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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 a large organization can persistently shift gender norms. Exploiting city-by-department variation in the sudden expansion of female clerical employment driven by World War I, we 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. These intergenerational effects increase with the size of the city-level exposure to female government workers and are driven by 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 contemporaneous increases in private sector labor force participation suggestive of spill-overs. Collectively, the results are consistent with both the vertical and horizontal transmission of gender norms and highlight how increasing gender representation within the public sector 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 can shift in response to short-term measures. Micro-level evidence on how temporary shocks can persistently shape gender norms remains, however, limited.

This paper studies how gender norms – societal expectations about how men and women should behave[1] – can persistently shift in response to sudden shocks to the gender composition of a large organization. We document the long-term effects on gender norms brought about by World War I (WWI) and the sudden increase in female workers within the nation's largest employer, the U.S. federal government. WWI entailed an economy-wide mobilization of resources to equip and coordinate military forces of both the U.S. and its allies (Kennedy, 2004). Wartime mobilization witnessed increased demand for civilian labor throughout the bureaucracy, including new openings for stenographers, typewriters, and other clerical positions (Smith, 1928). New openings for government workers were for the first time disproportionately filled by women (Gavin, 1997). The sudden influx exposed incumbent (and primarily male) workers to female co-workers, often for the first time (Nienburg, 1920). This demographic change in government composition was persistent, though: even after WWI ended, women played an increasingly prominent role in government work (Figure A.I).

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 wartime increases in the presence of female co-workers.

A key challenge to the study of gender norms is measurement. We introduce a simple framework to make precise our definition of gender norms. This framework also helps motivate our measurement, which relies on changes in the gender labor force participation gap to infer changes in gender norms around work – an approach followed by seminal papers on norms (Alesina et al., 2013; Fernández, 2013). 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. We can then measure long-term changes in gender norms by observing gender gaps in later-life outcomes among children of civil servants who worked in offices with high vs. low exposure to female co–workers. 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] We provide a more expanded and explicit discussion of our operationalization of gender norms in Section 2.2.

The identification challenge in our setting is that the temporary increase in female government workers may be correlated with geographical or workplace differences that directly affect gender-related outcomes. Our unique empirical 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. This is a major advancement of the empirical literature which relies on more aggregate geographical units of analyses (Giuliano, 2021). Furthermore, we can follow the "epidemiological approach" (see, e.g., Fernández (2011)) by studying movers who face the common local labor market conditions in their destination city but vary by their parental exposure to female co–workers depending on their origin city and parental department of work.

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 within two years (1917–1919). Linking personnel records to the full-count census, these female wartime entrants are younger, less likely to be married, more mobile, and more educated when compared to women entering before WWI. 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.

Second, we provide evidence for the vertical transmission of gender norms. 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 9%. 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 a shift-share instrumental variable design.

Our main results are robust to a wide range of falsification and robustness checks. Leveraging the high-frequency personnel records, we find that the office-level exposure effects are only driven by those civil servants exposed to the increase in female co–workers. In contrast, we do not find any effects on those who worked in the same (to-be exposed) offices but left prior to WWI. We also 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). 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. 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. We also rule out that our results are driven by other factors correlated with the increase in female co–workers such as the expansion of federal employment or the increase in the share of clerical positions. We find that the intergenerational transmission of gender norms – as captured by the increased female labor force participation of daughters of civil servants – is solely driven by parental exposure to a greater share of female workers. Finally, we complement our main measure of gender norms – the labor force participation of daughters – with an alternative measure: the propensity of men to marry a working spouse. Consistent with parental exposure to female co–workers shifting norms, we find that men exposed to a large number of female co–workers are more likely to marry a working spouse. This is driven by marriages formed after WWI and not mechanically by marriages among co–workers, providing additional evidence in support of broader changes in gender norms.

We then explore the mechanisms driving the vertical transmission of norms by asking whether parental exposure to female co–workers affected marriage, fertility, and schooling outcomes – key factors that determine female labor force participation. Consistent with the fact that female work during our study period was dominated by unmarried women (Goldin, 1991), we find that daughters of exposed parents are less likely to be married and more likely to have fewer children. Turning to human capital accumulation, we only find weak evidence that parental exposure to female co–workers increased the education levels of daughters. In a mediation exercise, we find that these observable differences in marriage status, fertility, and schooling cannot fully explain the increased labor force participation of exposed daughters. Parental exposure to female co–workers thus increases labor force participation above and beyond affecting the proximate determinants of labor force participation – consistent with changing norms to female work. Turning to additional labor market outcomes, the exposure effects are not only concentrated in federal government work but also extend to female work in the private sector. Rather than only transmitting information about job opportunities for women in the federal government, the private sector spillover is consistent with parental exposure to female co–workers shifting broader norms towards female work. Overall, parental exposure to female co–workers closes the gender earnings gap by 10 log points, reflecting the move of women not only into the labor force but also into higher earning positions.

An intriguing question in our setting is the extent to which the results reflect a greater sustained *demand* for female workers in the public sector, as opposed to a change in gender norms affecting the decision to work. While our reliance on within-city variation ensures that the results are not driven by cross-city differences in labor market conditions, we can rely on "movers" to directly disentangle the role of norms from local labor market conditions correlated with the office-level exposure shock. By 1940, 67% of the civil servant children lived in a city other than their parent's city of residence at the onset WWI, allowing us to separate out geography from the role of norms transmission. Indeed, even when comparing children of civil servants who ended up moving to the same city by 1940 (and thus face the same new labor market conditions and institutional environment),

variation in their parental exposure to female co–workers at the *origin* city–department remains highly predictive of greater labor force participation. The evidence from the "epidemiological approach" strongly suggests that the parental exposure effects we uncover reflect the transmission of norms.

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 the children of incumbent co–workers 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 female 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. Mirroring our individual-level results, we find that the exposure effects only affect aggregate female labor force participation, leaving male labor force participation unaffected. 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. 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; Bertrand, 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 in 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). 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.[2] 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,

[2]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.

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.[3] 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.

2 Background and Data

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

The United States entered WWI, later known as the "Great War," in April 1917. WWI involved a nationwide economic mobilization, unlike previous American military involvements. While nearly 1.2 million American soldiers participated in WWI (Keene, 2002), the war effort went beyond simply putting "boots on the ground."[4] The U.S. provided extensive manpower and resources for war-related government production activities, which included building shipyards, producing munitions, and other industrial activities to support American troops and their allies (Zieger, 2000; Rockoff, 2004).

[3] Among the few papers studying WWI are Gay (2023) and 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.

[4] In his joint address to Congress leading to the Declaration of War against Germany, President Woodrow Wilson predicted that the war would "involve the organization and mobilization of all the material resources of the country" (April 2, 1917).

Federal officials were exempt from military service as the federal government took on a central role in mobilizing and coordinating the war. The war led to an increase in demand for administration at all levels of government, changing the size and structure of the federal bureaucracy. Existing departments expanded and new agencies were created to coordinate and administer war-related activities, such as the Food and Fuel Administrations, the War Trade Board, the War Industries Board, and the Bureau of War Risk Insurance (Cuff, 1980). The first year of the war alone saw 100,000 new government jobs open up, all of which needed to be filled quickly. Thousands of artisans and laborers were needed to meet the demands of a growing bureaucracy (Osborn, 1917). Administrative growth also led to the creation of many new white-collar jobs within the government such as clerks, typists, and secretaries. 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. 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).

Prior to the war, federal departments retained discretion in making positions available to female employees. Several departments – such as the War and Navy departments – refused to consider women for many jobs within the federal service (Carpenter, 1942).[5] The rapidly expanding federal government provided new opportunities for female workers (Dumenil, 2017). 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 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).

The increased presence of women in federal government work occurred against the backdrop of ongoing changes within the broader labor market. At the time the U.S. entered the war, clerical work was on its way to becoming an "archetypal paid job" for women entering the labor force (England and Boyer, 2009). Indeed, the share of female 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

[5] While the Pendleton Act introduced rule-based exams, there remained discretion in making exams eligible for women.

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).[6] On the supply side, access to secondary school increased the number of young women who were qualified for clerical work (Goldin, 1990).[7] Our study shows how WWI also changed the demand for female workers, as well as the long-run effects of this sustained change.

2.2 Conceptualizing gender norms

A major challenge in the study of gender norms is measurement. This challenge is compounded in our historical setting, where survey data on beliefs and attitudes is unavailable. To make progress, we use a simple framework to make precise our definition of gender norms. This framework also motivates our measurement relying on changes in the gender labor force participation gap to infer changes in gender norms around work.

Setup. Broadly speaking, we define gender norms as societal expectations about how men and women should behave (Horne and Mollborn, 2020). These societal expectations in turn shape individual behavior, such as the decision to participate in the labor market. To see this, consider a setting where an agent i with group trait $j = \{m, f\}$ – male or female – decides to work. In our framework, there exists uncertainty over the wage w_i and the extent to which working is penalized (or rewarded) by society, as captured by ν_j, which is common across individuals of the same group. The agent will thus decide to work if the expected utility from working exceeds the certain utility derived from exercising the outside option $\underline{w_i}$:

$$\mathbf{E}[w_i] - \mathbf{E}[\nu_j|\mathbf{s}] > \underline{w_i} \tag{1}$$

We follow Fernández (2013) and conceptualize ν_j as capturing the gender-specific societal norm about work. For example, $\nu_f > 0$ can be interpreted as a social sanction that is imposed on working women, reducing their utility from work. Since there exists uncertainty over the size of the social sanction, the agent relies on signals captured in the tupel $\mathbf{s} = \{x_i, z\}$ to form an expectation. Theories of intergenerational transmission highlight mechanisms such as the transmission of norms from parents to daughters (Fernández et al., 2004; Fernández, 2011) or through social interactions (Bisin and Verdier, 2001; Fogli and Veldkamp, 2011). Such modes of transmission of norms around working were present at the turn of the 19th century.[8] We thus consider two types of signals. Agents can receive a private, individual-specific signal x_i. In our setting, this corresponds to the parental exposure to female co–workers, capturing the vertical transmission of norms from father to child.[9]

[6] 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).

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

[8] Goldin (1980), for instance, concludes that "[p]arents were a large factor in the intergenerational transmission of cultural norms" regarding the decision of single women to work.

[9] This channel also directly relates to the literature on cultural transmission, where beliefs and values are transmitted "from generation to generation" (Guiso et al., 2006).

Agents can also receive a public signal z that captures the horizontal transmission of norms. In our setting, this corresponds to the aggregate exposure to female workers in the labor market.

Implications for empirics. Equation 1 illustrates the key measurement challenge in the study of gender norms. Gender norms regarding work, captured by the term $\mathbf{E}[v_j|\mathbf{s}]$, are latent and unobservable. Absent direct elicitation, empirical work typically relies on relating shifters of gender norms (such as $\mathbf{s}$) to changes in observable outcomes – in this case, labor force participation. This approach is followed by a large body of work studying the historical origins of differences in gender norms, as manifested in gender gaps in labor force participation (Fernández and Fogli, 2009; Alesina et al., 2013).[10] Notice that Equation 1 implicitly imposes an exclusion restriction, whereby parental exposure only affects expectations about the societal sanctions v_j – also known as injunctive norms. To the extent that norms are descriptive (i.e., convey information), parental exposure can also affect expectations about labor market outcomes (i.e., $\mathbf{E}[w_i|s]$).[11] While we will not be able to fully disentangle both types of norms, our research design will allow us to credibly separate the exposure effects from local labor market factors correlated with exposure (Section 4).

For our empirical test, we use variation in exposure to female civil servants induced by the war-driven influx of women as a shifter of gender norms to study the effects on labor force participation. We expect that greater exposure to female civil servants leads women to revise downwards their expected social sanction, increasing their propensity to join the labor force.

2.3 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).[12] We build on the prior digitization effort by Aneja and Xu (2022), enriching the data to include worker's sex (details discussed in Section 2.4), 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 A.II provides a sample of the records in the Official Registers. For our main analysis, we restrict the sample period to President Woodrow

[10] A large literature on gender differences in LFP has also considered the role of other factors, such as the level of development, women's education, and family choices such as divorce (see, e.g., Goldin (1990) for a review).

[11] For a detailed discussion of injunctive and descriptive norms, see Cialdini et al. (1990).

[12] 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 covering only senior levels of the administration.

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.[13] As discussed in Aneja and Xu (2022), this can be an important advantage, given the potential for discrimination within occupations (Margo, 1990).

Full-count U.S. decennial Census. We make use of the full-count U.S. decennial population Censuses (1900-1940) in all parts of our analysis (Ruggles and Meyer., 2019). To drill down on the changing gender composition of the federal workforce, we first use the 1910 Census. This allows us to study the traits of those who entered as civil servants, based on characteristics before entering the service. In the main part of the paper (i.e., to study the effects of WWI on gender norms), we use census data to identify both the children and spouses of serving civil servants, as well as to examine the outcomes of the former in adulthood as a function of parental exposure to female co–workers.[14] For the latter part of our main analysis, we use the rich socioeconomic outcomes that the Census Bureau included in the 1940 Census. Finally, we also use census data to study the aggregate effects of exposure on city-level female labor force participation, as well as spatial heterogeneity within a city.

2.4 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 based on name and birth state. When comparing our imputed sex measure with the census-linked measure, both measures coincide

[13] Since the U.S. Census did not record a person's income before 1940, analyses of economic status typically rely on imputed incomes based on the linkage of a person's occupation to future censuses (Sacerdote, 2005; Collins and Wanamaker, 2021).

[14] We describe the linking of civil servant parents to children in Section 4.3.

with a correlation of 0.97. This gives us confidence in the validity of our imputed measure of sex.[15]

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

3.1 Expansion of federal employment and female representation

Our broad aim is to demonstrate that WWI changed norms towards women in the workplace by exposing federal civil servants to substantial numbers of working women for essentially the first time. Our first objective in documenting this transformation of gender norms is to document the rise of women within the federal government. We demonstrate quantitatively how wartime economic mobilization suddenly and substantially increased female representation 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.

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 I, 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 I highlights, federal employment declines slightly between 1919 and 1921. However, the federal 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 I, Panel (a)).[16] 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 a 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 I, Panel (b) shows the share

[15] 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).

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

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.[17]

Figure II breaks down the expansion of the overall federal employment by clerical vs. non-clerical positions. The expansion of the federal workforce was driven almost exclusively by the increase of the clerical workforce to meet the administrative demands of war. While panel (a) shows an expansion of federal government employment across both clerical and non-clerical occupations, the increase is significantly sharper for clerical positions. Panel (b) 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. The share of women in the federal clerical workforce jumped from around 30% to almost 70% within two years, 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 data to be able to study how the 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.[18] We then examine how gender gaps in pre-determined individual characteristics differ for wartime vs. non-wartime entrants.[19] Table I, Panel (a) presents descriptive evidence of differential changes in selection

[17] 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 A.III 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.

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

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

$$y_i = \beta_0 \text{Female}_i + \beta_1 \text{Post WWI}_{T(i)} + \beta_2 \text{Female}_i \times \text{Post WWI}_{T(i)} + \varepsilon_i \quad (2)$$

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.

into civil service using 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.[20] This suggests that the female wartime entrants may be coming from a previously untapped pool of labor.[21]

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 I, 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 I, 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.[22]

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 of the labor force. At the same time, they are more likely to have moved from rural areas or from a different state.[23] 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.

We define the indicator variable Post $\text{WWI}_{T(i)} = \mathbb{1}[t \geq 1919]$, corresponding to the first year after the U.S. entry into WWI for which we have personnel records. ε_i is the error term.

[20] 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.

[21] 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 A.I). 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 female 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.

[22] Results shown in Table I, 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.

[23] 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 A.II 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.

4 Empirical strategy

4.1 Measuring exposure to female civil servants

Did the large influx of female civil servants change gender norms within the federal government? Our identifying source of variation stems from the differential intensity of the war-driven increase in female civil servants across cities and departments. This variation allows us to compare the outcomes of those in offices that were more or 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 pair – or *office* – as follows:

$$\Delta\text{Exposure}_{jk} = \left(n^f_{jk1919}/(n^m_{jk19}+n^f_{jk19})\right) - \left(n^f_{jk15}/(n^m_{jk15}+n^f_{jk15})\right) \tag{3}$$

where j denotes the city and k the department. n^f_{jk19} denotes the number of female civil servants in the given office jk in 1919, while n^m_{jk19} denotes the corresponding number of male civil servants. Equation 3 thus captures the change in the share of female civil servants across offices between 1915 and 1919.

We restrict our main analysis to cities with at least 20 civil servants in a given office in 1915 and 1919. Since 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.[24] Figure III plots the distribution of 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 10 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 Estimating exposure effects

To assess the impact of exposure to female co–workers on gender norms – measured by the labor force participation of daughters of exposed civil servants (relative to their sons) – we estimate the following regression:

$$y_i = \beta_1 \text{Female}_i + \beta_2 \Delta\,\text{Exposure}_{jk} + \beta_3 \Delta\,\text{Exposure}_{J(i)K(i)} \times \text{Female}_i + \theta_{J(i)} + \tau_{K(i)} + \gamma' x_i + \varepsilon_i \tag{4}$$

Equation 4 relates the labor force participation outcome y_i for child i to the intensity of the parental exposure to female co–workers. Parental exposure $\Delta\text{Exposure}_{J(i)K(i)}$ (defined in Equation 3) varies at the office–level, with $j = J(i)$ and $k = K(i)$ denoting the city and department where the child i's parent worked at time of exposure in 1915, respectively. Female_i is a dummy variable that is 1 for daughters and 0 for sons.

The coefficient β_1 captures the (female-male) gender gap in labor force participation, while β_2 captures the

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

extent to which parental exposure to female co–workers affects the labor force participation decision of sons. Our main coefficient of interest is β_3, capturing the extent to which parental exposure to female co–workers affects the children's gender gap in labor force participation. In line with the gender-specific transmission of norms, we hypothesize that parental exposure to female co–workers differentially increases the likelihood of daughters to work later in life, i.e. $\beta_3 > 0$. x_i is a vector of additional controls that will be discussed when relevant, and ε_i is the error term. We cluster the standard errors at the office-level $J(i)K(i)$, coinciding with the level at which the parental exposure to female co–workers varies.

Identification. A key empirical concern is that differences in exposure to female co–workers ($\Delta\text{Exposure}_{J(i)K(i)}$) might be correlated with other unobserved factors that influence whether certain locations or departments are more likely to hire women. 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 parental exposure.

A distinct advantage of our setting is that parental exposure to female co–workers varies at the granular office-level, providing variation in exposure even within the same city (across departments) and the same department (across cities). 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 at the city- or department-level. Identification of the effect of parental exposure to female co-workers relies on the standard conditional independence assumption – namely, that the residual variation in female exposure is exogenous after partialing out city and department fixed effects. While we cannot directly test this assumption, we provide evidence in support of it by examining how our treatment variable relates to pre-treatment observable characteristics. In Table A.III, we show that exposure to female co–workers is, conditional on the city and department fixed effects, uncorrelated with an office's pre-war share of female co–workers. In Table A.IV, columns 1–2, we also 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.[25]

4.3 Linking parental exposure to children

The focus on intergenerational gender gaps in labor force participation as an indirect measure of gender norms requires (i) identifying the children of civil servants and (ii) tracking them into adulthood. The focus on both daughters and sons further complicates tracking children into adulthood as women traditionally changed their names after marriage. To implement our linkages, we rely on a range of "best practices" from the census linking literature to maximize the match rates of children over time.

[25] 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 A.IV, column 1) as well as a specification in which we also allow these intercepts to vary by gender (Table A.IV, column 2).

Identifying the children of civil servants. To identify the children of civil servants, we restrict the sample of potential parents to civil servants serving in 1915 who can be linked to either the 1900, 1910, or 1920 censuses. In each of the three census rounds, we define a "potential child" as a household member who (i) shares the same last name of the civil servant, (ii) is at least 18 years younger than the potential parent, and (iii) is aged 18 or younger in that census year. We restrict the sample to children born in or before 1917, the year the US entered WWI. These restrictions yield a sample of 29,290 civil service parents and 75,719 unique children.

Tracking the children of civil servants into adulthood. We match the children identified in the previous step to the 1940 census to observe labor force participation decisions in adulthood. We combine three linking approaches to maximize the linkage rate. First, we leverage genealogical data from Census Tree (Buckles et al., 2023). This cross-walk relies on crowd-sourced genealogies and marriage certificates, providing information on last name changes of women. This is a major advantage as it allows us to track women over time. Overall, we are able to match 41,642 children to the 1940 census.

Second, we rely on the crosswalk created by the Census Linking Project (Abramitzky et al., 2020). This cross-walk is created by using automated name linkage for men, whose last names remain constant over time. This well-tested approach allows us to match 13,046 sons over time.[26] Finally, we rely on our direct matching approach (Aneja and Xu, 2022), linking 3,957 children based on their exact full name and birth state. Pooling the matches across all three linkage methods, we track a total of 44,040 children (58%) of 23,056 civil service parents (79%) to the 1940 census.[27] As before, we restrict the analysis sample to larger cities (i.e., locations with at least two departments and offices of at least 20 staff, see Section 4.1). This results in a final sample of 18,317 children. To focus on the younger children who are more likely to be affected by exposure to female co–workers, we further limit the sample to those who are younger than 20 in 1917. This results in a final analysis sample of 13,502 children. Appendix Table B1 summarizes the construction of the sample.

5 Vertical transmission of gender norms

5.1 Main result on female labor force participation

Table II reports our main results based on Equation 4. Each column presents a separate regression with increasingly stringent fixed effects and controls. The dependent variable throughout is labor force participation, a dummy equals to 1 if the individual is in the labor force in 1940 and 0 otherwise.

Table II shows consistent evidence that parental exposure to female co–workers increases the LFP of daughters, relative to sons. More precisely, daughters whose parents were working in offices that experienced greater in-

[26] Of these, 9 linked observations (i.e. 0.07%) turn out to be female in 1940 Census in spite of the Census Linking Project cross-walk being restricted to men.

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

creases in the share of female co–workers during WWI are relatively more likely than their male counterparts to be working in adulthood. On average, daughters of civil servants are 48 percentage points (p.p.) less likely than sons to be in the labor force in 1940.[28] This gender gap in LFP, however, strikingly shrinks with greater parental exposure to female co–workers. For the baseline specification (column 1), we observe that a 1 SD increase in parental exposure increases the likelihood that a daughter works (relative to a son) by 2 p.p. As indicated by the level coefficient of $\Delta\text{Exposure}_{jk}$, parental exposure to female co–workers has no statistically discernible impact on the LFP of sons. Thus, the decline in the gender LFP gap is driven by a greater propensity for daughters of exposed civil service parents to work, consistent with a gender-specific transmission of norms.

The remaining columns gradually make this baseline specification more demanding to demonstrate the robustness of the results. In column 2, we report results where we include office (i.e., city–by–department) fixed effects to account for unobserved differences in labor force participation within federal departments of a given city. These fixed effects fully absorb the parental exposure variation in levels, but still allow us to identify the differential effect of parental exposure to female co–workers by the gender of the child. Similarly, we add both city–by–female fixed effects and department–by–female fixed effects. This set of fully gender-interacted fixed effects restricts the identifying variation in exposure tightly to comparisons within cities and departments. The upshot is that our core finding is strengthened: daughters 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 allowing the work-age profile to flexibly differ by the child's gender. 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, (log) salary in 1915, and whether the parent held a clerical position. Since the exposure variation is largely uncorrelated with individual characteristics (Table A.IV), the inclusion of these stringent controls leaves the estimates nearly unchanged. Overall, our preferred estimates solely relying on within-city and within-department variation in parental exposure suggest that a 1 SD increase in parental exposure to female co–workers reduces the gender gap in LFP by 4.1–4.4 p.p. This corresponds to a decline of the mean labor force participation gap by 8.6–9.2% in the sample.

5.2 Heterogeneity and placebo tests

Treatment intensity and complementarities. Our main result shows that parents working in offices exposed to a larger influx of female workers during WWI saw greater increases in their daughters' propensity to work in adulthood. We now explore several sources of heterogeneity to complement our main result. Models of multiple equilibria emphasize the role of tipping points, predicting discontinuities in the relationship between parental exposure to female co–workers and the effects on children's LFP gap. To investigate this possibility, we flexibly

[28] For the sake of expositional clarity, an increase in female LFP relative to men is equivalent to a reduction in the gender LFP *gap*. 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 4) should be interpreted as indicating a change in female LFP relative to male LFP, or a change in the female-male LFP gap.

estimate our baseline specification (Table II, column 4) by intensity bins.

As Figure IV 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. While this pattern is consistent with norm-based tipping points, we cannot statistically reject a linear treatment effect in line with our specification in Equation 4.

An important implication of the conceptual framework outlined in Section 2.2 is the potential for parental exposure to female co–workers – a private signal for children of civil servants – to interact with the public signal as manifested through the aggregate change in the share of female public employment at the city-level. In particular, theories of multiple equilibria would predict a complementarity between the individual and public signal (Equation 1). To explore this possibility, we split our sample by whether a parental city's aggregate change in the share of female public employment was above or below the median (Table III). Interestingly, the propensity of daughters of exposed civil servants to work later in life is higher in cities where the aggregate level exposure was larger (columns 2–3). This difference is statistically significant (column 4) and consistent with the presence of complementarities which – absent large shocks – may make societal norms highly persistent.

Placebo parental exposure for civil service leavers. Our preferred interpretation is that parental exposure to female co–workers helped shift the norms of already–serving parents (which were subsequently transmitted to the children). An alternative interpretation is that female war-time workers were more likely to select into more female-friendly offices in the first place. This source of endogeneity would make it difficult to distinguish the causal effect of parental exposure to female co–workers from the fact that employees in more female-friendly offices might generally transmit more gender–equal work norms to their children. While our reliance on within-city and within-department variation mitigates concerns over selection *across* cities and departments, there could still be selection at the *office*-level (i.e., the city–by–department). Even if our exposure shock is uncorrelated with an office's pre-war female share and observable worker traits (Table A.III and Table A.IV), selection on unobservable characteristics may still exist.

The availability of high-frequency personnel records allows us to conduct a placebo test to rule out the role of time-invariant selection on the office. In Figure V, we report the estimated parental exposure effects ($\Delta\text{Exposure}_{jk} \times \text{Female}_i$) for different exit cohorts. The "main sample" covers the set of civil servants that were serving in 1915 and last observed in the same year or thereafter.[29] The "placebo sample" covers those civil servants who were serving in the eventually exposed offices but left before the WWI shock was realized. Consistent with actual parental exposure driving our observed results, we find the intergenerational effects only for those civil servants who left after being exposed to the shock. These intergenerational effects are entirely absent for civil servants who selected into the same (to-be exposed) offices but left before the actual exposure. The absence of

[29] Since the personnel records are biennial, an individual last observed in 1915 could have exited between July 1st 1915 and July 1st 1917. Notice that the reference date (July 1) is after the US entry into WWI (April 4 1917).

"pre-trends" helps rule out that our results are driven by time-invariant selection on the office.

Parental exposure by children's age. We also extend the main analysis by studying how the parental exposure effects vary as a function of the 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 "formative years" – childhood and early adulthood – can shape later-life economic behavior. If the intergenerational effects of exposure to female co–workers reflect the transmission of norms via parents, we might expect to observe a greater transmission of workplace norms and information around women's work to those children who are still malleable and likely to be living in their parent's household at the time of exposure.

We explore heterogeneity by the child's age at the time of exposure by also including children that are 20 years and older in 1940, and then flexibly estimating Table II, column 4 for children for six different age bins. Figure VI presents the results, plotting the $\Delta\text{Exposure}_{jk} \times \text{Female}_i$ 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 thus consistent with the literature on the lasting effects of events during "formative years."

5.3 Robustness checks

Selection bias through imperfect census-linking. Although we rely on "best practices" in census-linking, there remains a concern that the results may reflect sample selection bias. For example, if "positively" selected daughters are more likely to be matched, working, and exposed to female co–workers through their parents, the resulting matched sample may be biased towards smaller gender gaps. Although the match rates are comparable to the related literature, the scope for selection is sufficiently large to potentially affect the results.

In our context, sample selection will only affect our main results if the match rate is correlated with our office-level exposure. As Table A.V shows, assuringly, the propensity of a civil servant child to be linked to the 1940 census is – conditional on the city and department fixed effects – uncorrelated with the parental exposure to female co–workers. Nonetheless, differences in the baseline traits of matched and unmatched children (Table A.VI, column 2) motivate us to probe further. Specifically, 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 A.VI, column 3). Table A.VII shows the reweighted point estimates for the intergenerational exposure effects reported in Table II. As the table shows, the results remain very comparable. Finally, we attempt to also allay concerns over

unobservables that IPW cannot balance on. Table A.VIII 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. Once again, the point estimates remain very comparable. Overall, we conclude that our results are unlikely to be driven by sample bias due to selective census-linking.

Sensitivity to outliers. The results in Section 5 highlighted the role of large exposure shocks in driving the intergenerational effects. While consistent with tipping point models, the empirical pattern raises the question to which extent our results are driven by outliers or particular departments and locations.

Table A.IX demonstrates the robustness of our main results in a variety of ways. First, with federal employment highest in Washington, D.C., we ask whether the results hold when excluding any identifying variation coming from exposure shocks in the state capital. As column 2 shows, the results hold when omitting all employment in D.C. Second, we explore the extent to which the results are driven by the War Department, which saw the largest increases in the share of female workers. The results remain similar when restricting the analysis only to the War Department (column 3). Omitting variation coming from the War Department, the resulting estimates are – as expected – less precisely estimated but the point estimate remains of comparable magnitude (column 4). Third, we winsorized the top 2.5% of observations on both tails for our exposure measure and find our results virtually unchanged. Overall, the results remain comparable throughout, allaying concerns over outliers.

Expansion in federal employment and clerical positions. 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 natural. In a public sector setting where exit is limited, shifting the composition of the workforce goes hand in glove with the expansion of employment. We provide a range of tests to ensure that our results are indeed driven by the increase in female co–workers and not an expansion of the overall federal employment or clerical workforce. Table A.X, column 2 provides a mediation exercise by directly controlling for the increase in workforce. The exposure effect remains significant and of comparable magnitude.[30] Since the increase in female federal employment is largely driven by the increase in clerks, there is a related concern that our results reflect the exposure to clerks rather than female co–workers. To assess this possibility, column 3 asks whether daughters of parents exposed to a larger increase in the share of clerks see comparable improvements in labor force participation. While exposure to female co–workers closes the children's gender gap in labor force participation, exposure to more clerks does not. Finally, in column 4, we run a "horse race" by including both correlated measures. Assuringly, the intergenerational effects are entirely driven by variation in parental exposure to female co–workers.

Instrumental variable strategy. An advantage in our empirical 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

[30] The result also holds when controlling for the increase non-parametrically using size bins.

the same governmental department and city. Nonetheless, concerns may remain over whether the remaining within–city and within–department variation is truly exogenous. We thus complement our approach by leveraging an arguably pre-determined 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 II). 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 A.V). 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.[31] 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. More formally, we instrument $\Delta\text{Exposure}_{jk} \times \text{Female}_i$ with the triple interaction $\text{Share of clerks 1915}_{jk} \times \text{War-related dept}_k \times \text{Female}_i$, controlling for $\text{Share of clerks 1915}_{jk} \times \text{Female}_i$ and including the female-interacted department and city fixed effects. As we show in Table A.IV, columns 3–4, this instrument appears – conditional on the lower-order interaction and fixed effects – not strongly correlated with any baseline characteristics of interest, consistent with the quasi-random nature of this pre-determined institutional variation.[32]

Table A.XII reports the reduced form (column 2) and IV estimate (column 3). Consistent with our main specification, we find that parental exposure to female co–workers closes the children's gender gap in labor force participation. This complementary research design leveraging a more explicit pre-determined source of variation to predict the increase in female co–workers thus helps further strengthen our main result. For the remainder of the analysis, we will continue to rely on our main OLS specification. For completeness, we report the IV estimates of all major results in the Appendix.

[31] We can confirm the intuition of using clerical and war department-related exposure as an instrument in other ways using our data. Figure A.V 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 A.XI summarizes the raw visual evidence in regression form, regressing the exposure variation (Equation 3) 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 A.V.

[32] Like the OLS balance test (Table A.IV, 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).

5.4 Alternative measure of gender norms

Our key measure of gender norms is the gender gap in labor force participation among children of civil servants exposed to the influx of female co–workers. While a large literature relies on this intergenerational measure (see Section 2.4), concerns may remain over the downstream nature of the measure – i.e., that we infer changes in norms by examining the outcomes of the children of those affected by a gender shock. To allay interpretation concerns, we thus complement our results using a direct measure of parental gender norms that is an outcome measured for the affected civil servants, rather than their children.

We focus in particular on the marriage choices of civil servants differentially affected by the exposure to female co–workers, and in particular whether exposed male civil servants were more likely to marry working women. While the early 20th century witnessed an increase in the labor force participation of married women (Goldin, 1989), norms around the social acceptability of married work, as well as the formal institutions enshrining these norms, persisted.[33] In one nationwide survey of professional women conducted by the Bureau of Vocational Information just after WWI, female respondents predominantly reported their primary responsibilities to be that of homemakers, and that marriage and career were contradictory roles. Moreover, the Bureau's survey provided substantial evidence that men's expectations made marriage and career incompatible for women (Drachman, 1989). Similarly, in a 1936 Gallup survey, 72% of respondents disapproved of "a married woman earning money in business or industry if she has a husband capable of supporting her." A large contemporary literature has likewise documented how female labor force decisions affect marriage formation and their durability (Bertrand et al., 2015; Bursztyn et al., 2017; Folke and Rickne, 2020).

Motivated by the historical context and the related literature, we propose to use a male's propensity to marry a working spouse as an implicit measure of favorable attitudes toward women's work, and thus another way of capturing gender norms.[34] Focusing on male civil servants, we test whether exposure to female co-workers increases the propensity for their spouses to work. We track the spouses of men who were working in the federal government in 1915 across the census rounds 1900-1940.[35] We then ask in a difference-in-differences setting whether exposure to female co-workers increases the spouses' propensity to work post-WWI (between 1920 and 1940) relative to the pre-war period (between 1900 and 1910). In addition to being a direct test of changing gender norms, this subanalysis allows us to test whether WWI changed norms across the federal government, by allowing us to expand our analysis to the subset of civil servants without children.

Table A.XIII shows the results, providing evidence consistent with exposure to female co–workers shifting gender norms. On average, we find that a 1 SD exposure to female co–workers increases the propensity of a male civil servant's wife to work by 4.3 p.p. after WWI (column 1). Assuringly, this increase is driven by

[33] "Marriage bars," or formal rules limiting the hiring of married women, were adopted by firms and local school boards throughout the first half of the 20th century (Goldin, 1988).

[34] In Appendix C, we validate this alternative measure of gender norms relying on current survey data from the World Value Survey.

[35] Appendix Table B2 summarizes the construction of the sample.

marriages formed *after* the actual exposure to female co–workers (column 3). In contrast, we do not find that the eventual exposure to female co–workers is predictive of having a working spouse for those who married *prior* to the realization of the exposure shock during WWI (column 2). Finally, we exclude from the sample marriages among civil servants to ensure that our results are not exclusively driven by the greater likelihood of exposed men marrying their female co–workers. As column 4 shows, the results are primarily driven by exposed men marrying spouses who end up working outside the public sector. The evidence based on revealed–preference marriage patterns is thus collectively consistent with our interpretation that exposure to female co–workers shifted the gender norms of incumbent civil servants.[36]

6 Mechanisms of transmission

We provide a range of additional results to shed light on the mechanisms through which parental exposure to female co–workers affects gender norms.

6.1 Marriage, fertility, and schooling

We consider if parental exposure to female co–workers affects other determinants of labor force participation. We first explore the impact of parental exposure on children's future marriages and childbearing – outcomes that are strongly tied to labor market participation (Easterlin, 1971; Gray, 1998; Goldin, 2006; Blau and Winkler, 2018; Kleven et al., 2019). As suggested in the preceding section, women's employment decisions were historically related to marriage decisions. Female workers in our study period are mainly unmarried women (Goldin, 1991), raising the question whether the higher labor force participation of exposed daughters goes with a lower propensity to get married. The results are reported in Table IV. As column 1 shows, parental exposure to female co–workers does reduce the propensity of daughters (relative to sons) to be married (in 1940). A 1 SD increase in parental exposure to female co–workers reduces the relative likelihood of daughters being married by 3.6 p.p. Similarly, daughters of exposed civil servants tend to also have relatively fewer children by 1940.[37]

We also examine whether parental exposure to female co–workers affects their children's educational attainment. A large literature has documented gender gaps in parental investments in human capital (Baker and Milligan, 2016; Dizon-Ross, 2019). Guided by this literature, we study whether parental exposure to female co–workers (who are also higher qualified) affects their children's gender gap in schooling (column 3). While parental exposure to female co–workers increases the relative years of education for daughters, the estimated coefficient is small and statistically insignificant.[38] Finally, we conduct a mediation exercise and ask whether the

[36] An alternative explanation for the increased female married work is that exposed male civil servants see a decline of their economic status due to the increased competition. Using the personnel records, we do not find evidence consistent with this interpretation. As Appendix Figure A.VII shows, the salaries of married men are not significantly impacted by variation in exposure to female co–workers.

[37] The IV results are reported in Table A.XIV.

[38] We do, however, find modest evidence of increased educational attainment at higher levels of schooling. To explore this, we use the

observable differences in marriage, fertility, and education we uncovered can fully account for the difference in labor force participation we observe. We do so by including a dummy for marital status and fixed effects for each number of children and education. As expected, the estimated parental exposure effects is somewhat smaller but still economically large and statistically significant (Table A.XIV, column 4). This suggests that parental exposure to female co–workers increases labor force participation above and beyond affecting the proximate determinants of labor force participation – consistent with changing norms to female work.

6.2 Sectoral choice and working conditions

We now examine if the parental exposure effects manifest specifically as work within the federal government, or whether transmission manifests as overall participation in the labor market. If parental exposure to female co–workers predominantly captures information about female employment in the federal government, we expect the labor force participation effects to be limited to federal employment. As Table V shows, however, the parental exposure effects extend to the private sector (columns 1–2).[39] In terms of point magnitude, 1 SD increase in parental exposure to female co–workers has the same effect on labor force participation across the public and private sectors, though the relative magnitude is – given the smaller labor force participation gap – larger for federal employment. The private sector effect is thus consistent with parental exposure to female co–workers increasing the overall propensity of daughters (relative to sons) to work.

The remaining columns of Table V restrict the sample to children who are in the labor force to explore how their work conditions vary with parental exposure to female co–workers. 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 exposed civil servants tend to work less than sons, 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 sizable reduction in the gender pay gap. Column 4 asks whether parental exposure to female co–workers affects the gender pay gap, measured as the total pre-tax wage and salary income in 1940. Strikingly, a 1 SD increase in parental exposure to female co–workers closes the gender pay gap by 10%. The combined evidence suggests that daughters of exposed parents are not only more likely to work but also enter higher-paying positions.

6.3 Movers and parental exposure at origin city

Despite the reliance on within-city variation in parental exposure to co–workers to identify the vertical transmission of norms, there may remain concerns that the greater labor force participation of daughters reflects a sustained demand for female workers by the government. While the private sector spill-overs help further allay

same specification as before to regress different levels of education on $\text{Exposure}_{jk} \times \text{Female}_i$. As Figure A.VI 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.

[39] The IV results are presented in Table A.XV.

such concerns and suggest broader changes in gender norms, we can rely on "movers" to explicitly disentangle the role of norms from local labor market conditions correlated with the office-level exposure shock.

The early half of the 20th century was a period of substantial internal migration in the United States (Hall and Ruggles, 2004; Rosenbloom and Sundstrom, 2004; Collins and Wanamaker, 2014). By 1940, 67% of the civil servant children in our sample lived in a city other than their parent's city of residence at the onset of WWI. Leveraging this widespread mobility, we can adopt an "epidemiological approach" (Fernández, 2011) and ask whether the parental exposure effects still hold for the subset of children who no longer reside in the original city of parental exposure to the increased representation of women in federal employment. We report the results in Table VI. In columns 1–2, we first test whether parental exposure to female co–workers predicts the likelihood of daughters (relative to son) moving to another city. While parental exposure decreases the likelihood of moving (column 1), there is no statistically significant relationship once conditioning on the destination using city fixed effects (column 2). In columns 3–4, we return to our main outcome (labor force participation) but restrict the sample to movers to test whether the effect of the exposure shock is still present. Even when comparing children of civil servants who ended up moving to the same city by 1940 (and thus face the same labor market conditions and institutional environment), variation in their parental exposure to female co–workers at the *origin* city–department remains highly predictive of greater labor force participation (column 3).

An empirical shortcoming of the "epidemiological approach" is that migration decisions are endogenous. While the destination fixed effects allay concerns over sorting in *levels*, migration decisions may still be origin-destination specific. In column 4, we go one step further by including origin-destination fixed effects. Even when comparing children of civil servants who moved from the same origin to the same destination city, those with parents in departments with higher exposure to female co–workers during WWI still see higher labor force participation. Consistent with the literature on cultural transmission, the evidence is strongly suggestive of our parental exposure effects reflecting the transmission of norms.

6.4 Strength of transmission by parent gender and occupation.

Finally, we test whether the parental exposure effect varied depending on the gender of the parent. If parental exposure to female co–workers changed gender norms, one may expect the effects to be concentrated among civil servant fathers. Working mothers may already have more equitable gender norms, blunting the potential impact of increased exposure to female co–workers (Fernández et al., 2004).[40] In columns 1 and 2 of Table A.XVI, 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 fathers, whereas the effect for mothers is muted. Lastly,

[40] 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.

recall from Figure II 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. In Table A.XVI, columns 3–4, 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 and making it difficult to reject the equality of both estimated coefficients.

7 Horizontal transmission and aggregate implications

We conclude our analysis by exploring the aggregate effects of this economic shock to women's participation in the federal service. While the previous section provided evidence consistent with the intergenerational transmission of gender norms, the role of vertical transmission in generating aggregate change is limited. This raises the question whether the large increase in the female federal workforce also created additional spill-overs.

To study whether the increased entry of female civil servants had impacts beyond the vertical transmission documented in Section 5, we aggregate the office-level exposure to the city-level:

$$\Delta\text{Exposure}_j = \left(N^f_{j1919}/(N^m_{j19}+N^f_{j19})\right) - \left(N^f_{j15}/(N^m_{j15}+N^f_{j15})\right) \tag{5}$$

where $\Delta\text{Exposure}_j$ measures the city-level change in the share of female federal workers and $N^f_{j1919} = \Sigma_k n^f_{jk1919}$ is the total city-level number of federal government workers in 1919, computed by summing across all departments k (see Equation 3). Figure VII summarizes the cross-city variation in the exposure measure, documenting substantial variation in the change in female shares. We leverage this cross-city variation to assess whether the overall presence of women affected female labor force participation beyond affected households.

7.1 Cross-city level variation in exposure

Moving then from the individual level to the city level,[41] we ask whether cities experiencing an increase in female representation in the government also see overall increases in female labor force participation. 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:

$$y_{jt} = \beta_1 \Delta\text{Exposure}_j \times \text{Post WWI}_t + \theta_j + \tau_t + \varepsilon_{jt} \tag{6}$$

Here y_{jt} is the outcome in city j in year $t = \{1900, ..., 1940\}$. $\Delta\text{Exposure}_j$ captures the city-level change in the

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

share of female federal workers, as defined by Equation 5. 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).

Our primary estimate of interest is β_1, which captures the aggregate-level exposure effect. Along the conceptual framework introduced in Section 2.2, this estimate would capture both the effects of the vertical transmission as well as any additional horizontal transmission. 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 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 6 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 VII 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 1–2). The point estimates remain comparable when introducing controls to hold constant changes in the federal workforce size and differences in city sizes (column 2). 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 VIII, 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.

The presence of aggregate effects is striking. In terms of magnitude, the 0.8 p.p. increase in city-level female labor force participation in response to a 1 SD increase in exposure – corresponding to an increase in the city-level share of female federal government workers of 7.6 p.p. – is economically large. A back-of-the-envelope calculation suggests that, on average, each additional female war-time civil service entrant leads to 2.2 additional women entering the workforce – a sizable multiplier effect.[42] We also exploit heterogeneity in the public sector size across cities to better understand the mechanisms of transmission. If the aggregate effects we observe are

[42] On average, an increase in the city-level share of female government workers by 7.6 p.p. corresponds to 96 additional female civil servants (0.076×1266 – the mean number of civil servants in 1915). An increase in the city-level female labor force participation by 0.8 p.p. corresponds to 313 additional female workers ($0.008 \times 35{,}997$ – the mean number of women in a city). Taking the ratio, we obtain the multiplier of $313/96 - 1 = 2.2$.

indeed driven by the increase in the share of the female federal workforce, we expect the horizontal transmission to be stronger in cities where the federal government has a larger footprint. To operationalize this, we split the sample into cities with above and below-median shares of federal employment. As column 3 of Table VII shows, we indeed find that the city-level exposure effects are larger in cities with a high federal employment share. Once again, this pattern is only restricted to female labor force participation (column 4).

Finally, we break down female labor force participation for the public and the private sector. As expected, the largest effects are concentrated in the public sector. While part of the short-run effect is mechanical, the persistence and increasing magnitudes well into 1940 are striking (Figure VIII, panel (b)).[43] We also find that exposure to female federal workers increases female labor force participation in the *private* sector. The magnitude of this spillover is smaller but remains persistent throughout 1940. Mirroring the individual-level spill-over effects on private sector employment, 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.

7.2 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 has highlighted the role of social learning in disseminating information and changing norms (Fogli and Veldkamp, 2011; Jessen et al., 2023; 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 4.3) to track the cohorts of interest through the census rounds 1900–1940. Figure IX summarizes the results.[44] 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

[43] The corresponding regression table can be found in Table A.XVII.
[44] Once again, the corresponding regressions as shown in Table A.XVIII.

with social learning as a potential mechanism through which horizontal transmission might operate.

8 Conclusion

In this paper, we demonstrate that WWI was a pivotal juncture in the history of women in the labor market. We document both the rise of women working in the federal government as well as the transformation of gender norms over generations. Newly-digitized personnel records allow for a close examination of how the war mobilization effort transformed American bureaucracy. We first show that after America entered the war, the share of female civil servants more than doubled within two years – driven by the increase in clerical jobs. These war-time entrants were more likely to be young, unmarried, and highly qualified (relative to their male counterparts). Importantly, they were also less likely to have been in the workforce, suggesting that WWI helped draw in a previously untapped source of labor. Moreover, the change in composition persisted: the government continued on a path towards greater gender diversity for the next half-century.

We then consider how the sudden increased presence of female public sector workers shaped gender norms. Leveraging city-by-department variation in the exposure of incumbent civil servants to greater gender diversity, we find strong evidence for the intergenerational transmission of gender norms as measured primarily using the labor force decisions of the incumbent workers' children. Additional outcomes bolster our interpretation of a change in gender norms within more exposed government offices. Within-city variation and a complementary "movers" design further allow us to credibly disentangle the effects of geography from changes in norms brought about by the sweeping increase in female representation across different offices of the U.S. government. Finally, we complement our evidence on the vertical transmission of norms with aggregate evidence consistent with an additional, horizontal transmission of norms that acts as a social multiplier to magnify the effects of increased gender representation in bringing about broader changes in the labor market.

In addition to contributing to opening the black box of female employment and clerical work during WWI, our evidence on the significance of "critical junctures" has broader policy implications. 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. The paper highlights the role of personnel policies – and in particular public employment – in reducing labor market inequalities.

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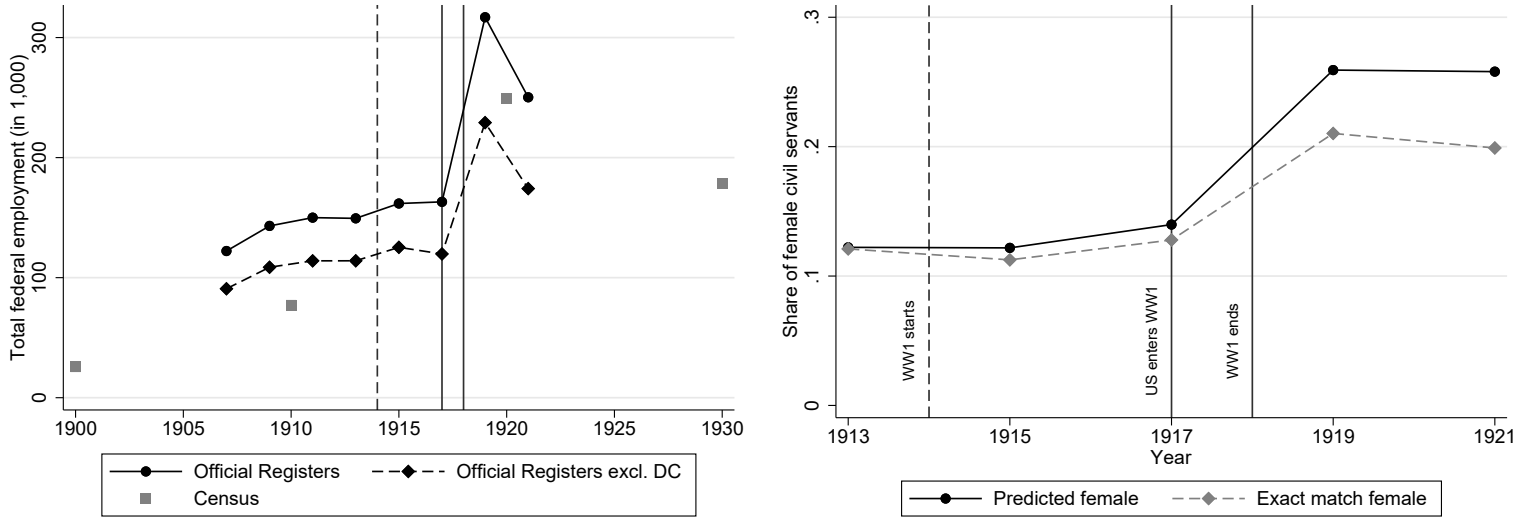
Figures and Tables

Figure I: 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 workers 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 2.3 for a detailed description of the procedure used to identify female civil servants.

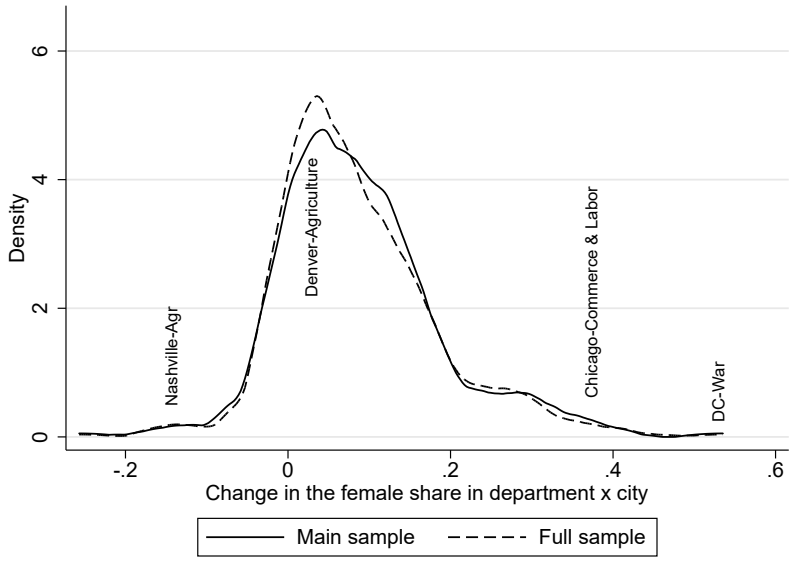
Figure II: Size and female share of federal workforce, broken down by clerical vs. non-clerical work

(a) Federal employment by clerk vs. non-clerk

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

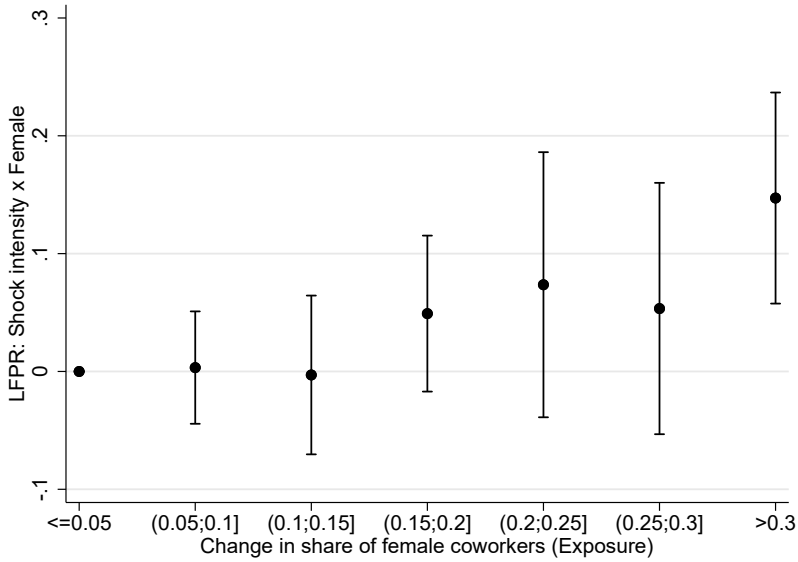
Notes: Panel (a): The figure shows the (log) number of federal civil servants by job type over time. The measure is derived from the personnel records and classifies job types as clerical (solid line) and non-clerical (dashed line). Panel (b): The figure shows the share of female civil servants, broken down by clerical (solid line) vs. non-clerical work (dashed line) over time.

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



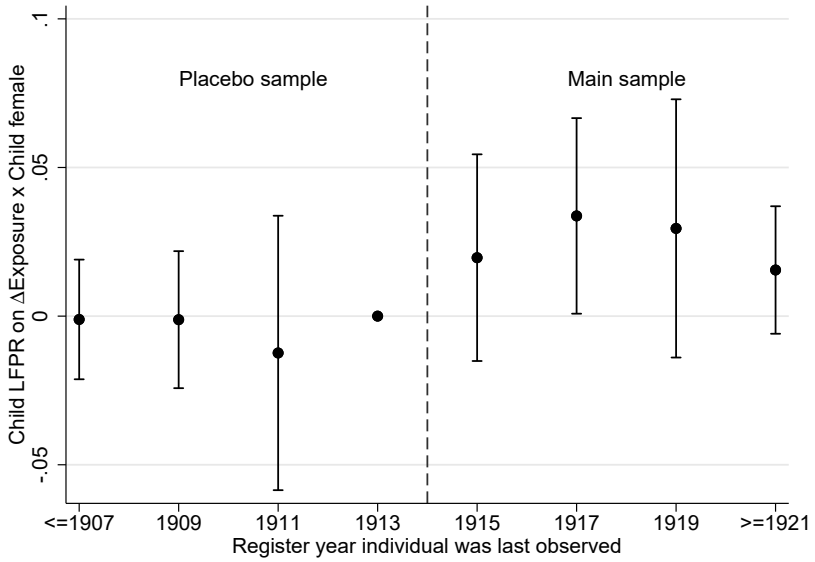
Notes: The figure shows the distribution of the change in the share of female civil servants across offices (i.e., city-department) between 1915 and 1919. The dashed line plots the distribution over the full sample of cities (221) with at least 20 civil servants in a given office. The solid line plots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

Figure IV: Exposure to female co–workers and children's LFP gender gap by intensity



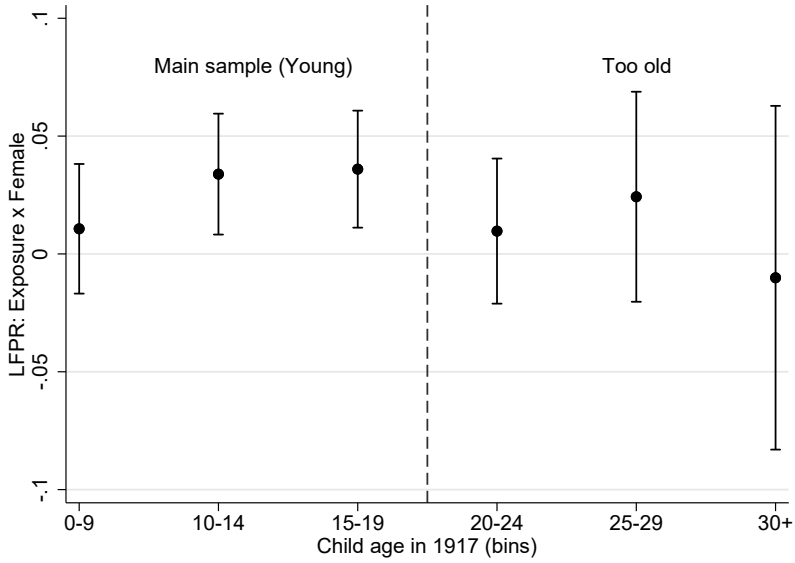
Notes: The figure reports a version of our baseline specification (Table II, Col. 4), allowing the coefficient on the interaction term ΔExposure × Female, to vary by the intensity (in seven different bins) of the exposure variable. The sample includes all children of civil servants in 1915 who could be linked to the 1940 census and are younger than 20 in 1917 (see Section 4.3 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 errors clustered at the office (i.e. city-department) level.

Figure V: Effect on intergenerational LFP gap by exposed vs. unexposed cohorts



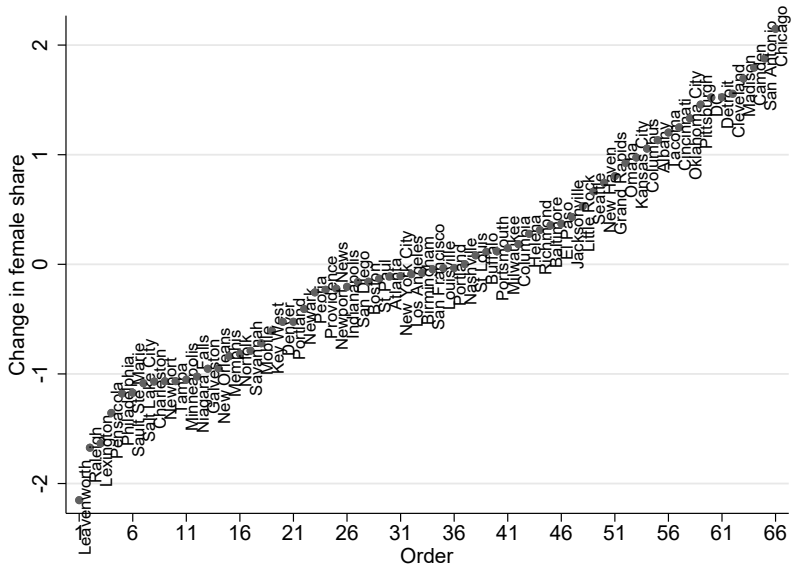
Notes: The figure shows a version of our baseline specification (Table II, Col. 4) with an extended sample, allowing the coefficient on the interaction term ΔExposure × Female, to vary by the year the parent exited the civil service. The main sample refers to the sample of actually exposed civil servants used to estimate Table II. The placebo sample refers to those parents who were serving in the to-be exposed offices but left before the realization of the exposure shock during WWI. 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 errors clustered at the office (i.e. city-department) level.

Figure VI: Exposure to female co–workers and children's LFP gender gap by age in 1917



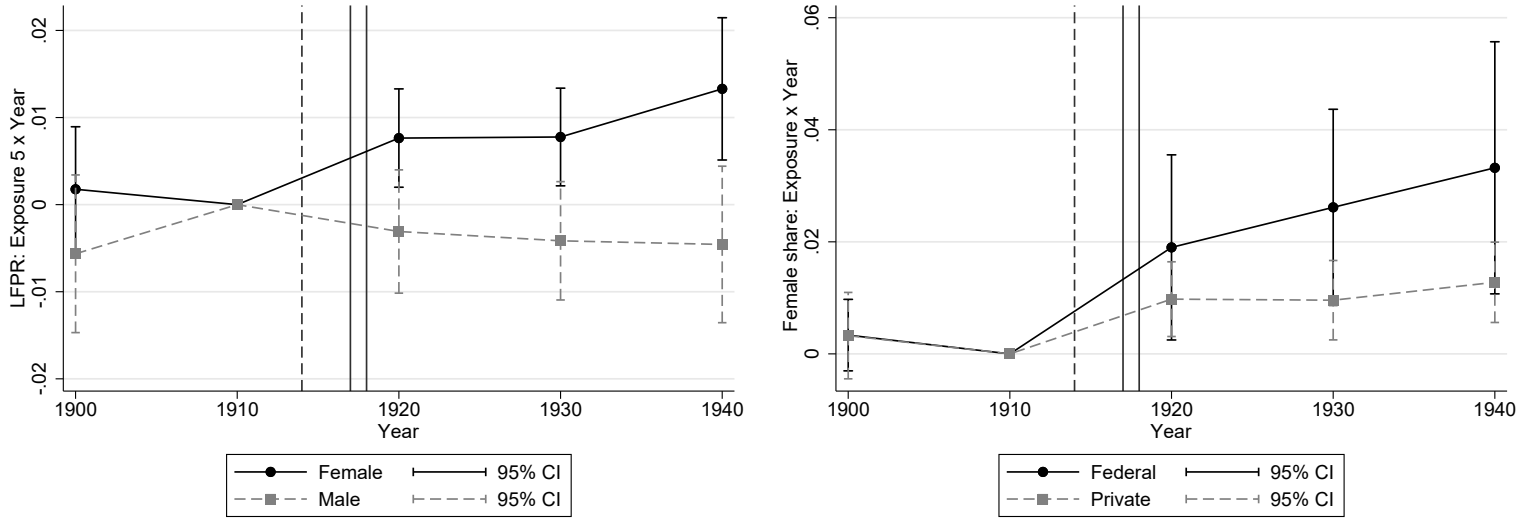
Notes: The figure shows a version of our baseline specification with an extended sample, (Table II, Col. 4), allowing the coefficient on the interaction term ΔExposure × Female, to vary according to child's age in 1917. The "too old" sample comprises those who were 20 or above in 1917. The outcome variable 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 95% confidence intervals are based on standard errors clustered at the office (i.e. city-department) level.

Figure VII: 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 exposure measure is computed as the change in the share of female civil servants across cities between 1915 and 1919 (see Equation 3). 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 VIII: City-level exposure to female civil servants and city-level labor market outcomes

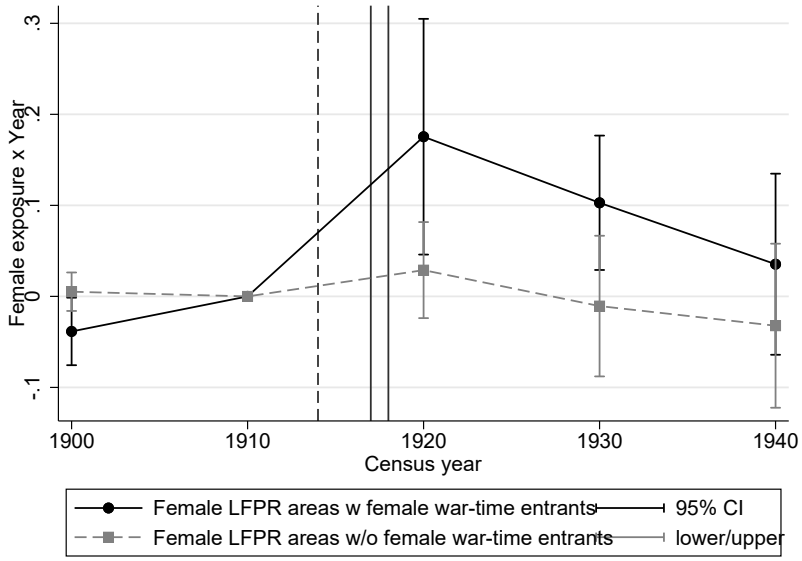


(a) Female – Male LFP

(b) Female share: federal – private

Notes: The figure shows a version of the full-control specification in Table VII (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 IX: City-level exposure to female civil servants and labor market outcomes by neighborhoods



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

Table I: Descriptive statistics of civil servant pre-entry characteristics

	(1) Mean	(2) Female	(3) WWI	(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 II: Parental exposure to female civil servants and labor force participation in adulthood

	(1)	(2)	(3)	(4)
	Labor force participation			
Dep. var. mean female-male gap	-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***
	(0.008)	(0.009)	(0.009)	(0.010)
City FEs	✓	✓		
Department FEs	✓	✓		
City × Department FEs		✓	✓	✓
City FEs × Female		✓	✓	✓
Department FEs × Female		✓	✓	✓
Age FEs × Female			✓	✓
Controls × Female				✓
Observations	13,502	13,502	13,502	13,502

Notes: The table shows estimated coefficients from Equation 3. 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 4.3 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 III: Complementarities between individual and aggregate exposure

	(1)	(2)	(3)	(4)
	Labor force participation			
Dep. var. mean female-male gap	-0.476	-0.476	-0.476	-0.476
Δ Exposure × Female	0.041***	0.092***	0.039*	0.039*
	(0.010)	(0.015)	(0.023)	(0.023)
Δ Exposure × Female				0.053**
× High aggregate exposure				(0.027)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Aggregate exposure × Lower order interactions				✓
Sample	Full	Aggregate exposure		Full
		High	Low	
Observations	13,502	13,502	13,502	13,502

Notes: The table shows estimated coefficients from Equation 3 for the full sample (columns 1 and 4) and broken down by whether the parental city's overall change in the share of female civil servants was above or below median (9 p.p.). 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 4.3 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. High aggregate exposure is a dummy that is 1 if the city-level change was above median 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). In column 4, all fixed effects and controls are interacted with the High aggregate exposure dummy to render the estimates in columns 2–3 comparable. Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table IV: Parental exposure to female co–workers and determinants of labor force participation

	(1) Married	(2) Children	(3) Education	(4) Labor force
Dep. var mean female-male gap	-0.0978	0.0696	0.288	-0.477
Δ Exposure × Female	-0.036***	-0.053**	0.043	0.034***
	(0.012)	(0.025)	(0.081)	(0.009)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Mediation controls (col. 1-3)				✓
Observations	13,502	13,412	13,179	13,090

Notes: The table reports the estimates from our OLS baseline specification (Table II, Column 4) using 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 4.3 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 married (Col. 1). The outcome variable is the child's number of children in column 2 and the years of education in column 3. In column 4, we include a dummy for being married, fixed effects for the number of children and years of education as additional mediation controls. 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 V: Parental exposure to female co–workers, sectoral choice and work conditions

	(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		Labor force participation=1	
Observations	13,502	13,502	9,003	9,032

Notes: The table reports the estimates from our OLS baseline specification (Table II, 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 4.3 for a detailed description of the sample). In columns 3–4, the sample is further 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 VI: Labor force participation decision of movers and parental exposure at origin city

	(1)	(2)	(3)	(4)
	Moved city		Labor force participation	
Dep. var mean female-male gap	-0.0228	-0.0229	-0.526	-0.521
Δ Exposure × Female	-0.027**	-0.005	0.025**	0.031**
	(0.011)	(0.007)	(0.012)	(0.014)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Destination City FEs		✓	✓	
Origin-destination City FEs				✓
Sample	Full		Moved city=1	
Observations	13,502	13,307	9,338	8,428

Notes: The table reports the estimates from our OLS baseline specification (Table II, Column 4) with additional children's outcomes. 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 4.3 for a detailed description of the sample). In columns 1–2, the dependent variable is a dummy that is 1 if the child's city of residence in 1940 is different from the parent's city in 1915 (the original city of exposure). In columns 3–4, the dependent variable is a dummy that is 1 if the child is in the labor force. The sample is restricted to those who have moved. 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: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

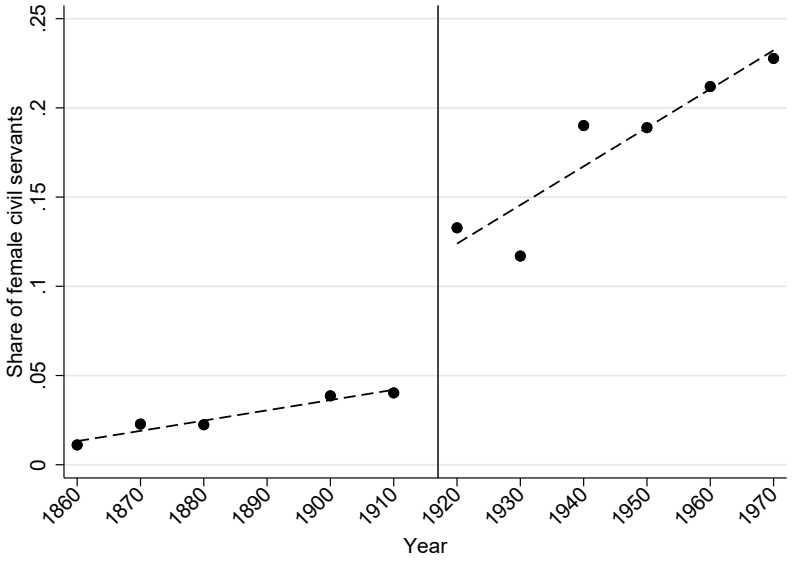
Table VII: Aggregate exposure to female civil servants and city-level labor market outcomes

	(1)	(2)	(3)	(4)	(5)
	Female LFPR			Male LFPR	
Mean of dep. var	0.239	0.239	0.239	0.646	0.646
Δ Exposure × Post	0.011***	0.009***	0.004	-0.001	-0.003
	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)
Δ Exposure × Post × High federal employment city			0.010*		0.005
			(0.006)		(0.007)
Year FEs	✓	✓	✓	✓	✓
City FEs	✓	✓	✓	✓	✓
Year FEs × City-level controls		✓	✓	✓	✓
Lower oder interactions	-	-	✓	-	✓
Δ Exposure × Post +	-	-	0.014***	-	0.001
Δ Exposure × Post × High federal employment city			(0.004)		(0.004)
Observations	330	330	330	330	330

Notes: The table shows OLS regression estimates from Equation 6. 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) and the share of men in the labor force (Cols. 4–5) 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. High federal employment city is a dummy that is 1 if the city's share of federal employment is above median (1.3%) 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: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

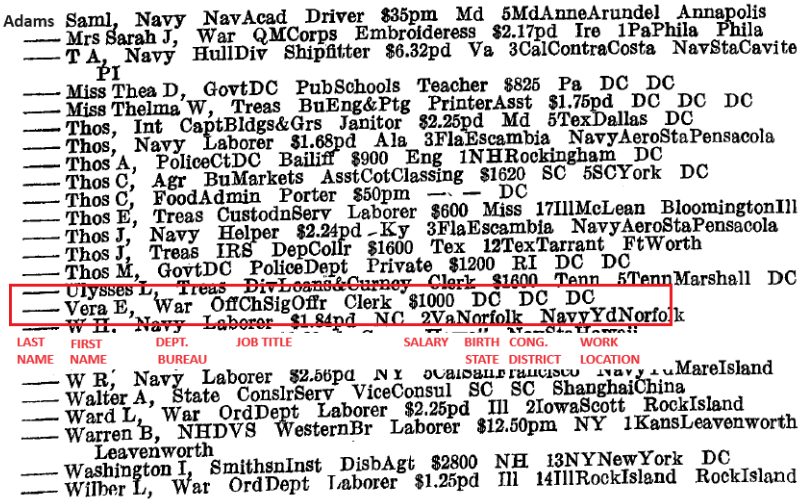
A Appendix – Additional Figures and Tables

Figure A.I: Share of female civil servants over the long-run 1860–1970



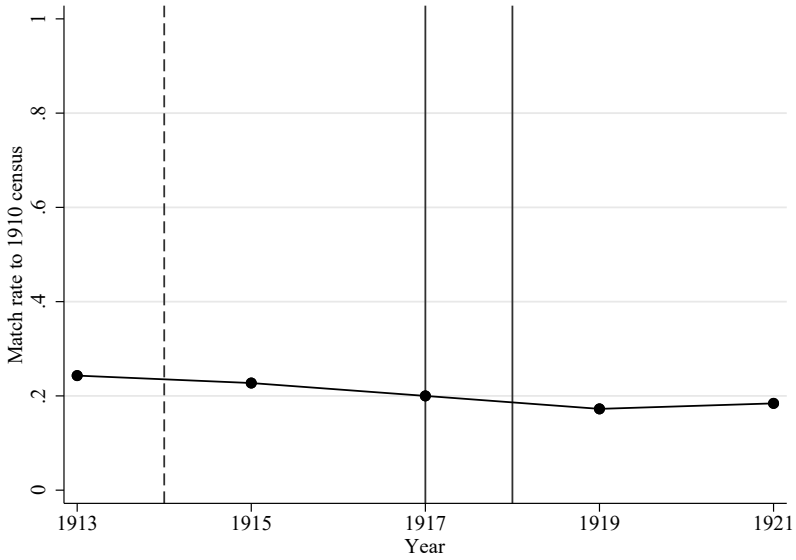
Notes: The figure shows the evolution of the share of female civil servants from 1860 to 1970 as it results from US decennial censuses. The black vertical line represents the US entry in World War I in 1917.

Figure A.II: Example of Official Register records



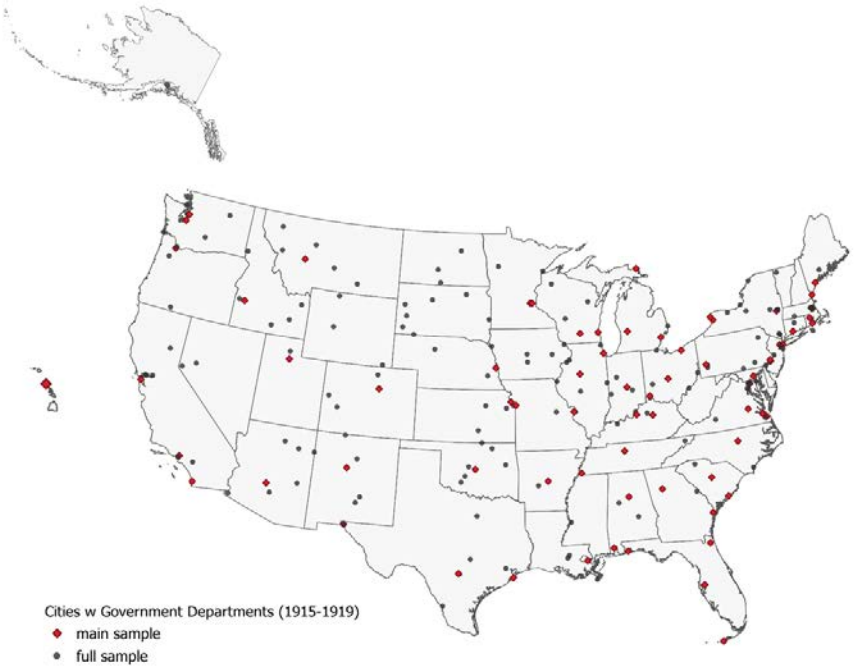
Notes: The figure shows a sample of the Official Registers for the year 1917 (p. 124). See Section 2.3 for a detailed description of the source.

Figure A.III: Census match rates over time



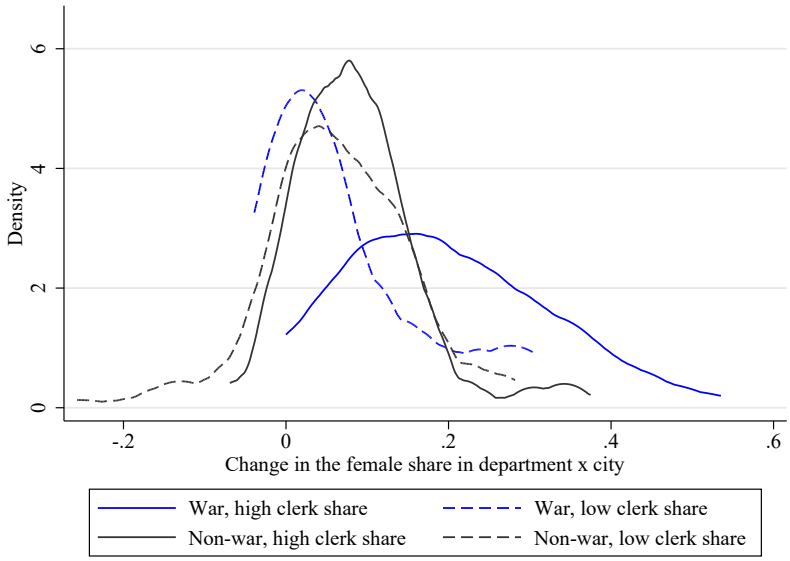
Notes: The figure shows the share of civil servants from the Official Register dataset (covering the 1913-1921 period) who could be linked to the 1910 Census. Dashed vertical line marks the beginning of WWI and the solid lines mark the entry of the U.S. and the end of WWI.

Figure A.IV: Spatial distribution of cities with federal departments



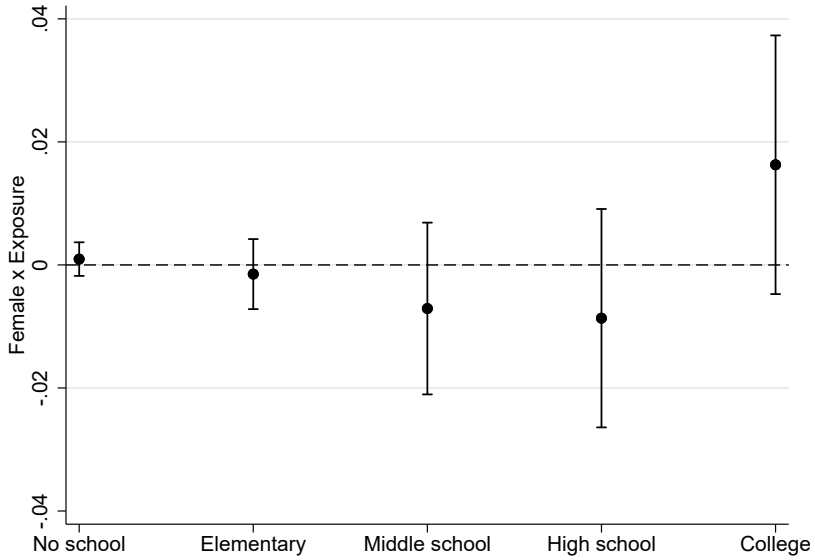
Notes: The figure shows the spatial distribution of cities with federal departments with at least 20 civil servants in a given office in 1915 and in 1919. Main sample (red squares) additionally restricts to cities with at least two departments.

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



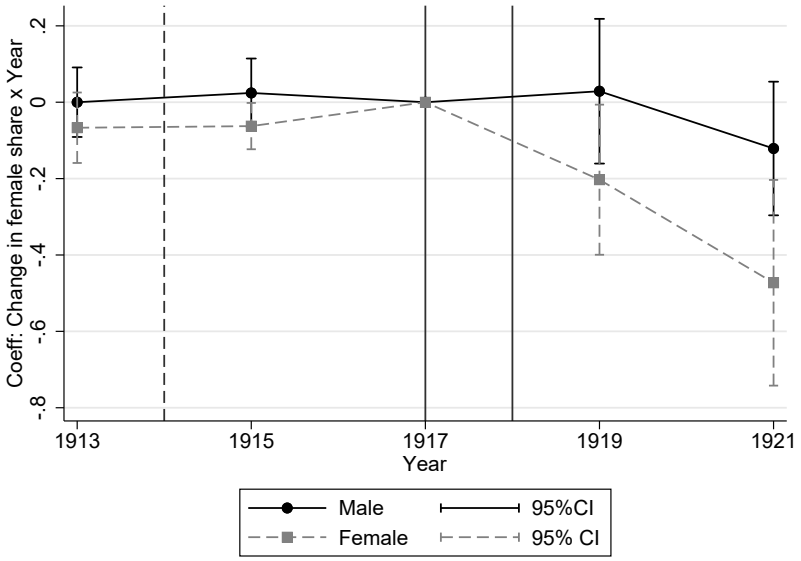
Notes: The figure shows the distribution of the change in the share of female civil servants across offices (i.e., city-department) between 1915 and 1919. Blue (resp., black) lines restrict to offices in war (resp., non-war) departments. Solid (resp., dashed) lines restrict to offices with the share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

Figure A.VI: Exposure to female civil servants and children's schooling gap



Notes: The figure plots the OLS coefficients on the interaction term ΔExposure × Female (see Equation 4). 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 4.3 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 II, Column 4. The 90% confidence intervals are based on standard errors clustered at the office (i.e. city-department) level.

Figure A.VII: Exposure and salary progression over time



Notes: The figure shows the parental exposure effects on (log) salaries for different years between 1913–1921 and broken down by whether the civil servant parent is male or female. The coefficients are estimated from a regression of (log) salary on ΔExposure interacted by year, year fixed effects and individual fixed effects, separately for male and female subsamples. The dashed vertical line marks the beginning of WWI. The solid lines mark the entry of the U.S. and the end of WWI. The standard errors are clustered at the office (i.e. city-department) level. Reporting 95% confidence intervals.

Table A.I: Descriptive statistics of pre-entry characteristics - industries

	(1) Mean	(2) Female	(3) WWI	(4) Female × WWI	(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 A.II: Descriptive statistics of additional pre-entry characteristics - WWI and 1918 pandemic

	(1) Mean	(2) Female	(3) WWI	(4) Female × WWI	(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 A.III: Pre-war levels of and increase in female share across department-cities

	(1)	(2)	(3)	(4)
	Female share, 1907-1913			
Mean dep. var.	0.088	0.088	0.088	0.089
Δ Exposure	-0.022	-0.112*	-0.001	0.002
	(0.060)	(0.060)	(0.052)	(0.061)
Observations	922	922	922	915
Year FEs	✓	✓	✓	
City FEs		✓	✓	
Department FEs			✓	
City × Year FEs				✓
Department × Year FEs				✓

Notes: The table shows the relationship between our measure of exposure to female co–workers and office's pre-war share of female co–workers. 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 sample pools offices over rhe 1907-1913 period. The outcome variable is the female share of civil servants across offices in each year of Official Registers between 1907 and 1913. ΔExposure captures the change in the share of female civil servants across offices between 1915 and 1919 (see Equation 3). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.IV: Individual-level 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 4.3 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 A.V: 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 shows a version of Table II, 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 4.3 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 (see Section 5.3). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.VI: 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 4.3 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 A.VII: 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 shows a version of Table II, 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 (see Section 5.3). Standard errors are clustered at the city-department level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.VIII: 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	Labor force participation=0	
Observations	22,616	22,616

Notes: The table shows a version of Table II 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 4.3 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 A.IX: 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 shows a version of our OLS baseline specification (Table II, Col. 4), accounting for outliers. The unit of observation is the individual-year. In Column 1, we report the OLS baseline coefficient (Table II, 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 A.X: Exposure and children's LFP gap – change in federal workforce size and clerical share

	(1)	(2)	(3)	(4)
	Labor force participation			
Dep. var mean female-male gap	-0.476	-0.471	-0.476	-0.471
Δ Exposure × Female	0.041***	0.040***	0.038***	0.031**
	(0.010)	(0.011)	(0.012)	(0.013)
Δ (log) size × Female		-0.002		-0.007
		(0.006)		(0.008)
Δ Clerk share × Female			0.004	0.016
			(0.009)	(0.013)
City × Department FEs	✓	✓	✓	✓
City FEs × Female	✓	✓	✓	✓
Department FEs × Female	✓	✓	✓	✓
Age FEs × Female	✓	✓	✓	✓
Controls × Female	✓	✓	✓	✓
Observations	13,502	12,189	13,502	12,189

Notes: The table shows a version of our OLS baseline specification (Table II, Col. 4). The unit of observation is the individual-year. In Column 1, we report the OLS baseline coefficient (Table II, Col. 4) to ease comparison. In column 2, the baseline specification is augmented with the (log) 1915-1919 change in the federal workforce at the office-level. In column 3, the baseline specification is augmented by the change in the office-level clerk share. 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 4.3 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 A.XI: 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 (see Section 5.3). 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 3). 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 A.XII: 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 4, estimated with OLS and our 2SLS specification (see Section 5.3). 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 4.3 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 II, 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 A.XIII: Exposure to female civil servants and being married to a working spouse

	(1)	(2)	(3)	(4)
	Wife is working			
Mean of dep. var	0.078	0.066	0.093	0.087
Δ Exposure	0.023	0.022		
	(0.021)	(0.021)		
Δ Exposure × Post WWI	0.043*	-0.034	0.106***	0.087***
	(0.022)	(0.040)	(0.028)	(0.027)
Age FEs	✓	✓	✓	✓
Department × Year FEs	✓	✓	✓	✓
City × Year FEs	✓	✓	✓	✓
Sample	Full	Married	Married post WWI	
		pre WWI	All	Excl. govt' work
Observations	44,261	24,596	19,656	19,396

Notes: The table shows OLS regression estimates from Equation 4. The sample includes spouses (i.e., wives) of men who were working in the federal government in 1915 and identified across the census rounds 1900-1940. In column 2, the sample is restricted to those who married prior to WWI (i.e., in census rounds 1900-1910). In columns 3–4, the sample is restricted to only inclide marriages that were formed after WWI (i.e. in census rounds 1920-1940). In Column 4, the sample only includes male civil servants' wives that are not federal workers listed in the Official Registers. The unit of observation is individual-year. The outcome variable is a dummy equal to 1 if the male civil servant's wife is working. 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. Year FEs correspond to census round fixed effects (1900-1940).

Table A.XIV: Exposure and effect on children's outcome gaps - sociodemographics, IV

	(1) Married	(2) Children	(3) Education	(4) Work
Dep. var mean female-male gap	-0.0974	0.0739	0.291	-0.477
Δ Exposure $\times$ Female	-0.050**	-0.061	0.205	0.068***
	(0.022)	(0.046)	(0.131)	(0.019)
City FEs $\times$ Department FEs	✓	✓	✓	✓
City FEs $\times$ Female	✓	✓	✓	✓
Department FEs $\times$ Female	✓	✓	✓	✓
Age FEs $\times$ Female	✓	✓	✓	✓
Controls $\times$ Female	✓	✓	✓	✓
Kleibergen-Paap F-stat	45.324	44.386	44.765	43.767
Observations	13,672	13,582	13,345	13,256

Notes: The table shows a version of Table IV, with 2SLS estimation strategy (see Section 5.3). 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 4.3 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 married (Col. 1). In column 2, the outcome variable is the number of children. In column 3, the outcome variable is the years of education. Column 4 includes a dummy for being married and fixed effects for each number of children and year of education as mediation controls. 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 A.XV: 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		Labor force participation=1	
Observations	13,502	13,502	9,003	9,032

Notes: The table shows a version of Table V, with 2SLS estimation strategy (see Section 5.3). 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 4.3 for a detailed description of the sample). In Column 4, the sample is further 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 A.XVI: 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 shows a version of our OLS baseline specification (Table II, 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 A.XVII: Exposure to female civil servants and city-level labor market outcomes

	(1)	(2)	(3)	(4)
	Female LFPR			
	Public sector		Private sector	
Mean of dep. var	0.0996	0.0996	0.277	0.277
Δ Exposure × Post	0.024**	0.008	0.009**	0.008
	(0.010)	(0.013)	(0.004)	(0.006)
Δ Exposure × Post × High federal employment city		0.034*		0.002
		(0.020)		(0.008)
Year FEs	✓	✓	✓	✓
City FEs	✓	✓	✓	✓
Year FEs × City-level controls		✓	✓	✓
Lower oder interactions	-	✓	-	✓
Δ Exposure × Post +	-	0.042***	-	0.010**
Δ Exposure × Post × High federal employment city		(0.015)		(0.004)
Observations	330	330	330	330

Notes: The table shows OLS regression estimates from Equation 6. 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 federal government sector (columns 1–2) and the private sector (columns 3–4) as derived from decennial censuses. High federal employment city is a dummy that is 1 if the city's share of federal employment is above median (1.3%) and 0 otherwise. 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. High/low = above/below median (1.3%). Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.XVIII: Exposure to female co–workers and neighborhood-level spillovers

	(1)	(2)	(3)	(4)
	Labor force participation			
Mean dep. var.	0.214	0.697	0.214	0.214
Δ City-level exposure × Post	0.086**	-0.021	0.037	
	(0.043)	(0.029)	(0.034)	
Female war-time entrant in neighborhood × Post			-0.002	0.000
			(0.002)	(0.001)
Δ City-level exposure × Post			0.077**	0.041**
× Female war-time entrant in neighborhood			(0.032)	(0.016)
Individual FEs	✓	✓	✓	✓
Year FEs	✓	✓	✓	
Year FEs × City-level controls	✓	✓	✓	
City × Age FEs	✓	✓	✓	✓
City × Year FEs				✓
Sample	Female	Male	Female	
Observations	11,991,020	13,724,485	11,990,765	11,991,276

Notes: The table shows OLS regression estimates from Equation 6. 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: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

B Appendix – Linking Procedure

Table B1: Identifying children of civil servants in adulthood

	Total	Share female
Civil servants in 1915 (parents)		
(1) Civil servants employed in 1915	161,773	0.122
(2) Matched to 1900-1920 census based on full name and birth state	67,194	0.123
Children of civil servants between 1900-20		
(3) Children found in households of matched civil servants in (2)	75,719	0.498
(4) Civil servants in (2) that are parents of children in (3)	29,290	0.069
Children of civil servants in 1940		
(5) Children from (3) matched via Census Tree to 1940	41,642	0.401
(6) Children from (3) matched via Census Linking Project to 1940	13,046	0.001
(7) Children from (3) matched via full name, birth state, age to 1940	3,957	0.509
Pooled sample of civil servants' children in 1940		
(8) Combined sample of unique children from (5), (6), (7)	44,040	0.405
(9) Civil servant parents of children in (8)	23,056	0.064
(10) Imposing large city restriction on (8)	18,317	0.395
(11) Imposing age restriction (<20) in 1917 on (10)	13,678	0.391
(12) Dropping children with missing data	13,502	0.390

Notes: The table summarizes the main steps of the linking procedures that have been undertaken in this paper. See Section 4.3 for a detailed description. At each census round, a child is identified as a household member who shares the same last name as the civil servant's, is at least 18 years younger than the parent, and is aged 18 or younger in that census year. The sample is always restricted to children born before 1918. See Section 4.1 for details on the restriction to large cities. Census Tree dataset is a cross-census linkage developed by Buckles et al. (2023). The Census Linking Project provides a crosswalk to link census respondents across time developed by Abramitzky et al. (2020).

Table B2: Identifying spouses of civil servants

	Total	Share female
Civil Servants in 1915		
(1) Civil servants employed in 1915	161,773	0.122
(2) Matched to 1900-1940 census based on full name and birth state	80,945	0.120
(3) Male civil servants in (2)	71,261	0.000
Spouses of civil servants between 1900-1940		
(4) Spouses found in households of matched civil servants in (3)	56,378	1.000
(5) 1900-1940 pooled sample of (4)	94,092	1.000
(6) Imposing large city restriction on (4)	26,228	1.000
(7) Imposing large city restriction on (5)	44,267	1.000

Notes: The table summarizes the main steps of the linking procedures that have been undertaken in this paper. At each census round, a spouse is identified within the civil servant's household through the `SPLOC` variable provided by IPUMS. See Section 4.1 for details on the restriction to large cities.

C Appendix – Validation of alternative gender norms measure

Throughout the paper, we 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). In particular, our key measure of gender norms is the female labor force participation gap of the exposed (*vs* non-exposed) parents' children born before WWI. In Section 5.4, we complement our main results using a direct measure of civil servants' gender norms, where we proxy favorable attitudes towards women's labor force participation with men's propensity to marry a working woman. In what follows, we validate this alternative measure of gender norms. Ideally, one would need to have survey data contemporaneous to the period of our study in which not only are respondents asked about gender norms but also about their marital status and their spouse's labor market participation. To the best of our knowledge, no historical survey collects such information. We overcome the lack of historical survey data by relying on data from the World Value Survey (henceforth, WVS). This is a collection of national, individual-level surveys on a wide range of topics, including attitudes towards gender roles and gender equality. The survey also contains information on demographic characteristics, such as gender, age, education, labor market status, and income. The survey has been administered seven times, from 1981 to 2021. Importantly for our purpose, the seventh wave (2017-2022) records the employment status of respondents' spouse. We can then investigate whether men with a working spouse have more favorable attitudes towards women's labor force participation and in general, gender equality in the labor market.

We restrict WVS data from Wave 7 to respondents in the United States with a spouse and with non-missing employment status. These restrictions yield a sample of 1,481 individuals. We construct a comprehensive measure of positive attitudes towards women's labor force participation, by averaging out the z-scores over a set of questions on gender roles in the labor market. Table C1 reports the exact wording of the survey questions under scrutiny.[45] With this index at hand, we investigate whether marital decisions predict variation in attitudes towards women in the labor market. In particular, we regress the gender norms z-score against a dummy equal to one if the respondent is working, a dummy equal to one if the spouse is working, and their interaction.[46] All regressions include a vector of demographic characteristics: respondent's age, income, and education.

We first run the regression restricting the sample to male respondents. Estimated coefficients are reported in Table C2, columns 1 and 2. As expected, while the male respondent's employment status does not explain variation in gender norms (after controlling for individual characteristics), the respondent spouse's employment status does explain it. Within the sample of married men, having a working spouse is positively and significantly correlated with positive attitudes on gender roles in the labor market. We interpret such result as a validation of our alternative measure of gender norms, relying on male civil servants' marital decisions (see Section 5.4). We then estimate the same regression separately for women (Table C2, columns 3 and 4). Reassuringly, having a working (likely, male) spouse does not explain variation in female respondents' gender norms and if anything, the relationship is negative.[47] We interpret these differential results by respondents' gender as indicative of this exercise isolating the relationship between marital decisions and gender norms.

[45] All questions are rescaled so that the higher values stand for more positive attitudes towards gender equality.

[46] In our analysis sample, around 70% of male respondents work and 63% of men's spouses work. Whereas, around 60% of female respondents work and 80% of their spouses work.

[47] The positive coefficient on the interaction between the working dummies for female respondents and their spouse (column 4) is suggestive evidence of a possible assortative matching of individuals with more progressive views

Table C1: WVS gender norms index: questions

Question	**Answers coded as**
When jobs are scarce, men should have more right to a job than women	1 = strongly agree to 5 = strongly disagree
If a woman earns more money than her husband, it's almost certain to cause problems	1 = strongly agree to 5 = strongly disagree
Being a housewife is just as fulfilling as working for pay	1 = strongly agree to 4 = strongly disagree
On the whole, men make better business executives than women do	1 = strongly agree to 4 = strongly disagree

Notes: The table reports the exact wording and answer scale of the questions in the World Value Survey, Wave 7 (2017-2022) that we aggregate to construct a comprehensive measure of gender norms. All questions are rescaled so that higher values stand for more positive attitudes toward women and gender equality in the labor market. Questions a

Table C2: Cvil servants' marital decisions – WVS validation

	(1)	(2)	(3)	(4)
	Gender norms z-score			
Mean dep. var.	-0.021	-0.017	0.055	0.065
Working respondent	0.155**	0.0235	-0.0388	-0.109
	(0.0767)	(0.0770)	(0.115)	(0.120)
Working spouse	0.403***	0.342***	-0.124	-0.237**
	(0.0845)	(0.0840)	(0.0806)	(0.0983)
Working respondent × Working spouse	-0.228**	-0.190*	0.267**	0.297**
	(0.103)	(0.100)	(0.128)	(0.129)
Individual controls		✓		✓
Sample	Men	Men	Women	Women
Observations	823	812	658	638
Mean working repondent	0.720	0.718	0.622	0.622
Mean working spouse	0.633	0.633	0.809	0.810

Notes: The table shows OLS regression estimates. The sample is restricted to WVS Wave 7 respondents in the United States with a spouse. Columns 1 and 2 (resp, columns 3 and 4) restrict the sample to male (resp., female) respondents. The outcome variable is a z-score averaged across a set of questions on gender norms in the labor market: higher values indicate more positive attitudes toward women. See Table C1 for the exact wording of the questions under scrutiny. Working respondent (resp., working spouse) is a dummy equal to 1 if the respondent (resp., the respondent's spouse) is working (full-time, part-time, or self-employed). Individual controls include: respondent's age, self-reported income (3 categories: low, middle, high), and education (5 categories). Robust standard errors reported. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.