005)	(0.002)	(0.006)	
Influenza excess mortality – destination city	588.4	18.147***	-12.481***	-7.688***	228,346
		(0.980)	(0.652)	(1.112)	

Notes: The table compares the differential changes in selection into civil service between wartime and non-wartime periods and between male and female civil servants. The sample is restricted to civil servants entering into the American civil service, from 1913 to 1921. WWI is a dummy equal to 1 from year 1919 on, corresponding to the first year after the U.S. entry into WWI for which we have personnel records. Each row reports the (difference in) means of a specific characteristic attached to each entrant civil servant. Column 1 reports the mean of each characteristic over the entire sample. Column 2 (resp. 3) reports the female-male (resp. post-pre WWI) difference in means. Column 4 reports post-pre WWI difference of the female-male difference in means. Panel A reports location-specific war-related measures, attached to each civil servant according to the state (or county) of appointment. Liberty bonds is the state-level subscription rate of the Fourth Liberty Loan during WWI (Hilt et al., 2022). Desertion rate at the state level and enlistment rate at the county level are taken from Crowder (1920). Panel B reports location-specific measures of severity of the 1918 Influenza pandemic, attached to each civil servant according to the state of appointment or the city of first federal job. The state-level measure (available for 27 states) is computed dividing the total number of people died to influenza and pneumonia in the 1918-1919 period by the corresponding number in the 1915-1916 period (data digitized from Rogers, 1920). The city-level measure (available for 46 cities) is taken from Correia et al. (2022) and is defined as the difference between the deaths to influenza and penumonia that took place in the 1918-1919 period and the number expected in the absence of the pandemic (i.e., median mortality in the 1910-1916 period), reported as a rate per 100,000 inhabitants. Robust standard errors reported. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A3: Correlates of key regressor

	(1)	(2)	(3)	(4)
	OLS		IV	
	Δ Exposure × Female		Share clerks × War × Female	
Mean of dep. var	0.00467	0.00475	0.0127	0.0127
Panel A: Children's traits				
White	-0.032	0.016	0.003	0.003*
	(0.040)	(0.013)	(0.004)	(0.001)
Number of siblings	-0.005**	-0.001	-0.000	-0.000
	(0.002)	(0.001)	(0.000)	(0.000)
Age in 1917	0.001	-0.000	0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)
Panel B: Civil servant parent's traits				
Parent is female	-0.047	-0.010	-0.009	-0.000
	(0.046)	(0.006)	(0.005)	(0.001)
Parent age in 1917	0.000	0.001**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Log(Parent salary 1915)	-0.002	-0.007*	-0.001	-0.000
	(0.011)	(0.004)	(0.001)	(0.000)
Parent tenure in 1915	0.002	0.001**	0.001**	-0.000
	(0.002)	(0.000)	(0.000)	(0.000)
Parent was clerk in 1915	0.058**	-0.000	0.006*	-0.001**
	(0.026)	(0.004)	(0.003)	(0.000)
p-value (H_0: All coefficients=0)	0.0182	0.310	0.382	0.369
City FEs	✓		✓	
Department FEs	✓		✓	
City FEs × Female		✓		✓
Department FEs × Female		✓		✓
Observations	13,520	13,514	13,520	13,514

Notes: The table reports regressions of ΔExposure × Female (columns 1–2) and Share clerks × War × Female (columns 3–4) on individual-level baseline characteristics of civil servant's children (Panel A) and their civil servant parents (Panel B). The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Share clerks is the clerical share of the parental office in 1915. War is a dummy equal to 1 if the parental office in 1915 is in a war-related department. Columns 1 and 3 include city FEs and department FEs, while Columns 2 and 4 include female-interacted city FEs and department FEs. The table also reports the p-value of a joint significance test, with the null hypothesis that all coefficients are jointly 0. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4: Predicting increase in female share of civil servants across department-cities

	(1)	(2)	(3)	(4)
		Δ Exposure		
Mean dep. var.	0.089	0.089	0.089	0.089
War dept	0.064***	0.003	0.014	
	(0.017)	(0.020)	(0.020)	
Share clerks 1915 (%)	0.209***	0.061	-0.001	-0.049
	(0.065)	(0.053)	(0.054)	(0.077)
War dept × Share clerks 1915 (%)		0.567***	0.526***	0.416**
		(0.127)	(0.142)	(0.170)
Observations	233	233	233	233
City FE			✓	✓
Department FE				✓

Notes: The table shows the first stage of our 2SLS regression estimates. The unit of observation is city-department (i.e., office). The sample consists of the 70 cities in our main sample - that is, cities with at least 20 civil servants in a given office in 1915 and in 1919 and with at least two federal government departments. The outcome variable, ΔExposure, captures the change in the share of female civil servants across offices between 1915 and 1919 (see Equation 2). War dept is a dummy equal to 1 if the office is in a war-related department. Share clerks is the 1915 share of clerks in the office. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A5: Exposure and children's gender gap in labor force participation – reduced form

	(1)	(2)	(3)	(4)
		Labor force participation		Δ Exposure × Female
Dep. var. mean female-male gap	-0.476	-0.476	-0.476	-0.476
ΔExposure × Female	0.041***		0.070***	
	(0.010)		(0.021)	
Share clerk × Female		-0.085	-0.118	0.473
		(0.127)	(0.132)	(0.721)
Share clerk × War dept × Female		0.429***		6.097***
		(0.115)		(0.897)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Kleibergen-Paap F-stat	-	-	46.187	-
Estimation method	OLS	Reduced	IV	First-stage
Observations	13,502	13,502	13,502	13,502

Notes: The table shows the coefficients from the regression model Equation 3, estimated with different strategies. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise (Cols. 1-3). Column 1 reports our baseline OLS estimates (Table 2, Col. 4) where ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919. Column 2 reports the reduced-form estimates, Column 3 shows the 2SLS estimates, and Column 4 reports the corresponding first-stage coefficients with instrumented exposure to female workers. ΔExposure is instrumented with the interaction between the office-level share of clerical workers in 1915 and a dummy equal to 1 for being in a war-related department (controlling for lower order interactions). Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A6: Exposure to female civil servants and propensity of child to be matched in 1940

	(1)	(2)	(3)	(4)	(5)
	Child is matched in 1940 Census				
Dep. var. mean female-male gap	-0.265	-0.265	-0.265	-0.266	-0.266
Female	-0.265***				
	(0.011)				
Δ Exposure	-0.009				
	(0.006)				
Δ Exposure × Female	0.009	0.010	0.010	0.009	0.025
	(0.008)	(0.008)	(0.008)	(0.008)	(0.018)
City FEs	✓	✓			
Department FEs	✓	✓			
City × Department FEs		✓	✓	✓	✓
City FEs × Female		✓	✓	✓	✓
Department FEs × Female		✓	✓	✓	✓
Age FEs × Female			✓	✓	✓
Controls × Female				✓	✓
Kleibergen-Paap F-stat	-	-	-	-	44.353
Estimation method	OLS				2SLS
Observations	22,214	22,214	22,214	22,034	22,034

Notes: The table replicates Table 2, with the outcome being a dummy equal to 1 if the civil servant's child has been linked to the 1940 Census. The unit of observation is the individual-year. The sample includes all identified children of civil servants in 1915 who are younger than 20 in 1917, regardless of whether they are linked to 1940 Census (see Section 4.2 for a detailed description of the sample). ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Columns 1-4 report OLS estimates, whereas Column 5 reports 2SLS estimates. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A7: Descriptive statistics of matched vs. unmatched sample – raw and reweighted

	(1) Overall mean	(2) Diff. means matched vs. unmatched	(3)	(4) Obs.
		Unweighted	Weighted	
Parent female	0.096	-0.008***	-0.004	34,843
		(0.003)	(0.003)	
Parent city: DC	0.380	-0.023***	-0.001	34,843
		(0.005)	(0.005)	
Parent dept: War	0.396	-0.020***	-0.000	34,843
		(0.005)	(0.005)	
Share of clerks [20 bins]	0.160	-0.001	-0.000	34,843
		(0.001)	(0.002)	
Child female	0.508	-0.266***	-0.001	34,843
		(0.005)	(0.006)	

Notes: The table compares 1940 census-linked and not-linked civil servants' children. The overall sample includes all identified children of civil servants in 1915 who are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample and of the linking procedures). Column 1 reports the mean characteristics of the full sample. Columns 2 and 3 report the difference in means between the linked and not-linked sample, using the raw variables (Col. 2) or inverse probability weighting (Col. 3). Parent female is a dummy equal to 1 if the child has a civil servant parent who is a female. DC (resp. War) is a dummy equal to 1 if the child has a civil servant parent who works in DC (resp. in a war-related department) in 1915. Share of clerks if the clerical share of the parental office in 1915. Child female is a dummy equal to 1 if the civil servant child in the sample is a female. Robust standard errors reported. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A8: Exposure and children's LFP gap – reweighting based on parental characteristics

	(1)	(2)	(3)	(4)	(5)
	Labor force participation				
Dep. var. mean female-male gap	-0.476	-0.476	-0.476	-0.476	-0.476
Female	-0.471***				
	(0.011)				
Δ Exposure	-0.005				
	(0.006)				
Δ Exposure × Female	0.018**	0.041***	0.043***	0.040***	0.073***
	(0.008)	(0.009)	(0.010)	(0.010)	(0.021)
City FEs	✓	✓			
Department FEs	✓	✓			
City × Department FEs		✓	✓	✓	✓
City FEs × Female		✓	✓	✓	✓
Department FEs × Female		✓	✓	✓	✓
Age FEs × Female			✓	✓	✓
Controls × Female				✓	✓
Kleibergen-Paap F-stat	-	-	-	-	43.266
Estimation method	OLS				IV
Observations	13,502	13,502	13,502	13,502	13,502

Notes: The table replicates Table 2, by reweighting civil servants' children in the sample (i.e. linked to the 1940 Census) to be comparable to their not-linked counterparts. The reweighting is based on: parental working city in 1915 (whether District of Columbia), parental working department in 1915 (whether war-related), 1915 clerical share (split in 20 bins) of the office of parental exposure, parental gender, and child's gender. The unit of observation is the individual-year. The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Columns 1-4 report OLS estimates, whereas Column 5 reports 2SLS estimates. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A9: Exposure and children's LFP gap – bounding potential selection bias

	(1)	(2)
	Labor force participation	
Dep. var. mean female-male gap	-0.477	-0.477
Δ Exposure × Female	0.033***	0.045***
	(0.007)	(0.016)
City × Department FEs	✓	✓
City FEs × Female	✓	✓
Department FEs × Female	✓	✓
Age FEs × Female	✓	✓
Controls × Female	✓	✓
Kleibergen-Paap F-stat		43.935
Estimation method	OLS	IV
Impute for missing	Not in LF	
Observations	22,616	22,616

Notes: The table replicates Table 2 on a larger sample including all identified children of civil servants in 1915 who are younger than 20 in 1917, regardless of whether they are linked to 1940 Census (see Section 4.2 for a detailed description of the sample). The unit of observation is the individual-year. Not-linked children in the estimation sample are imputed not to be in the labor force. Column 1 (resp. 2) reports coefficients estimated with OLS (resp. 2SLS) strategy. The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A10: Exposure and children's LFP gap – outlier robustness checks

	(1)	(2)	(3)	(4)	(5)
	Labor force participation				
Dep. var. mean female-male gap	-0.476	-0.492	-0.487	-0.469	-0.476
Female × Δ Exposure	0.041***	0.033*	0.044***	0.039	
	(0.010)	(0.019)	(0.011)	(0.027)	
Female × Δ Exposure (winsorized)					0.042***
					(0.010)
City × Department FEs	✓	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓	✓
Sample	Full	Non DC	War dept	Non-war dept	Full
Observations	13,502	8,709	5,437	8,040	13,502

Notes: The table replicates our OLS baseline specification (Table 2, Col. 4), accounting for outliers. The unit of observation is the individual-year. In Column 1, we report the OLS baseline coefficient (Table 2, Col. 4) to ease comparison. In the following columns, the sample is restricted to children with civil servant parents working in 1915 in offices that are not in Washington D.C. (Col. 2), are in war-related departments (Col. 3), are not in war-related departments (Col. 4). In Column 5, the sample drops the top 2.5% of observations on both tails of the ΔExposure measure. The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A11: Exposure and children's LFP gap – change in federal workforce size

	(1)	(2)	(3)	(4)
	Labor force participation			
Dep. var. mean female-male gap	-0.476	-0.476	-0.471	-0.476
Δ Exposure × Female	0.041***	0.041***	0.040***	0.045***
	(0.010)	(0.011)	(0.011)	(0.014)
Δ size × Female		-0.000		
		(0.001)		
Δ (log) size × Female			-0.002	
			(0.006)	
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Δ size × Female [10 bins]				✓
Controls × Female	✓	✓	✓	✓
Observations	13,502	13,502	12,189	13,502

Notes: The table replicates our OLS baseline specification (Table 2, Col. 4). The unit of observation is the individual-year. In Column 1, we report the OLS baseline coefficient (Table 2, Col. 4) to ease comparison. In the following columns, the baseline specification is augmented with the 1915-1919 change in the federal workforce across offices: the raw variable (Col. 2), the corresponding log value (Col. 3), and the raw variable split in 10 bins (Col. 4). The sample includes all children of civil servants in 1915 who could be linked to the 1940 census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). The outcome variable is a dummy equal to 1 if the child is in the labor force in 1940 and 0 otherwise. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A12: Exposure and effect on children's outcome gaps - labor market, IV

	(1)	(2)	(3)	(4)
	Employed in			
	Federal	Private	Log(Hours work)	Log(Income)
Dep. var. mean female-male gap	-0.032	-0.444	-0.085	-0.356
Δ Exposure × Female	0.031**	0.041*	-0.024	0.101
	(0.013)	(0.023)	(0.022)	(0.083)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Kleibergen-Paap F-stat	46.184	46.184	42.856	43.108
Sample	Full sample			Working
Observations	13,502	13,502	9,003	9,032

Notes: The table replicates Table 4, with 2SLS estimation strategy. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). In Column 4, the sample is furtherly restricted to individuals who are working in 1940. The outcome variable is a dummy equal to 1 if the child is employed in the federal government (Col. 1) or in the private sector (Col. 2) as reported in the 1940 Census. The outcome variable is (log) hours worked (Col. 3) and (log) working income (Col. 4) as reported in the 1940 Census. ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A13: Exposure and effect on children's outcome gaps - sociodemographics, IV

	(1) Never married	(2) Any child	(3) Children	(4) Same state	(5) Education
Dep. var. mean female-male gap	0.0978	0.00436	0.0894	0.0294	0.288
Δ Exposure $\times$ Female	0.054**	-0.031*	0.025	0.049*	0.179
	(0.024)	(0.019)	(0.059)	(0.025)	(0.156)
City FEs $\times$ Department FEs	✓	✓	✓	✓	✓
City FEs $\times$ Female	✓	✓	✓	✓	✓
Department FEs $\times$ Female	✓	✓	✓	✓	✓
Age FEs $\times$ Female	✓	✓	✓	✓	✓
Controls $\times$ Female	✓	✓	✓	✓	✓
Kleibergen-Paap F-stat	46.184	46.184	46.184	46.184	45.607
Observations	13,502	13,502	13,502	13,502	13,179

Notes: The table replicates Table 5, with 2SLS estimation strategy. The unit of observation is the individual-year. The sample includes all children of civil servants in 1915 who could be linked to the 1940 Census and are younger than 20 in 1917 (see Section 4.2 for a detailed description of the sample). All outcome variables are derived from the 1940 Census. The outcome variable is a dummy equal to 1 if the child is single (Col. 1), has no child (Col. 2), lives in the same state as the one in which the parent was working in 1915 (Col. 4). The outcome variable is child's number of children (Col. 3), and of years of education (Col. 5). ΔExposure captures the change in the share of female civil servants across offices (i.e. city-department) between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Female is a dummy equal to 1 if the child of the civil servant is female and 0 otherwise. Controls include: (i) a set of child's characteristics (i.e., a dummy equal to 1 if white, and number of siblings), and (ii) a set of civil servant parent's characteristics (i.e., a dummy equal to 1 if female, age in 1917, a dummy equal to 1 if clerical position in 1915, and (log) salary in 1915). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A14: Exposure to female civil servants and city-level labor market outcomes – by neighborhood exposure

	(1)	(2)	(3)	(4)
	Labor force participation			
Mean dep. var.	0.214	0.697	0.227	0.209
Δ Exposure × Post	0.086**	-0.021	0.156***	0.036
	(0.043)	(0.029)	(0.058)	(0.038)
Year FEs	✓	✓	✓	✓
Individual FEs	✓	✓	✓	✓
City FEs	✓	✓	✓	✓
Age × Year FEs	✓	✓	✓	✓
Δ (log)size × Year FEs	✓	✓	✓	✓
Sample	Female	Male	Female	
Neighborhoods	All	All	Entrants	No entrants
Observations	11,991,020	13,724,485	3,067,754	8,923,011

Notes: The table shows OLS regression estimates from Equation 4. Unit of observation is the individual-year. The sample covers a panel of census-linked individuals present in the main sample of (70) cities in 1920 through the years 1900–1940. ΔExposure is the change in the share of female civil servants across cities between 1915 and 1919 and it is standardized to mean 0 and standard deviation 1. Post is a dummy equal to 1 for the years 1920 and later and 0 otherwise. The outcome variable is a dummy equal to 1 if the individual is in the labor force in 1940 and 0 otherwise. Δ (log)size measures the (log) change in the city-level federal employment between 1915–1919. Column 1 and Columns 3–4 restrict the sample to women only, while Column 2 restricts the sample to men. In column 3 (resp., 4), the sample is restricted to women who in 1920 lived in a census enumeration district with (resp., without) at least one female wartime civil servant. Standard errors are clustered at the city-level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.