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FRONTIER HISTORY AND GENDER NORMS IN THE UNITED STATES

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ABSTRACT

This paper explores how historical gender roles become entrenched as norms over the long run. In the historical United States, gender roles on the frontier looked starkly different from those in settled areas. Male-biased sex ratios led to higher marriage rates for women and lower for men. Land abundance favored higher fertility. The demands of childcare, compounded with isolation from extended family, markets, and social infrastructure, constrained female opportunities outside the home. Frontier women were less likely to report "gainful employment," but among those who did, relatively more had high-status occupations. Together, these findings integrate contrasting narratives about frontier women—some emphasizing their entrepreneurial independence, others their prevailing domesticity. The distinctive frontier gender roles, in turn, shaped norms over the long run. Counties with greater historical frontier exposure exhibit lower female labor force participation through the 21st century. Time use data suggests this does not come with additional leisure but rather with more household work. These gender inequalities are accompanied by weaker political participation among women. While the historical frontier may have been empowering for some women, its predominant domesticity reinforced inegalitarian gender norms over the long run.

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1 Introduction

Gender inequality varies widely between and within countries, even at similar levels of development and despite widespread technological and institutional changes favoring female empowerment. Such persistent differences have prompted a growing number of cultural explanations (see Giuliano, 2017, 2020, for reviews). Some emphasize deep-rooted historical origins of norms around female work, marriage, familial structures, and women in politics, offering novel insights on the modern landscape of gender inequality. In this paper, we link the history of frontier settlement to the diffusion and entrenchment conservative gender norms across the United States—a high-income democracy with distinctively limited parental leave policies, low public support for childcare, and restrictive reproductive rights. We trace out a process of cultural formation that enshrined the stark "separate spheres" for men and women observed in classic historical accounts of gender roles in the United States (e.g., de Tocqueville, 1835; Welter, 1966).

Distinctive demographics and extreme levels of isolation characterized life on the sparsely populated American frontier. Far away from the conveniences of more settled localities, the frontier presented many challenges but also new opportunities, especially for those attracted by land abundance and able to thrive in a harsh environment. Such opportunity amidst isolation fostered unique demographic and social structures not observed elsewhere. These distinctive settings could affect culture in many domains, including gender roles. We explore this cultural formation using a wealth of data spanning more than 150 years to identify the origins and long-run evolution of the frontier legacy for gender norms.

In the late 19th century, the U.S. Census Bureau introduced the concept of the frontier: the line demarcating the edge of populated settlement. Turner (1893) later referenced this concept in a classic essay on America's frontier character. The most precise definition found in these studies—the line dividing population densities above and below two people per square mile—is adopted by Bazzi et al. (2020) to track the frontier's movement from 1790 onward. Continually moving westward with successive waves of pioneering settlers, the frontier was not a fixed geographic area, but rather a form of society at early stages of settlement. We follow this settlement using complete-count Census data to document the distinctive features of frontier society that are important for understanding the foundations of gender norms.

Our findings reconcile contrasting historical narratives about frontier women as either empowered and independent or bound by domesticity. Frontier locations had sharply male-biased sex ratios and a disproportionate share of young adults. Frontier women were more likely to be married, at earlier ages, and with older men. Favored by land abundance, fertility was higher. Extended family household structures were less common. The combination of high fertility and isolation amplified domestic duties, leaving limited scope for female "gainful employment" on the frontier. While fewer women reported gainful employment on the frontier, those who did were more likely to be working in high-status occupations. This thick upper tail of entrepreneurial women differed from settled areas of the country where men occupied such positions. Together, these patterns, interpreted through the lens of family economics, shed new light on the complex history of women's

life on the frontier. Moreover, we find evidence consistent with these differential gender roles on the frontier arising through both selective migration as well as exposure effects.

Examining the association between fertility and female employment across the U.S., we find that differential fertility on the frontier can explain a modest part of the differential employment. Isolation further contributed: limited access to markets meant that home production was required for most basic needs, while opportunities to work for pay in labor markets were scarce. Moreover, we show that frontier women had limited recourse to extended family with whom to share the homemaking and childcare burden. It is also possible that lower employment merely implied greater leisure, as women's scarcity increased their bargaining power (as Grosjean and Khattar, 2019, suggest for Australia). We discuss this mechanism, as well as two countervailing forces that may have undermined women's bargaining power on the American frontier. First, while male-biased sex ratios were a country-wide characteristic in Australia, in the U.S. they were specific to the frontier, which, in a context of high mobility, may have limited the potential gains to intrahousehold bargaining power for women. Second, isolation implied a lack of outside options that may have weakened women's bargaining power. We provide evidence consistent with these forces by leveraging (i) differences among frontier women married *before* and *after* migration, and (ii) differences across states in the rollout of women's legal economic rights that increased their outside options.

We then explore whether and how the frontier shaped cultural norms over the long run. We identify the frontier legacy using localized variation in the duration of exposure to frontier conditions. As the frontier moved west, it did so at different speeds in different locations.[1] The longer that frontier settlers had to shape local norms and institutions, the greater the scope for enduring influence. We compare modern outcomes across counties with varying total frontier experience (TFE), measured as time on the frontier during the main era of westward expansion from 1790–1890.[2]

Long after frontier conditions had abated, counties with greater TFE exhibit persistently higher fertility and lower female labor force participation (FLFP). Each additional decade of TFE (mean 1.8, standard deviation 1.1) is associated with 0.15–0.2 standard deviations lower FLFP. These sizable differences persist through the 2000s, withstand a battery of place-based confounds of gender norms and TFE, hold across different regions of the country, and are driven by historical exposure to frontier conditions rather than a mere history of low density. At the same time, the fertility differential across high- and low-TFE counties, although still large in the early 1900s, had slightly weakened by the late 20th century, implying that the cultural norms around female work evolved differently than those around childbearing.

Together, these results suggest that historical female domesticity became entrenched as a norm, which was then transmitted across generations. While the liberating aspects of the frontier could have taken over in the long run as isolation dissipated, we find little evidence of such a reversal.

[1] Among the factors driving such variation, Bazzi et al. (2020) highlight one that is external to any given county: the flow of immigrants into the U.S., which would hasten westward expansion in subsequent years. Like that study, we leverage the ebb and flows in immigration to construct an instrumental variable for TFE.

[2] Our sample is restricted to counties for which we can measure TFE, namely those that were not yet settled in 1790 and had already transitioned from frontier to settled areas by 1890. This excludes the eastern seaboard as well as most of the West census region. In our baseline analysis, we omit the West Coast due to the distinct nature of settlement in the area, but we have measures of TFE for the region that we explore in additional exercises.

Rather, the average woman in high-TFE areas remains more disempowered economically than her counterpart in low-TFE areas.

Twenty-first century data from the American Time Use Survey corroborates our interpretation of persistent gender inequality. Women in counties with greater TFE spend significantly more time on housework, which comes at the expense of leisure. These women work less outside the home, but that is more than offset by additional domestic work. While we could not demonstrate as much in the historical era for lack of time use data, these findings go against the notion that lower female employment outside the home on the frontier was a result of stronger bargaining power.

Political representation and mobilization may have contributed to the persistent legacy of the frontier for gender norms. Female suffrage originated in the western United States, and we find some evidence that it was more strongly supported by male legislators in high-TFE areas. However, this may have been confined to elite segments of society, and motivated by reasons unrelated to female empowerment.[3] These same high-TFE areas exhibit less grassroots mobilization for female suffrage in the early 1900s, relatively smaller increases in turnout after suffrage is introduced in 1920, and greater opposition to the women's rights movement later in the century. Female political representation is also persistently lower in high-TFE areas. Overall, the lack of female leaders in public life may have limited role-model-based mechanisms for gender empowerment and, more generally, restricted the scope for prestige-biased cultural change favoring egalitarian gender norms (see Henrich and Gil-White, 2001, on the role of leaders in cultural evolution).

Survey-based measures of conservative gender attitudes provide further insights on the enduring constraints to women's opportunities. In high-TFE areas, respondents are more likely to believe a woman's place is in the home and that men make better leaders. We find similar patterns across both genders, suggesting that women internalized these conservative frontier norms across successive generations. These norms plausibly emerged in response to frontier conditions historically, and, over time, may have reinforced gender inequality despite secular trends in the other direction.

Our study offers fresh insights to a large literature on gender inequality (see, e.g., Blau and Kahn, 2000; Goldin, 1990, 2006). We build on previous contributions that highlight cultural determinants (Fernández et al., 2004; Fernández and Fogli, 2009; Fogli and Veldkamp, 2011; Miho et al., 2023) and their historical origins (Alesina et al., 2013; Gay, 2023; Grosjean and Khattar, 2019). Our focus on the American frontier centers a distinctive historical feature of a country where the ideology of "separate spheres" took an acute form in the "cult of true womanhood" (Welter, 1966), and where present-day gender norms vary widely despite nationwide technological and institutional changes favoring female empowerment. Our findings may be relevant beyond the United States: the implications of geographic and social isolation in an extreme historical context could shed light on such mechanisms in other contexts, especially in developing countries with high levels of fertility, social isolation, and female domesticity.[4]

[3] Scholarship on suffrage raises several explanations for the early suffrage movement in Western states, including, among others, an effort to increase the voting population and hence states' representation in national politics (see Braun and Kvasnicka, 2013; Mead, 2006a; Teele, 2018).

[4] See Anderson (2022) and Jayachandran (2021) for rich and extensive surveys of the large and growing literature in development economics on the causes and consequences of gender norms in the modern economy. In one example of

We bring a unifying gender-based perspective to research on the history and legacy of the American frontier. While early influential scholarship on the frontier by Turner (1893) and others largely neglected women, later work provided rich insights into the varied lives of women in these settings (Faragher, 2008; Harris, 1984; Jeffrey, 1979, 1998; Martin, 1975; Myres, 1982; Riley, 1981; West, 1989). We provide a comprehensive quantitative account of how the American frontier shaped heterogeneous gender roles historically and ultimately gave rise to conservative gender norms over the long run. Our analysis of the frontier legacy suggests how, like other cultural traits, gender norms can become entrenched in local culture and institutions through historical experience, without implying a mechanical or unceasing persistence.[5]

Our findings on the origin and evolution of frontier gender norms contribute new evidence and nuances to the growing literature on cultural persistence and change. We trace out a process through which gender roles during early stages of development give rise to long-run gender inequality in economic and political life by shaping conservative norms. This pathway echoes Zelinsky's (1973) "doctrine of first effective settlement," which argues that the earliest settlers can have disproportionate influence on the long-run culture of a place. The findings resonate with Haddad (2021), who shows that the gender norms among the earliest foreign immigrants to a given county have outsized influence on long-run norms, and with Bazzi et al. (2020), who uncover the persistent legacy of individualistic culture originated in frontier settlements. The present study also underscores the entrenchment of societal structures in malleable environments as a key mechanism for persistence, consistent with research showing larger long-run effects of early settlers in places with underdeveloped institutions (see, e.g., Brodeur and Haddad, 2021; Grosjean, 2014; Couttenier et al., 2017). Together, our results offer a new perspective on the two-way interactions between people and place that have shaped and reshaped the geography of culture throughout history.

The rest of this paper is organized as follows. Section 2 offers brief historical background integrated into a conceptual discussion of how the American frontier may have shaped gender norms. Section 3 documents gender disparities on the historical frontier and examines the underlying roots. Section 4 characterizes the long run legacy of frontier history for gender inequality and the conservative norms that support such social structures. Section 5 concludes.

2 Frontier Gender Norms: Background

From colonial times until the late 19th century, the United States underwent a process of rapid population growth and territorial expansion. Throughout this period, successive waves of settlers pushed the frontier westward as the country dispossessed indigenous groups of their native lands. The high speed of territorial expansion entailed a continuous stretching of the population toward the West, with the frontier being thinly settled and far removed from population centers in the East.

the sort of mechanisms we highlight on the historical frontier, Marcos (2023) shows how the absence of grandmothers reduces FLFP in modern Mexico. Other work highlights the role of social norms around female seclusion in shaping gender inequity in India (see, e.g., Anukriti et al., 2020).

[5]The results associating TFE with FLFP and fertility in 1940 are also reported in Homola et al. (2023), an article focused on TFE and women's military enlistment, which appeared when our project was already developed and being presented.

Low population density and remoteness were the two (related but distinct) forms of isolation that characterized frontier counties. Low density implied isolation from other people within a given location. Proximity to the frontier line meant isolation from population hubs and markets to the east, and in most cases limited interaction with the federal government. With such isolation came a lack of social infrastructure, making frontier life "rough, crude, hard, and dangerous," as Overmeyer (1944) put it. Low density and remoteness also meant land abundance, which offered economic opportunities for those leaving more densely settled locations.

The isolation of the frontier came with distinctive demographics, such as an outsized presence of young males (e.g., Eblen, 1965). The frontier environment and demographics would ultimately shape the lives of settlers and their culture. Bazzi et al. (2020), for example, show that the frontier not only attracted individualistic settlers but also amplified their individualism over time. More generally, the frontier setting influenced many aspects of social life, including gender roles.

This section lays out historical and conceptual background for understanding how frontier conditions shaped gender inequalities and norms during the settlement era and over the long run. We draw from historical accounts of frontier settlement and women's lives at the time, interpreted through the lens of family economics. Some historical narratives portray frontier life as blurring gender roles and empowering women, as the scarcity of labor and male-skewed ratios favored women's position in society. Other narratives point to high fertility and isolation as structural forces that confined women to domesticity and seclusion from public life. We describe all these forces and explain how those contrasting narratives are, in fact, consistent and complementary.

Labor Scarcity. Narratives of female economic empowerment on the frontier illustrate how labor scarcity and economic necessity undermined gender roles. The counterpart of low density was land abundance, which implied high returns to labor. Isolation necessitated self-reliance, as it reduced the scope for drawing on markets or social networks. To satisfy basic needs in the absence of physical or social infrastructure, frontier women often performed tasks elsewhere reserved for men (Myres, 1982).[6] This in turn would often lead to an improved position for women. Flexner and Fitzpatrick (1996, pp. 8-9) argue along the same lines: "…by the demands it made on human beings for survival, frontier economy established a certain rough egalitarianism which challenged other, long-established concepts of propriety. Women were just as indispensable as men, since a household which lacked their homemaking skills, as well as nursing, sharpshooting and hunting when needed, was not to be envied."[7] Harris (1984, p. 47) argues that women had "considerable status within the family" and that "[m]en and women generally had different roles to play, but the mutuality between the sexes enforced by the needs of homesteading expanded women's power to negotiate and win."

[6] "The frontier, like the trail, tended to blur sex roles" as "[e]veryone was expected to 'lend a hand,' leading "women to perform tasks ordinarily considered outside their sphere," like building houses, clearing land, digging wells, planting, and harvesting (Myres, 1982, p. 160).

[7] Such skills would have naturally been valued in the marriage market: Riley (1981, p. 57) notes "the choosing of a mate on the frontier was a matter of economic necessity …Good health and perseverance were premium assets while the charm and ability to entertain that one values so highly in a society of mechanization and leisure time was only of tangential significance …the women who could not sew nor cook had no place on the frontier" (see also Martin, 1975).

Male-biased Sex Ratios. Besides the overall sparsity of people on the frontier, there was a stark relative scarcity of women. Male-biased sex ratios increased women's power in the frontier marriage market, where "young women did not have to accept the first available suitor" (Jeffrey, 1979, p. 66). A large literature in economics examines the effects of skewed sex ratios (see, e.g., Abramitzky et al., 2011; Acemoglu et al., 2004; Alix-Garcia et al., 2022; Bethmann and Kvasnicka, 2013; Boehnke and Gay, 2022; Brainerd, 2017; Carranza, 2014; Gay, 2023). The positive effects of women's scarcity on their relative power is emphasized in other contexts by, for example, Angrist (2002) and Grosjean and Khattar (2019). However, this force toward empowering women may have been partially mitigated by multiple factors on the American frontier. First, while female scarcity was a country-wide characteristic in the Australian context studied by Grosjean and Khattar (2019) and group-wide among the immigrants studied by Angrist (2002), frontier areas in the 19th century U.S. were outliers compared to other areas of the country. Women that married before migrating to the frontier did not face a marriage market with surplus males at the relevant time. For women that married on the frontier, if the prevailing norms surrounding marriage were formed in areas without a stark gender imbalance, the force may also have been diminished. Finally, and perhaps most importantly, the implications of male-biased sex ratios on women's bargaining power may have largely dissipated *after* marriage, as the frontier's isolation severely constrained outside options.

High Fertility. Other narratives emphasize that while frontier women took on work traditionally associated with men, they were still burdened with most childcare and domestic work. Gender roles were blurred for kids on the frontier, but such roles abruptly emerged in the transition to adulthood and in marital life.[8] Jeffrey (1979) argues that because there was little to no reallocation of power towards women within the household, the erosion of gendered work was asymmetric: while women took on men's responsibilities, this was not met by a commensurate increase in men taking on women's roles.[9] Frontier women performed many of the tasks that men performed. Moreover, women were almost exclusively in charge of child-rearing and domestic work, often in the absence of extended family support, especially from elder women like grandmothers.

High fertility rates increased the burden of women's tasks on the frontier. Land abundance and high returns to labor likely incentivized large families on the frontier. Malthusian mechanisms imply that decreasing returns to labor in the presence of a fixed factor (e.g., land) lead to a negative association between population density and fertility (see Ashraf and Galor, 2011; De la Croix and Gobbi, 2017). Land abundance and labor scarcity would increase the demand for children,

[8] On the frontier, there was much less gender differentiation in common children's games, and girls would help their fathers with work just as much as boys, with domestic work usually left to adult females. But according to West (1989, pp. 142-143), "[t]he fact that Victorian values still held a lot of sway on the frontier meant that as girls hit mid-teens, their parents increasingly tried to reorient them away from outdoor tasks and make them more 'lady-like'. This caused a fair amount of cognitive stress and frustration on the part of young women that had spent most of their time in the prior decade from five to fifteen learning to ride and break horses, plow a field, plant, and harvest, and fire a gun."

[9] In her words, "Even though frontier conditions forced them into manly pursuits and led them to modify some of their standards, they hardly pressed for a liberation from female norms and culture. Much of the 'freedom' which women experienced was the freedom to work even harder than they had before, with dramatic results" (Jeffrey, 1979, p. 72). Myres (1982) also notes that "frontier women were essentially conservative, and few of them abandoned their conception of women's nature or ceased to value 'female culture'."

especially in a context where children started to work at a young age on family farms. Economic historians of the U.S. also pointed to a positive effect of land availability on fertility (Easterlin, 1971, 1976; Forster et al., 1972; Schapiro, 1982; Steckel, 1992; Yasuba, 1961), albeit highlighting different mechanisms than those of typical Malthusian models. Easterlin (1976) argued that land abundance made it easier for new generations to acquire land, which reduced parents' incentives to limit family size based on bequest considerations. Regardless of the specific channels through which land abundance affected family patterns, high fertility meant that a large fraction of women's prime-age working hours were spent either pregnant or nursing (see Albanesi and Olivetti, 2016). Together with disproportionate childcare duties, high fertility thus compounded women's domestic burden.

Isolation. The frontier's remoteness and population sparsity further exacerbated women's domestic burden. Limited access to markets meant that home production was required for most basic needs. In settled areas with denser markets, households could outsource the provision of many goods and services, while on the frontier these were too costly or simply unavailable.[10] This entailed a strong tie to the domestic sphere.[11] In the economics literature, Greenwood et al. (2005), Cavalcanti and Tavares (2008), and others argue that modern appliances—refrigerators, vacuum cleaners, washing machines, dryers, dishwashers, and microwaves—were "engines of liberation," freeing up women's time from household tasks. This has implications for our analysis. Modern appliances were absent in the 19th century, but at least some households had the opportunity to buy goods and services instead of producing them at home. These market opportunities were more scarce on the frontier, imposing greater constraints to female liberation from domesticity.

Besides increasing home production needs, the isolation of the frontier may have reduced women's bargaining power once married, despite their scarcity in the marriage market. Isolation entailed a lack of social protection and opportunities outside the home. The lack of a dense network of close relationships in the community meant that married women had little recourse to start over or find safety during episodes of domestic violence. The frontier's high mobility and lack of social infrastructure likely limited the sort of norms that would protect victims.[12] While kin networks can be protective against spousal abuse (see, e.g., Figueredo et al., 2001), resorting to relatives was often not an option in isolated frontier locations. Moreover, male-biased sex ratios may have fostered masculinity norms (as shown by Baranov et al., 2020, for Australia), which could have increased the

[10] Frontier women engaged in cooking, food production, and processing, including butter, cheese, preserved foodstuffs, home dairy, and chicken; making soap and candles; spinning, weaving, and sewing to manufacture and repair clothes, hosiery, table and bed linen; washing and ironing; housecleaning; and all healthcare activities (see Riley, 1981, p. 87). And as Myres (1982, p. 240) notes: "Although by the nineteenth century, factories were beginning to produce foodstuffs, clothing, and others goods previously provided by home production, frontier women continued to manufacture such items themselves because neither the goods, nor the cash to obtain them were readily available."

[11] Sochen (1976, p. 43) notes: "All of woman's work in frontier and rural America centered around the home. The chores could be unending, difficult, and challenging, but they did not remove her from her home. They could be physically and emotionally trying, but they remained womanly because they focused upon the wife-mother role of woman."

[12] The weakening of social pressure against within-household violence is described by West (1989, p. 152) in reference to child abuse: "In these mixed and transient societies, the power of public opinion naturally was diluted. Adults who might have been restrained under the watchful eyes of neighbors and relatives felt freer to act on their impulses." Handy-Marchello (2007) argues that "violence frequently shattered the peace of pioneer households" and describes cases in which "neighbors did not attempt to intervene."

prevalence of violence generally with potential spillovers on women. The vulnerability of women on the frontier may help explain why, in the face of labor scarcity, there was an asymmetric erosion of gendered work that disproportionately burdened women.[13]

The Persistence of Frontier Gender Norms. The frontier's distinctive gender roles, featuring high fertility and low employment, may have fostered gender norms that prescribed domesticity. The presence of empowered women on the frontier could have pushed in the opposite direction. Insofar as frontier life shaped gender norms, this cultural imprint might have persisted, through intergenerational transmission, well beyond the frontier era in a given place. This hypothesis echoes Zelinsky's (1973) "doctrine of first effective settlement," in which early settlers determine the long-run evolution of culture.[14] It also resonates with economic theories of intergenerational transmission in which initial conditions affect long-run cultural equilibria (see, e.g., Bisin and Verdier, 2010).

Conservative gender norms may have been entrenched and sustained through both vertical and horizontal transmission of culture, which have been strong forces in other contexts. In a study of the World War I legacy in France, Gay (2023) shows that women's relative scarcity led to a permanent increase in female labor force participation through transmission of norms in various ways—through parents, marriage, and local social interactions. In a study of Stalin's massive deportations from the west to the east of the USSR during World War II, Miho et al. (2023) provide evidence of horizontal intergroup transmission of gender norms: exogenous variation in the composition of deportees across destinations is linked to changes in female labor force participation, entrepreneurship, fertility, and gender attitudes among the native population. While the context of the American frontier is different, it is plausible that both vertical and horizontal transmission of gender norms were important. Early settlers could have an outsized influence on initial social norms and local institutions, making the frontier era in any given county a likely critical juncture in its cultural trajectory.

The conservative gender norms adopted by early settlers may also have persisted, in part, through their entrenchment into widespread religious and secular cultural configurations. In a formal model, Akerlof and Rayo (2020) show that traditional narratives of the family foster distinct gender roles, with "separate spheres" for men and women. The "cult of true womanhood" (Welter, 1966), America's rather extreme version of the doctrine of "separate spheres," specified piety, purity, submissiveness, and domesticity as the four cardinal female virtues. This ideology had a strong presence in religious platforms as well as in secular women's magazines catering to middle

[13] The gender division of labor may have reinforced female isolation. According to Stansell (1976, p. 92), "[w]omen were also unable to reconstitute the network of female friendships which had been an accustomed and sustaining part of daily life 'back home.' ... During summers and warmer weather ... men traveled down to buy supplies and negotiate loans, and rode to nearby claims to deliver mail, borrow tools, or share news. ... 'As soon as the storms let up, the mean could get away from the isolation,' wrote Mari Sandoz, Nebraska Writer and daughter of a homesteader, 'But not their women.' " Sochen (1976, p. 42) paints a similar picture: "The man on horseback, moving across the prairie and plains, is a common image; the woman bending over the open fire, sewing, reading, nursing the baby, or tending to the sick is the usual female portrait of frontier women. The striking difference is critical and surely based on reality. The men moved around, ever searching and socializing, while the women remained close to home, hearth, and family."

[14] In his words, when "an empty territory undergoes settlement [...] the specific characteristics of the first group able to effect a viable, self-perpetuating society are of crucial significance for the later social and cultural geography of the area, no matter how tiny the initial band of settlers may have been" (Zelinsky, 1973, p.p. 13–14).

and upper classes. In his observations about 19th century American society, de Tocqueville (1835) reflected on the stark differentiation in gender roles (which he viewed as consistent with the egalitarian values of democracy in America): "In no country has such constant care been taken, as in America, to trace two clearly distinct lines of action for the two sexes, and to make them keep pace one with the other, but in two pathways which are always different."

3 Fertility and Gender Inequality on the Frontier

Frontier populations were distinctive along several dimensions. As highlighted by demographers, historians, and economic historians (e.g., Eblen, 1965; Bazzi et al., 2020), frontier societies exhibited sex ratios skewed towards men and age ratios skewed towards prime-age adults. We visualize these characteristic frontier demographics through population pyramids. Figure 1 displays the distribution of population by age and sex from 1850 to 1890, comparing frontier and non-frontier areas.[15]

A striking feature in Figure 1 is the outsized presence of young males. This entailed a large share of prime-age adults in frontier populations, as well as an extremely imbalanced gender composition. Compared to a mean sex ratio of 1.09 in non-frontier counties, the average frontier county had 0.34 additional males for every female. Another demographic feature that stands out is the high child–women ratio, as frontier counties had simultaneously more young children and fewer women. All of these characteristics had important implications for gender roles on the frontier.

In remainder of this section, we examine how the distinctive isolation and demographics of the frontier shaped women's lives. Using all available Census data, we describe the patterns of fertility, marriage, and family structure that characterized the frontier, as well as the nature of women's work. We then develop an interpretation of female domesticity on the frontier, exploring the roles of high fertility and different forces affecting intrahousehold bargaining power.

3.1 Data and Estimating Equations

We track the frontier between 1790 and 1890, defined for each year as the contour line separating counties with population densities above two people per square mile from those with sparser settlements. This definition operationalizes the historical notions advanced by the "*Progress of the Nation*" Census report (Porter et al., 1890) and the influential contemporaneous essay by Turner (1893).[16] Figure 2 displays a series of maps depicting the history of the westward-moving frontier. For each period, frontier counties are defined as those (i) in close proximity to the frontier line (within 100 kilometers) and (ii) with population density below six people per square mile (a cutoff stipulated

[15] 1850 is the first year for which we have complete-count census data that allows for detailed breakdowns of population by gender *and* age. 1890 is the final year of the frontier era as conceived by Porter et al. (1890) and Turner (1893). While this figure combines all populations for 1850–1890 without any adjustment, the picture is basically unchanged after normalizing by decade-specific populations.

[16] For intercensal years, we use interpolated density (assuming a constant annual population growth rate that matches the decadal growth rate). Full details on the GIS methods used to track the frontier, including a discussion of smaller frontier lines located off the main contour lines, can be found in Bazzi et al. (2020).

by Porter et al. as the onset of post-frontier settlement). Non-frontier counties are those more than 100 kilometers inside the frontier line and/or with more than six people per square mile.

We describe socioeconomic differences on the frontier with the following equation:

$$x_{ct} = \alpha + \beta \text{ frontier}_{ct} + \theta_{d(c)} + \theta_t + \varepsilon_{ct}, \tag{1}$$

where x_{ct} is some characteristic for county c at time t, *frontier*$_{ct}$ is frontier status, and $\theta_{d(c)}$ and θ_t are Census division and year fixed effects, respectively. In this historical regression, we focus on the frontier era through 1890, measuring outcomes based on complete-count Census data compiled by the Integrated Public Use Microdata Series (Ruggles et al., 2019). The sample is restricted to counties that lie between the 1790 frontier line in the eastern U.S. and the 1890 frontier line in the heartland.[17] Following Bester et al. (2011), we cluster standard errors within 60×60 square-mile grid cells that cover counties in our sample. Inference is robust to other forms of spatial autocorrelation.

We further characterize the frontier differential by unbundling the two dimensions of isolation: (i) proximity to the frontier line, and (ii) low population density. The following specification distinguishes these two components:

$$x_{ct} = \alpha + \beta_1 \text{ near frontier line}_{ct} + \beta_2 \text{ low population density}_{ct} + \theta_{d(c)} + \theta_t + \varepsilon_{ct}, \tag{2}$$

where *near frontier line*$_{ct}$ is an indicator for counties within 100 km of the frontier line at time t, and *low population density*$_{ct}$ is an indicator for population density below six people per square mile.

We also probe the variation in density and proximity beyond the binary restrictions used to define frontier status. We estimate the following equation to provide a clearer picture of the density gradient and the east–west gradient that underlie the average frontier differentials in Table 1:

$$x_{ct} = \alpha + g(\text{isolation}_{ct}) + \theta_{d(c)} + \theta_t + \varepsilon_{ct}, \tag{3}$$

where $g(\cdot)$ is a local linear regression function recovered using the Robinson (1988) estimator, and *isolation* is either population density or distance to the frontier line.

3.2 Fertility, Marriage, and Family

This section documents the frontier's high fertility, marriage patterns induced by the scarcity of women, and low presence of extended families. We begin, in Table 1, by describing fertility rates using a common historical proxy, the child–women ratio, measured as the number of children under the age of 5 over the number of women in their childbearing age (15—49) times 1000. Our sample comprises frontier and non-frontier counties from 1850 to 1880.[18] Frontier counties have on average 10% higher child–women ratios than non-frontier counties (column 1, panel A). This is likely an

[17] This is the most conservative sample restriction that is used as a baseline in Bazzi et al. (2020). Extending the analysis to include the frontier counties on the West Coast and/or those living in counties more than 100 km beyond the 1890 frontier line leaves the results largely unchanged and, if anything, amplifies some of the effect sizes.

[18] Prior to 1850, we lack gender×age breakdowns in county-level tabulations. The 1890 microdata was lost in a fire.

underestimate insofar as infant mortality was higher on the frontier, where health infrastructure was relatively underdeveloped. The differential fertility is associated with both dimensions of frontier isolation: counties within 100 km of the frontier line have 52 more under-5 children per 1,000 women than those east of the 100 km cutoff, and counties under six people per square mile have nearly 42 more under-5 children per 1,000 women (column 1, panel B). In other words, high fertility on the frontier is not merely a product of its low density. These findings resonate with historical work on fertility, which showed substantially higher child-women ratios in rural areas and a steep east–west gradient of increasing fertility (see Haines, 1994; Jones and Tertilt, 2008; Steckel, 1992).

Higher marriage rates went hand in hand with the higher fertility rates of frontier societies. In the average non-frontier county, 70% of women aged 15 plus had ever been married (i.e., including widows and divorcees), while these rates were 5 percentage points (p.p.) higher in the average frontier county (column 2, panel A). Meanwhile, the share of men ever married was much lower on the frontier than elsewhere (column 3, panel A). This is consistent with the skewed sex ratios, especially among prime-age adults, described above with reference to Figure 1. For both outcomes, we see in panel B that the frontier differential is shaped not only by low density but also by proximity to the frontier line. Overall, then, although low-density rural areas typically have higher marriage and fertility rates, the frontier differential goes beyond that.

The frontier's male-biased sex ratios explain the higher marriage rates for women and lower rates for men. The surplus of male candidates meant that women faced a tight marriage market. Young women entering the marriage market were few relative to the pool of male suitors, which included not only males in the same cohort but also those from previous cohorts who had not yet found a partner. These older males may have been increasing their competitiveness over time by acquiring land, establishing functioning farms, and building a home to provide a stable livelihood for a family. Marriage rates were higher on the frontier for women of all ages, and particularly so for very young women, as shown in Figure 4.

Large age gaps between spouses were another feature of marriage patterns on the frontier. Among married couples, the age gap was roughly 0.25 years larger on the frontier relative to a mean of 4.4 years outside the frontier (column 4, panel A). The large age gaps between spouses on the frontier might have compounded the other sources of bargaining power imbalance within marriages, to the extent that men could exert greater authority over younger wives. Unlike other outcomes in Table 1, the age gap differential is largely explained by the lower density on the frontier (panel B). A possible explanation for these patterns is that competition in the marriage market in rural areas could favor older males that had already established the means to support a family, a force that would be relevant on the frontier as well as in other low-density rural areas. The remoteness of the frontier, insofar as it coincided with skewed sex ratios, would deepen these implications of competition among males, but at the same time made access to land easier.

The remaining columns of Table 1 bear out two other features of frontier life that likely constrained female opportunities outside the home. First, female divorce rates were one-third lower on the frontier, implying that either divorce was less common or divorced women were more likely to leave the county; the latter is supported by evidence on marriage dissolution patterns discussed

below. Second, households on the frontier comprised smaller extended family structures and fewer elder females. Households with more than two generations were nearly one quarter less likely on the frontier than the non-frontier (column 6, panel A). Households with grandmothers present were similarly less prevalent (column 7) as were households with extended family members from within the same generation as the household head (column 8). These patterns suggest greater intergenerational isolation for women on the frontier than for those living in settled communities.

Fertility and Marriage. The higher female marriage rate on the frontier was a major proximate cause of higher fertility rates. Appendix Table A.1 shows that, to some extent, the overall frontier differential in fertility reflects the greater presence of young married women, who are more likely to have kids on the frontier but also elsewhere. Using Census micro-data from 1850–1880, we find that the frontier differential in children per household or young children (under five) per household (columns 1 and 2) remains unchanged when adding flexible controls for mother's age (columns 3 and 4). However, the differential falls substantially when we restrict the sample to ever-married women (columns 5 and 6). Together, these results suggest that much of the differential fertility on the frontier can be explained by differential marriage.

A Semiparametric Look at Frontier Differentials. Using equation (3), we conduct a semiparametric analysis of how outcomes in Table 1 vary with density and proximity to the frontier. For density, Appendix Figure A.1 reveals sharp structural breaks for some of the x characteristics, including sex ratios and the prime-age adult share (originally shown in Bazzi et al., 2020) as well as the shares of men ever married, spousal age gaps, and extended family presence. The breaks occur in the range of 2–6 people per square mile, consistent with the frontier density cutoffs stipulated by the Census Bureau in the 1800s. For other outcomes like fertility, the frontier differential is not a result of such a sharp structural break so much as a gradual change as we move towards less dense counties. Appendix Figure A.2 presents analogous estimates of $g(\cdot)$ for distance to the frontier line. The graphs reveal a similar pattern of distinctiveness close to the frontier cutoff of 100 km to the east, with a few outcomes exhibiting noticeable breaks in that vicinity.

Marriage Dissolution. In Appendix Table A.2, we complete our description of marriage patterns with an assessment of dissolution patterns. To do this, we use a linked sample of married men in 1870 and 1880 from the Census Linking Project (Abramitzky et al., 2020). We find higher rates of marriage dissolution on the frontier (column 1), owing to the combination of more absent spouses due to informal separation (column 2), divorce (column 3), and widowing (column 4). The higher incidence of divorce, combined with the lower share of divorced women in frontier counties documented above, suggests that divorced women on the frontier were more likely to leave the county. The higher incidence of widowers is consistent with greater female mortality on the frontier, which could partly result from higher fertility in a context of high maternal mortality risk.

3.3 Women's Work

With higher marriage rates, higher fertility, less divorce, and more limited family structures, frontier society was generally inhospitable to "gainful employment" for women. Here, we provide evidence on these distinctive patterns of female labor, restricting attention to the period from 1860 to 1880 because the 1850 Census only records employment activities for men but not women. While measures of labor force participation are not available until 1940, we consider the share of women aged 16 and above that report a "gainful occupation."[19]

Table 2 shows that, on average, frontier counties exhibit 2.5 p.p. lower rates of gainful employment by females, compared to a mean of 12% in non-frontier counties (column 1, panel A). This frontier differential in female gainful employment is due to both lower density and greater isolation (panel B). These differential rates of "gainful employment" may understate the actual differential rate of female labor force participation due to unpaid family labor and social stigma (Burnette, 2021; Chiswick and Robinson, 2021; Goldin, 1990, 2006; Riley, 1981). One specific concern relates to the greater prevalence of unpaid family labor in agriculture, where many women participated in farm production of marketed goods but were not counted as farmers (see Chiswick and Robinson, 2021). Given the importance of agriculture on the frontier, this may lead to differential under-reporting of female employment. To address this, we can calculate measures of gainful employment among all households in a county with at least one male member working in agriculture, or among households without any male members in agriculture. The results, displayed in columns 2 and 3, are very similar to our baseline, suggesting that these do not merely reflect a compositional effect.

While the average frontier women was less likely to be gainfully employed, those women working did so in higher-status occupations than their counterparts in already-settled parts of the country. Column 4 of Table 2 shows that, among those gainfully employed, average occupational income scores were nearly 10% higher among women working on the frontier. These scores, ranging from 0 to 80, capture occupation-specific incomes based on 1950 Census data (Ruggles et al., 2019).

Importantly, this is not an artifact of a general frontier differential in occupational income scores common to both genders. Taking the ratio of average female to average male scores, column 5 reveals greater parity in occupational status among men and women on the frontier relative to elsewhere. Panel B shows that this frontier differential in the prevalence of high-status women can be explained both by proximity to the frontier line and its low population density.[20]

The findings in columns 4 and 5 of Table 2 are robust to alternative measures of socioeconomic status and are not merely due to gender differences in agricultural employment on the frontier. On the former, we find similar results using the Saavedra and Twinam (2020) machine-learning-based measure of socioeconomic status that combines industry, occupation, and demographic informa-

[19] For details, see Chiswick and Robinson (2021), the "Integrated Occupation and Industry Codes and Occupational Standing Variables in the IPUMS" at `https://usa.ipums.org/usa/chapter4/chapter4.shtml`, and further discussion for 1880 at `https://usa.ipums.org/usa/volii/88occtc.shtml`. The development of criteria for classifying "gainful occupations" was led by Francis Walker, the Superintendent of the 1870 and 1880 Censuses, improving the data quality relative to previous years although still based on an imprecise notion by modern standards.

[20] Appendix Figures A.1 and A.2 report results from a semiparametric analysis relating female work patterns to population density or proximity to the frontier.

tion.[21] On the latter, we find results when restricting the sample to women and men working outside agriculture.[22]

Figure 5 provides further insight into the work patterns of women with gainful occupations. We report the shares of women in the top ten occupations from 1860–80, using *occ1950* occupational categories from IPUMS and lumping some categories into bigger groups.[23] The figure shows the shares of all women with gainful occupations in each category for the frontier (with colored bars) and for the rest of the country (with empty bars). To ease visualization, the colored bars for the frontier depict three types of economic activities: green for agriculture, yellow for manufacturing activities, and red for services or non-production occupations in any sector.

Looking across frontier and non-frontier bars in Figure 5, we see clear patterns underlying the higher average status of gainfully employed women on the frontier. First, the combined shares of the two agricultural categories are similar for the frontier and elsewhere, but the share of owners and tenants is higher on the frontier, while the share of farm laborers and wage workers is higher elsewhere. When looking at relatively high-status categories, outside the frontier a sizable share of gainfully employed women were "operative and kindred workers"; employment of this kind, usually at manufacturing firms, was much less common on the frontier. On the other hand, two categories with even higher status were more common on the frontier: teachers and "managers, officials, and proprietors." The latter included hotel keepers, restaurant keepers, saloon keepers and bartenders, traders and dealers. Importantly, while historical narratives suggest that prostitution was an integral part of frontier life (Butler, 1987) and much more common than in the rest of the country, this does not seem to be a first-order driver of the observed frontier differential in upper tail working women. Women reporting prostitution as an occupation were classified by IPUMS within the distinct category of "Attendants, professional and personal service (not elsewhere classified)," which has an occupation score of 13 and is not among the top ten categories in Figure 5.[24]

Averages versus Upper Tails: Reconciling Frontier Narratives. Our findings above on frontier women's work—lower rates of gainful employment but higher status among working women—help reconcile contrasting historical narratives. Many portray strong, empowered women in entrepreneurial roles, highlighting the liberating potential of the frontier compared to the constrained Victorian structures of settled societies to the east. On the other hand, isolated women bound to domesticity are also a common image in frontier history. Our findings here suggest that both nar-

[21] With this outcome, the frontier coefficient in the column 4 specification is 0.871 (std. error 0.169), and in column 5 is 0.020 (std. error 0.007), relative to the mean outcome in non-frontier counties of 7.2 (std. dev. 2.1) and 0.46 (std. dev. 0.11), respectively. The analogous estimates for frontier proximity and low density in panel (B) follow a similar pattern.

[22] With this restriction, the frontier coefficient in column 4 specification is 1.236 (std. error 0.373), and in column 5 is 0.060 (std. error 0.012).

[23] The share of working women not included in any of these categories is similar on and off the frontier (around 12%), and so is their average occupation score (around 27). Thus, their omission from the figure does not distort the comparison.

[24] Sex work does not explain the excess mass of frontier women working in service- and trade-based occupations and does not appear to be pervasive enough on the frontier to explain its relatively thicker upper tail of female occupational standing. Using the 10% 1880 Census sample, we compute the share of working women who report "Prostitute" as their occupation. We find that about 1.3% of women in the labor force report being a sex worker in comparison to only 0.018% for non-frontier counties. There are several caveats to this analysis. Most importantly, perhaps, is the undercounting of sex workers due to social stigma, which was arguably stronger outside the frontier (Rutter, 2005).

ratives are part of the same picture. While the mass of women on the frontier found themselves relatively more constrained by homemaking duties, a small share of frontier women reached the upper echelons of society taking on highly visible and high-return roles in the local economy. Given their visibility, such women may have occupied an outsized presence in frontier mythology. Yet, historiographic accounts correctly include the experience of most women as well.

The combination of lower female employment rates with higher status among working women on the frontier can be explained through the lens of a standard Roy model (see, e.g., Mulligan and Rubinstein, 2008). If there is positive selection of women into labor market participation, an equilibrium with lower participation is bound to feature relatively high earnings and/or status among working women. If there were stronger factors that constrained women from leaving their homes for work on the frontier, then women would only do so if they had the capabilities to earn high enough returns. In such contexts, selection would make the set of working women on the frontier display higher status than elsewhere. The next section examines the factors that may have shaped these observed patterns.

Selective Migration. The distinctive patterns of marriage, fertility, and women's work on the frontier may reflect selective migration to the frontier, exposure effects that shaped settlers' behavior while on the frontier, or both. We explore selective migration in Appendix Table A.3. Following married couples from 1870 to 1880 with data from the Census Linking Project (Abramitzky et al., 2020), we explore whether the gender disparities that we see on the frontier mechanically reproduced pre-existing intrahousehold inequalities of couples that self-selected as frontier migrants. In Panel A, we consider differences in 1870 between couples that migrated to the frontier and those who remained in the non-frontier during the ensuing decade. In all specifications, we include fixed effects for state of residence in 1870; in even columns, we also control for husbands' occupational scores, to ensure we are capturing differences in gender roles within couples, not just overall differences across couples. We do the same in panel B but also restrict the sample to couples in which the husband was initially in agriculture, addressing possible concerns about compositional differences.

Appendix Table A.3 shows that selective migration is important in explaining the frontier differential for some outcomes but works against it for others. Compared to others from settled areas in 1870, frontier migrants had fewer children (columns 1-2), implying that selective migration does not mechanically account for higher fertility on the frontier. Frontier migrants exhibit wider age gaps (columns 3-4), with magnitudes large enough to explain the frontier differential in column 4 of Table 1. These migrants also exhibit lower female employment rates (column 5-6), but this selection explains only a quarter or a fifth of the overall frontier differential in column 1 of Table 2, suggesting scope for exposure effects. Finally, women who moved to the frontier with their husbands report lower occupational scores conditional on gainful employment (columns 7-8), suggesting that the thick upper tail of working women on the frontier is not driven by selective migration among already-married women. Together, these estimates point to both selection and exposure effects being important in explaining the distinctiveness of frontier gender roles in the historical era, and thus also contributing to the persistent frontier legacy that we identify in Section 4.

3.4 Understanding Female Domesticity on the Frontier

Section 3.2 showed that, in frontier locations characterized by isolation, land abundance, and male-skewed sex ration, women usually married earlier, with older men, and had more children. Section 3.3 showed that frontier women were less likely to work for pay outside the home, but among working women, those on the frontier had higher occupational status, which can be rationalized by selection in a context of high barriers to entry. In this section, we develop our interpretation of the higher domesticity for the average women on the frontier. We show that barriers to entering the labor force seem to go beyond the higher fertility induced by land abundance, pointing to the role of frontier isolation in terms of housework burdens and the absence of employment opportunities available elsewhere. We also argue that frontier women likely did not enjoy more leisure, as isolation also undermined the bargaining power induced by male-skewed sex ratios.

More than a "Child Penalty" on Employment. Lower rates of female "gainful employment" on the frontier may have been, to some extent, a result of high fertility. In this historical period, women bore the brunt of childcare activities all across the United States. On the frontier, where land abundance favored high fertility, the burden of childcare may have been more extreme. A large literature documents the presence of "child penalties" in wages and employment for women working in the modern U.S. economy.[25] This section examines the extent to which lower involvement in the labor force among women on the American frontier was driven by the outsized burden of high fertility.

We focus on women living in agricultural households on the frontier and elsewhere to make more compelling comparisons. Columns 1–3 of Table 3 show, using individual-level regressions, the frontier differentials in fertility and female gainful employment. Column 3 indicates a similar differential as observed at the county level in prior results: frontier women are about 3 p.p. less likely to report a gainful occupation. We then provide a rough approximation to gauge the size of the child penalty, regressing reported gainful employment by women on the total number of children (column 4) and the number of children under five (column 5). For women in agricultural households across the U.S., each child (under five years old) is associated with a 1.5 p.p. (3 p.p.) reduction in the likelihood of gainful employment.[26]

Combining the estimates in columns 1 and 5, we arrive at a rough sense of the extent to which the employment child penalty can account for the frontier's lower female employment in column 3. Frontier women had on average 0.1 more children under five, and each child under five is associated with a 3 p.p. lower likelihood of employment; so this channel would account for slightly more than one-tenth of the overall lower female employment on the frontier. A similar conclusion arises when we add a control for children under five in column 7, which makes the coefficient on the frontier dummy drop by about ten percent. [27] These exercises are of course subject to strong caveats,

[25] See, for example, Kleven et al. (2019) and Kleven (2022), and for a more general analysis of the association between fertility and female labor force participation, see Doepke et al. (2023), Jones and Tertilt (2008), and Jones et al. (2010).

[26] These figures appear small compared to recent estimates of the child penalty (e.g., 22 p.p. in Kleven, 2022), but this comparison is among working women (i.e., related to 100 p.p. employment rates) whereas in our case the reference rate is 14 p.p. Thus, the historic child penalty we estimate is sizable in relative terms.

[27] If we consider all children instead of children under five years old (columns 1, 4, and 6), the child penalty is even smaller

but insofar as the magnitudes are still informative, they suggest that differential fertility can only explain a modest share of the lower female employment on the frontier.

More Leisure or More Housework? As the child penalty does not account for most of the lower employment, frontier women must have spent more time on leisure and/or housework. It is possible that frontier women enjoyed higher leisure thanks to stronger bargaining power. Grosjean and Khattar (2019) show, along these lines, that historically male-biased sex ratios in Australia strengthened bargaining power of women in the marriage market, leading to less female labor participation and more leisure. In addition, land abundance on the American frontier may have favored greater leisure than in non-frontier rural locations, through an income effect. Together, these factors may have offered frontier women the benefit of being supported financially while spending their time at home caring for children rather than working in factories or as domestic servants. Female bargaining power may have influenced not only the quantity of work but also the types of work in which frontier women specialized, with childbearing and household work plausibly being preferable in many cases to common occupations of women elsewhere.

On the other hand, it is also possible that even when female employment on the frontier was lower, childcare and housework were demanding enough to imply less leisure for women. This is consistent with historical narratives and with the limited available data on historical time use. A survey by the U.S. Department of Agriculture that collected daily time use records in the 1920s indicates that women across America spent very long hours in household work, and that this burden was higher for women in rural households, especially those with young children (Pidgeon, 1937, pp. 29-30).[28] The frontier was bound to exacerbate the burden of housework and childcare, as isolation forced home production of most goods and services, and, as we showed in Table 1, there were often no extended family with whom to share that burden.

The possibility that child-rearing and housework on the frontier left no time for work outside the home is consistent with either leisure being lower for everyone or with women's leisure being differentially low. The latter would imply that their bargaining power based on male-skewed sex ratios was undermined by other factors. Section 2 describes various reasons why the benefits of female scarcity in the marriage market may have been mitigated, perhaps even more than offset. In this account, higher fertility and lower female employment on the frontier would have been induced by weaker, not stronger, intrahousehold bargaining power. This would be consistent with women desiring fewer children than men due to the implied burdens, including maternal mortality risk, with this marital disagreement over the number of children resolved in favor of men's desired fertility (see Albanesi and Olivetti, 2016; Doepke and Kindermann, 2019; Hazan et al., 2021).

and so is its likely role in explaining the frontier differential in female employment. This is consistent with the fact that, according to historical narratives, children started to work early, and parental time spent on child-rearing was moderate after a very young age.

[28] Among >2,000 homemakers in rural and urban areas, women spent on average 51 hours a week in housework; this figure was higher in farm households, and even higher in farm homes with young children, reaching 73 hours.

Bargaining Power. We examine two channels that may have undermined women's bargaining power on the frontier, thus shaping their fertility and work patterns. First, we assess the idea that female scarcity in marriage markets may not have benefited all frontier women. Second, we examine the notion that women's bargaining may have been undermined by the frontier's isolation, which entailed a lack of options to find protection against abuse or to exit marriage. Our results are consistent with the idea that the forces weakening women's bargaining power on the frontier contributed to female domesticity.

We begin by exploring the hypothesis that gender imbalances would be relevant for women married on the frontier, but not for women who married before migrating to the frontier and hence did not face sharply skewed sex ratio at the time of entering a marital contract. We take this idea to the data with a sample of women from the Census Tree dataset (Buckles et al., 2023; Price et al., 2021), linking them across two consecutive Census rounds, 1860 and 1870. In panel (A) of Table 4, we compare patterns of fertility and employment for three groups: (i) women who live and were married in settled areas (the omitted category in the regressions), (ii) frontier women who were married in settled areas, and (iii) frontier women who married on the frontier. The results show that, compared with married women living in settled areas, all married women on the frontier have higher fertility and lower "gainful employment," but the gap is larger for frontier women married in settled areas than for frontier women married on the frontier. Panel (B) of Table 4 further validates this differential by restricting the sample to frontier women and adding county fixed effects. In this smaller, more demanding specification focused on frontier settlers, we see that women married on the frontier had lower fertility and higher employment compared to frontier women married elsewhere. One interpretation of these patterns is that those marrying on the frontier could more effectively capitalize on female scarcity in the marriage market to gain bargaining power despite the disadvantages of isolation borne by all married women on the frontier. We acknowledge, however, that these patterns are merely suggestive, as omitted variables and selection on unobservables could explain the timing of migration and marriage decisions.

We further investigate the role of bargaining power by exploring the interaction between frontier conditions and state-level variation in women's economic rights (see Geddes and Lueck, 2002, Hazan et al., 2019, and for broader perspectives, Doepke et al., 2012, Tertilt et al., 2022). Women's rights to own property and retain their labor earnings, which determined women's outside options and their bargaining power, were granted at different times in different states over the 19th and 20th centuries (see Appendix Figure A.3). Frontier isolation may have undermined women's bargaining power through the absence of protection against abuse and the lack of outside options to exit marriage. A key reason that women needed to rely on support networks, mainly their families, was the structural gender inequality of this historical period. In particular, the lack of economic rights obstructed women's independence, and frontier isolation undermined women's intrahousehold bargaining power position by removing their main outside option, amplifying their vulnerability. Insofar as these structural inequalities were remedied, the relevance of this channel diminished,

as women could leave their home and have a chance to be independent elsewhere.[29]

Consistent with this hypothesis, Table 5 shows that the frontier differential in fertility and employment outcomes largely disappears in states that had granted economic rights to women. For the two other core outcomes we consider, marriage rates and occupational status among working women, the frontier differentials do not appear to vary with women's economic rights. While these results suggest that bargaining power may have played some role in shaping frontier gender roles, our analysis leaves open questions that are difficult to answer without survey data on time use or gender attitudes. In the following section, we use such data, only available for more recent periods, to analyze long-run legacies of frontier experience.

4 The Frontier Legacy in the Long Run

This section examines the legacy of frontier settlement for gender norms and inequality over the long run. The frontier's distinctive gender roles, characterized by high fertility and low rates of female involvement in labor markets, may have fostered gender norms prescribing domesticity. On the other hand, the higher occupational status of working women on the frontier might have pushed in the opposite direction. If frontier life shaped gender norms at this early juncture of development, such norms may have persisted beyond the frontier era.

Various mechanisms can foster the persistence of gender norms. These include intergenerational transmission within the family or social interactions outside the household, such as those mediated by schools, labor markets, churches, civic associations, and other local institutions. Social norms supporting female domesticity and seclusion may also have a self-reinforcing aspect, insofar as they limit access to emerging opportunities in the public sphere. Throughout the 20th century, various technological and institutional changes enabled women to deepen and expand their participation in economic and political domains across the U.S. (Goldin, 2006, 2021, 2023). While frontier conditions had long abated when these transformations took place, domesticity norms may have hindered empowerment in public life, obstructing the evolution of more egalitarian gender norms.

To examine the long-run legacy of the frontier, we rely on variation in the duration of historical exposure to frontier conditions across counties. For locations that were on the frontier for several decades, the scope for entrenchment of frontier cultural norms was greater than in places that the frontier passed over within a few years. For each county, we use the measures of frontier status for each time period to calculate its total frontier experience (TFE) over 1790–1890. Figure 3 displays the spatial distribution of TFE, which shows considerable variation both across and within states.

We identify the frontier legacy over the long run by exploiting this localized variation in historical exposure, controlling for an array of potential confounders and considering several robustness

[29] We assess the relevance of women's economic rights using the following augmented version of equation (1):

$$x_{cst} = \alpha + \beta_1 \text{ frontier}_{cst} + \beta_2 \text{ economic rights}_{st} + \beta_3 \text{ frontier}_{ct} \times \text{economic rights}_{st} + \theta_{d(c)} + \theta_t + \varepsilon_{cst}, \quad (4)$$

where $economic\ rights_{st}$ is a binary indicator equal to one whenever both property rights and earnings rights were available to women living in state s at time t (and equal to zero otherwise). This measure follows Hazan et al. (2019) and relies on data from Geddes and Lueck (2002).

checks, including an instrumental variables approach that isolates plausibly exogenous variation. Our main estimating equation is given by:

$$y_c = \alpha + \beta \text{ total frontier experience}_c + \mathbf{x}_c'\boldsymbol{\gamma} + \theta_{s(c)} + \varepsilon_c, \tag{5}$$

relating *total frontier experience* (scaled in decades) to outcome y in county c, where $\theta_{s(c)}$ is a state fixed effect. In baseline specifications, the frontier window is from 1790 to 1890, and the sample includes all counties within the 1790 and 1890 frontier lines (see Figure 3). The $\mathbf{x}_c$ vector comprises predetermined or fixed county-level covariates including latitude, longitude, average rainfall and temperature, elevation, potential agricultural yield, and distance to rivers, lakes, and the coast.[30] The coefficient β therefore identifies a local effect of TFE after partialling out geoclimatic factors that may shape TFE and the given outcome. As in the historical regressions in Section 3, standard errors are clustered on 60×60 square-mile grid cells that cover counties in our sample.

We start our analysis by documenting long-run associations of historical frontier exposure with gender roles and the status of women throughout the 20th century. Many decades after the frontier had passed, locations with greater TFE display higher fertility and lower FLFP. Among working women we continue to find a thicker upper tail of high-status occupations, perhaps due to positive selection in the presence of persistent entry barriers, as in the historical period. Such barriers arguably include many of the conservative gender norms entrenched during the frontier era.

In the following sections, we turn to the modern era, further documenting persistence and more richly characterizing the frontier legacy of gender inequality. Using detailed time use data, we show that women in high-TFE locations do not enjoy more leisure. We then look at various forms of female political engagement and gender politics, finding that electoral structures may have reinforced frontier gender norms over the long run. Finally, we present evidence from survey data that supports our emphasis on norms. We show how frontier history fostered a persistent set of conservative gender attitudes that may have undermined greater gender equality across various domains of public life. While we do not take a stand on the mechanisms underlying persistence, our results are suggestive of a critical role for gender norms, and a self-reinforcing feature of domesticity norms that limit participation in public spheres where gender roles are progressively changing.

4.1 Frontier History and Modern Gender Inequality

This section examines the long-run legacy of frontier experience for fertility, marriage, and female labor market activities. We consider Census-based outcomes measured in 1940 from the Integrated Public Use Microdata Series (Ruggles et al., 2019) and from 1950 to 2000 from the IPUMS National Historical Geographic Information System (Manson et al., 2019). In Table 6, panel A, we revisit outcomes from the historical regressions in Table 1, now for the year 1940. Panel B does the same for 2000 with slightly different outcome definitions given the changes in available measures.

The results in panel A of Table 6 suggest frontier gender norms endured long after the era of westward expansion had ended. By 1940, counties had at least 50 years since frontier conditions

[30] We tie our hands here, and in robustness checks, by restricting to the same controls used in Bazzi et al. (2020).

prevailed; some had not been on the frontier for more than a century. Stark gender imbalances were long gone (see Appendix Figure A.4), and the share of the labor force employed in agriculture had dwindled over time, likely mitigating a direct effect of land abundance on fertility through land bequest motives. And still, the gender roles that characterized frontier life persisted: TFE is associated with significantly higher fertility (column 1), higher marriage rates for both women and men (columns 2 and 3), and lower female labor force participation (FLFP) (column 4).[31] Long after the end of the frontier era, women in high-TFE counties are still more bound to the home, as they have more children and supply less labor to the market, even when compared to men (column 5). When they work outside the home, they do so in occupations more distinct from men than do their counterparts in low-TFE counties (column 6).

Many of the findings in Table 6 seem to mirror those in Table 1 from the mid-1800s when most women living in frontier counties were confined to the domestic space given the relatively stronger demands on their time to produce children and basic necessities. To get a sense of the magnitudes, we can multiply the coefficients by two to go from zero to two decades of TFE, which is just above the mean of 18 years. For this comparison, the high-TFE county would, for example, have (i) 26 more children for every 1,000 women, relative to a mean of 376 and a standard deviation (s.d.) of 79, and (ii) 3 p.p. lower FLFP, relative to a mean of 17% and s.d. of 6%.

These long-run correlations with TFE suggest that the initial norms around female seclusion and domesticity on the frontier persisted across generations as part of a sticky cultural configuration. Panel B of Table 6 reinforces this interpretation, showing that most of these strong correlations with TFE, including for FLFP in column 4, persist through the end of the 20th century. Before World War II, female employment rates were very low, but by 2000 FLFP exceeded 50%. Yet, the negative association with TFE persisted.

The Declining but Persistent Frontier Legacy over the 20th Century. We elaborate our historical analysis by tracking the impacts of frontier exposure decade by decade over the 20th century. Figure 6 reports time-varying estimates of equation (5), with state-year fixed effects and allowing controls to vary over time (i.e, interacting controls with year FEs) so as to mimic the flexibility of the year-specific regressions reported in Table 6. To make comparisons across time more meaningful despite differences in measurement (especially pre- and post-1940), we now standardize the measures of fertility and female employment for each period. For completeness, we report the results for the unstandardized versions of the outcome variables in Appendix Table A.4. The estimates in Figure 6 show a declining magnitude over time (with an outlying reduction in 1970), but they remain sizable and also fairly stable in the last few decades. The decay from 1940 to 2000 is smaller and the present-day impacts larger in this figure, where we consider standardized outcomes, than in Table 6 and Appendix Table A.4, particularly for fertility. These tables show a declining frontier legacy in absolute magnitude for the second half of the 20th century. In this period, the trend toward lower fertility and higher FLFP was a powerful force for convergence, leading not only to changes in the

[31] The results in column 3 differ from the historical period when frontier men were likely to be married than their non-frontier counterparts. This can be explained in part by the re-balancing of sex ratios in post-frontier society.

mean of our outcomes of interest but also to sharp falls in their standard deviations. Still, when we consider the standardized outcomes, we see that frontier history remains a significant factor underlying the remaining subnational variation.[32]

Working Woman's Occupational Standing. We revisit the analysis from Section 3.3 to see whether high-TFE areas retain a greater mass of women at the upper end of the occupational distribution. Appendix Table A.6 shows that by 1940, just as in the frontier era, working women in high-TFE counties hold relatively higher-status occupations compared to women in low-TFE counties (column 1, Panel A). These differentials are also significant when accounting for differences in men's occupational standings (column 2, Panel A). The remaining columns of Table A.6 assess whether these differential labor market outcomes may be explained by education, and find that this is unlikely: high-TFE locations show low rates of high school graduation among women but little gender gap in attainment (columns 3 and 4). This suggests a general under-provision of education in high-TFE locations by the mid-20th century, but no significant gender inequality in education that might explain the persistence of greater female representation in the upper tail of the occupational distribution. Panel B shows that these estimates for educational outcomes persist through 2000.

Just as in the historical period, we interpret these findings on high-status women through the lens of a standard Roy model of selection. Given stronger constraints on women entering paid work, we would expect an equilibrium with lower FLFP combined with higher occupational standing among working women. The difference in the modern era is that the barrier to labor market entry is not the frontier's isolation, but rather the cultural legacy of historical frontier exposure.

Overall, our findings on long-run outcomes thus far suggest that counties with greater historical exposure to the frontier remain places with fewer independent women, at least in terms of their engagement in economic life outside the home. To substantiate this interpretation of limited female autonomy, we turn to measures of time use and gender attitudes, which offer a unique window into women's lives at home as well as the perceptions of their role in society. Before doing so, however, we explore the robustness of our findings on FLFP.

Identification and Robustness Checks. FLFP occupies a central place in our study and in the broader economics literature on gender norms. We focus on this outcome in the ensuing robustness checks. Together, these checks aim to clarify the sources of identifying variation in TFE and, in turn, bolster the case for our proposed interpretation of the long-run correlations.

Additional controls. Appendix Table A.7 augments the baseline geoclimatic controls in equation (5) with additional confounds of TFE and FLFP. These include ruggedness and rainfall risk, distance to nearest Indian battle, historical demographics (i.e., slaves, immigrants, Scotch-Irish, and birthplace

[32] We also provide analogous results for the gender gap in labor force participation; these results, displayed in Appendix Figure A.5 and Table A.5, show that the gap has narrowed faster in high-TFE counties. Given the persistent differential in female employment, this suggests relative declines in male labor force participation in high-TFE counties in the late 20th century, some of which may intersect with broader declines in male labor market opportunities during this period (associated, for example, with skill-biased technological change and import competition).

diversity as of 1890) and historical economic factors (i.e., distance to portage sites and mines, connection to railroads, and manufacturing employment as of 1890). The inclusion of these controls one by one has little effect on the point estimate, with the exception of connection to the railroad in 1890, which decreases the coefficient by around one-third. Yet, the estimate remains statistically and economically significant, even when including the full set of controls in the final column. Similar insights hold for FLFP across the entire 20th century (see Appendix Table A.8).

Disentangling population density. We address an important confounding influence of population density. In particular, we use several distinct but complementary approaches to disentangling frontier history from a history of low density. First, we control for contemporaneous density. Second, we include indicators for the decile of within-state population density. Third, we implement a nearest-neighbor-matching-type specification that includes fixed effects for within-state pairs of counties that have the most similar population density. Fourth, we split the sample based on contemporaneous urban population shares. Finally, we control for the total number of years from 1790 to 1890 in which a county had population density less than 6 people per square mile. Appendix Table A.9 shows that the frontier legacy for FLFP holds up to these different checks, suggesting that the variation in gender norms across the geography of TFE is distinct from the variation across the geography of density. In other words, our long-run estimates reflect a history of frontier settlement rather than an accumulated history of low density and all that implies for gender roles.

Instrumental variables. To address residual concerns about endogeneity in the association between TFE and modern outcomes, we can estimate the effects of TFE using an instrumental variables (IV) strategy. Following Bazzi et al. (2020), we isolate exogenous variation in TFE due to historical shocks to the settlement process driven by inflows of immigrants to the United States. For each county, the IV captures total immigration flows from Europe to the Atlantic seaboard starting just before the onset of local frontier settlement. Specifically, the IV is the log of the average national annual actual migration inflows over the 30 years subsequent to the frontier line arriving within 110 km from the given county centroid. We also consider an alternative version of the IV, based on Nunn et al. (2017), that relies on predicted, rather than actual, immigrant inflows induced by climate shocks in Europe. Intuitively, these time-varying flows put population pressure on the settled parts of the eastern U.S., thus hastening westward expansion and reducing TFE among counties on the frontier, and at the same time, those aggregate immigration flows are unrelated to the local conditions of any given frontier county.[33] The IV estimates in Appendix Table A.10 are similar across the two approaches. Together, they confirm the previous OLS results for key outcome variables in fertility and FLFP, as well as those for conservative gender attitudes discussed at length below in Section 4.3.

Alternative frontier definitions. While our definition of frontier status and hence TFE relied on thresholds in density and proximity, the long-run association of TFE and FLFP is not an artifact of those

[33] Appendix D of Bazzi et al. (2020) provide extensive details on the identifying variation underlying the two IVs, including visual and regression-based evidence clarifying why the first stage is so strong as well as discussion of how the push-factor IV can generate excludable variation in TFE. The key validity concern is that the increased scale of immigration induces different types of internal movers to the frontier where those types may be more or less prone to the sort of gender norms we uncover on the frontier.

baseline threshold choices. Appendix Table A.11 demonstrates robustness to various thresholds and alternative treatments of frontiers located off of the main contour lines.

Regional variation and extended frontier time frame. We also carry out a regional heterogeneity analysis, add the west coast to our baseline sample of counties, and extend the frontier era through 1950. Appendix Table A.12 shows that the TFE estimates remain negative and statistically significant except when restricting to U.S. counties in the West Census region only, which could be due to the small sample size. More substantively, the point estimates and implied effect sizes are very similar across regions, which suggests that our estimates reflect an underlying legacy of frontier settlement rather than specific features of that process in different parts of the country.

Gender Inequality as Captured by Time Use Data. Much of our analysis thus far points to an enduring frontier legacy of gender inequality in the economy. However, low FLFP on its own is not necessarily evidence of female disadvantage, as it might reflect greater leisure obtained through intrahousehold bargaining power. For the historical period, this interpretation seems at odds with the burden of motherhood on the frontier described in Section 2 and the overall patterns documented in Section 3, but we did not have detailed data on time use to measure leisure in the frontier era. Here, we show for the modern period that the frontier legacy of low FLFP is not accompanied by greater leisure time at home, but rather by more household work. This aligns with our conjecture about how to interpret the low FLFP, high fertility, and lack of extended family support structures at home in the historical era.

We explore the day-to-day time allocation of partnered women from 2003 to 2020 using the American Time Use Survey (ATUS). This long-running survey captures daily time use, in minutes, across a range of activities inside and outside the home. We group these activities into four categories: leisure, household activities, work, and other activities.[34] We estimate the relationship with TFE at the individual-level, augmenting equation (5) with survey wave FE and individual controls for age, age squared, education status, race, household size, and presence of children below 18 in the household. The results also hold if we exclude these controls, which may be endogenous to TFE.

Table 7 shows that women in high-TFE counties engage in significantly less leisure and more housework than their counterparts in low-TFE counties. Each additional decade of TFE is associated with roughly 2.8% less leisure and 1.6% more housework relative to means of 4.4 and 3.8 hours per day, respectively (columns 1 and 2). We also find a significant positive association with time spent working (column 3). This presents a contrast with our previous findings of a negative association of TFE and FLFP until 2000, which prompts several additional comments. First, if we define an outcome for "any work" (a binary indicator for spending above zero minutes per day on work activities), we do not find a significant association, suggesting that the pattern is driven by the intensive margin of hours spent in the labor market; this margin may reflect, in part, the working

[34]Leisure activities include all time spent on socializing, relaxing, and leisure as well as engaged in recreational sports and hobbies (this definition aligns with the one used in Aguiar and Hurst, 2007). Household activities include time spent on a range of household management and organizational tasks. Work activities include all time spent working, doing activities as part of one's job, engaging in income-generating activities (not as part of one's job), and looking for jobs and interviewing. The last category, "Other," includes a number of activities ranging from sleep to shopping.

hours of those in the upper tail following the selection mechanism noted above. These patterns may also reflect the nature of the ATUS sample, which only covers 402 counties and has a strong over-representation of low-TFE locations. In any case, the findings are informative. The last column of the table shows that there is little relationship between TFE and the residual "other" category.

The negative association between TFE and leisure documented for women in panel A does not hold for partnered men, whose time allocation exhibits little systematic or significant association with TFE (panel B). Including respondents of both genders in the same regression with added interactions terms, we can confirm that the estimated effects of TFE on the leisure share for women and men are statistically different. This suggests that female time use in high-TFE counties is unlikely to be driven by different underlying economic structures affecting both genders.

4.2 Women in Politics: Suffrage and Representation

To better understand the scope of conservative gender norms and how they became entrenched, we now explore the frontier legacy for female political representation and engagement in politics. The history of female suffrage in America features a prominent role for women in Western states, some of which were the first to grant women the right to vote in the late 1800s and early 1900s: Wyoming was first in 1869 followed by Colorado in 1893, Utah and Idaho in 1896, Washington in 1910, California in 1911, and Oregon, Kansas, and Arizona in 1912. Our sample only includes parts of some of these states, as most of the region had not transitioned from frontier to settled areas by 1890, and thus we do not have accurate, comparable measures of TFE for them. But despite this limitation of our sample, we can explore whether frontier gender norms contributed to the early embrace of women's political rights, and to women's participation in politics thereafter.

Our findings in Section 3.3 suggest that frontier society was indeed home to a small number of entrepreneurial women. Yet, at the same time, our findings elsewhere in Section 3 suggest that most women on the frontier had less autonomy and less opportunities to engage in public life outside the home. Our results in this section show a contrast between support for suffrage among elites and apathy if not outright opposition among the masses.

On the elite side, column 1 of Table 8 shows that congressional representatives in districts with greater TFE were more likely to vote for the 19th amendment in 1919, which recognized women's right to vote.[35] Each additional decade of TFE is associated with a 4.4 p.p. higher likelihood of a yea vote relative to the mean of 70%, though the point estimate is not statistically significant at conventional levels (p-value = 0.11). While political support for suffrage undoubtedly came from various quarters (see the Introduction), some narratives emphasize the role of elite women in pressuring male politicians of the time (see Mead, 2006b; Stefanco, 1987). Some of these women, or their daughters in later years, may have come from the ranks of the upper tail women working outside the home. At the same time, we find no significant differences in the gender composition of House representatives across high- and low-TFE congressional districts from 1917–2020 (column 2). While

[35] We estimate this cross-sectional regression at the congressional district (CD) level using measures of TFE and $\mathbf{X}$ controls from equation (5) that are area-weighted across all counties within the given CD.

this suggests limited translation of the economic upper tail into a political upper tail, the null result may simply be due to the very limited entry of women into Congress for most of the 20th century.

In column 3 of Table 8, we explore bottom-up female engagement in politics by examining differential voter turnout in national elections before and after the 19th Amendment. There is no county-level data on voter participation by gender in these elections. We thus follow the work of Cascio and Shenhav (2020) and infer female voter participation rates based on overall voter turnout. More precisely, we measure excess voter turnout as the difference in turnout from the 1924 and 1916 presidential elections. We rely on ICPSR county-level data on presidential election turnout computed on the basis of estimated eligible voters. We find that TFE is negatively associated with excess voter turnout, suggesting that women's relative political participation was significantly lower on the frontier. This regression augments the baseline controls and state FE in equation (5) with the shares of male and female populations that are of voting age in 1910 and 1920, to account for any confounding influence of differential gender composition across high- and low-TFE counties at the time. In a separate analysis, we find that limiting the sample to counties in states that had not already granted female suffrage prior to 1919 leads to a similar albeit less precise estimate: -0.510 (std. error 0.300). This negative relationship holds across elections spanning 1919 but not for elections across earlier (1912–1916) or later periods (1920–1924) (see Appendix Table A.13).

In the remaining columns of Table 8, we turn to political and social mobilization of women at the local level. First, we find little evidence of popular mobilization for women's rights in the lead up to and during the 19th Amendment vote. Using data from the "Mapping American Social Movements" project, we explore such mobilization as reflected in National Woman's Party (NWP) actions from 1914–1922, including demonstrations, meetings, legislative engagements, legal actions, etc. The NWP was an American women's political organization established in 1916 advocating for female's suffrage and equal rights. Although NWP actions were rare events, seen in only 24 counties in our baseline sample, such events were nearly half as likely to occur with each additional decade of TFE (column 4). This negative relationship with TFE is consistent with a result in Table 9, discussed below, showing that nearly a century later women (and men) in high-TFE counties report stronger opposition to the women's rights movement. These findings also resonate with the general lack of female representation in social and public life throughout the frontier era. Second, we consider temperance movement activities, another measure of historical collective action led by women with much more widespread prevalence across counties, and find a similarly negative association with TFE (column 5). Finally, using data on political participation of women at a broader range of political offices, from school boards to mayors to courts (with data from the Political Graveyard), we find that TFE is associated with lower female representation (column 6).

Overall, our results in this section point to a contrast: while male congressional representatives from locations with greater TFE were somewhat more likely to support suffrage, these locations displayed similar levels of female participation in politics and lower levels of female mobilization and voter participation rates throughout the 20th century. The frontier legacy of gender inequality in politics may have played a part in sustaining and reinforcing the more general exclusion of women from important public roles outside the home. Without women occupying such spaces, there would

have been little opportunity for young women to aspire to the sort of gender roles observed in other, more egalitarian societies.

4.3 Gender Norms

The enduring impact of frontier history on gender inequality begs the question: how can this legacy persist? Here, we argue that social norms contribute to such persistence. Using modern survey data, we identify more conservative gender norms in locations with longer frontier histories. The findings suggest that persistent gender norms around work and politics are sustained by a set of conservative views about gender roles, held by both men and women.

We draw on two surveys capturing gender attitudes. The DDB Needham Life Style Survey (LSS) asks respondents whether they believe a woman's place is in the home, whether they think the women's liberation movement is a good thing, whether they believe men are better leaders than women, and whether they believe that men are smarter than women. The LSS rounds with these questions span 1985–98 and cover nearly 90 percent of counties in our baseline sample. The General Social Survey (GSS) asks respondents whether they believe that what most women really want are a home and kids, whether they approve women working, whether they would vote for a female president, and whether they think that women should take care of the home and not the country. The GSS rounds with these questions span 1993–98 and cover 107 counties in our baseline sample. For each question across both surveys, we create a binary indicator equal to one if the respondents agrees with the statement and zero otherwise, rotating all outcomes to go in the same affirmative direction. As with the previous regressions using the ATUS data, we estimate an individual-level analogue of equation (5) and control for age, age squared, and race.

Table 9 shows that men and women exhibit more conservative gender attitudes in counties with greater TFE. Panel A reports estimates pooling men and women, panel B men only, and panel C women only. The frontier legacy is associated with greater support for keeping women at home taking care of the children (columns 1 and 6), out of the labor force (column 7), out of politics (column 8), and out of leadership roles more generally (column 3). It is not surprising that these types of respondents are also more opposed to the women's rights movement (column 2). Yet, such beliefs do not necessarily come with the view that women are less intelligent than men (column 4) or that women's role at home must come at the expense of civic duty (column 9). Rather than belaboring specific point estimates, we summarize the magnitudes using a simple mean index across the four outcomes within a given survey. For the LSS, each additional decade of TFE is associated with 1 p.p. more conservative gender attitudes relative to a mean of 30% (column 5). For the GSS, the effect size is larger: 2.8 p.p. relative to a mean of 20% (column 10).

Although effect sizes and precision vary across outcomes, it is clear from panels B and C of Table 9 that both men and women are invested in inegalitarian gender norms in high-TFE communities across America. Putting this together with prior results, we can, at least in part, rule out the possibility that female empowerment on the frontier led to male backlash over the long run. Rather, it seems that gender inequality on the historical frontier persisted over time, and in the long run,

women had internalized gender disparities in various domains of private and public life. In an equilibrium sense, those women who embraced these norms more fully may have found greater returns in the local marriage market and in society more generally.

Religion. One of the ways in which conservative gender norms on the frontier may have persisted over the long run is through entrenchment with religious norms. In a different context, Miho et al. (2023) show religious denomination is a key dimension to understanding the horizontal transmission and persistence of gender norms. In the context of the American frontier, Bazzi et al. (2023) trace out a legacy of religious innovation and characterize its implications for religious politics in America over the long run. They find that historical frontier experience is associated with greater prevalence of evangelical Christianity and greater religiosity, as revealed, for example, by the stated importance of religion and frequency of church attendance. A large social science literature connects religiosity and gender norms, and in the LSS data, respondents who consider religion important in their lives display 6.6 p.p. more conservative gender attitudes (as measured in column 5 of Table 9). It is possible, then, that some of the sticky gender norms we identify in this section are explained by different religious behaviors in high-TFE areas. The same could be said for many different cultural norms, rooted in unique historical conditions that might not persist but nevertheless become ingrained over time through religious doctrine and practice. This is an important area for future research and one where frontier history may be particularly informative.

5 Conclusions

This paper offer evidence from a rich historical setting—the American frontier—showing how the socioeconomic environment shapes gender norms. We see frontier history and the process of westward expansion as a fruitful setting for distinguishing between different theories on the origins of gender norms. The historical record offers disparate views about the female experience on the frontier. We bring centuries of data to bear on this rich history and, in so doing, reconcile competing narratives around the liberating and regressive aspects of gender roles on the frontier.

Our findings point to an especially important role for isolation—both from society at large as well as from extended family—in limiting the scope for life outside the home and working against the additional bargaining power women might otherwise find in female-scarce environments. A small subset of women found their way to the top of the socioeconomic ladder in ways that might not have been feasible outside the frontier. However, over the long run, the inegalitarian gender norms came to dominate the frontier legacy. Whether some of these persistent norms might have been diluted through technological change and policy innovations remains an important question for future work.

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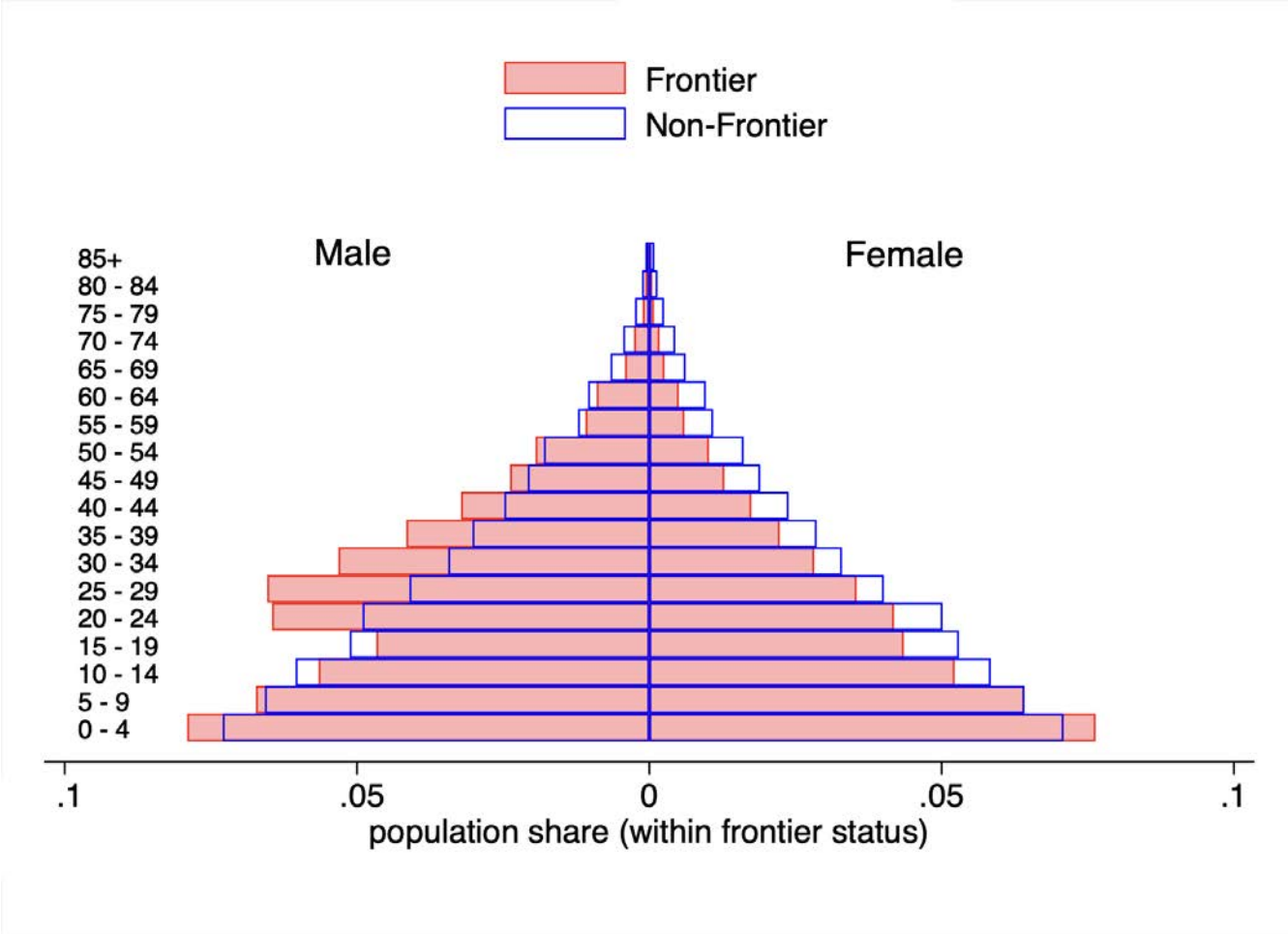
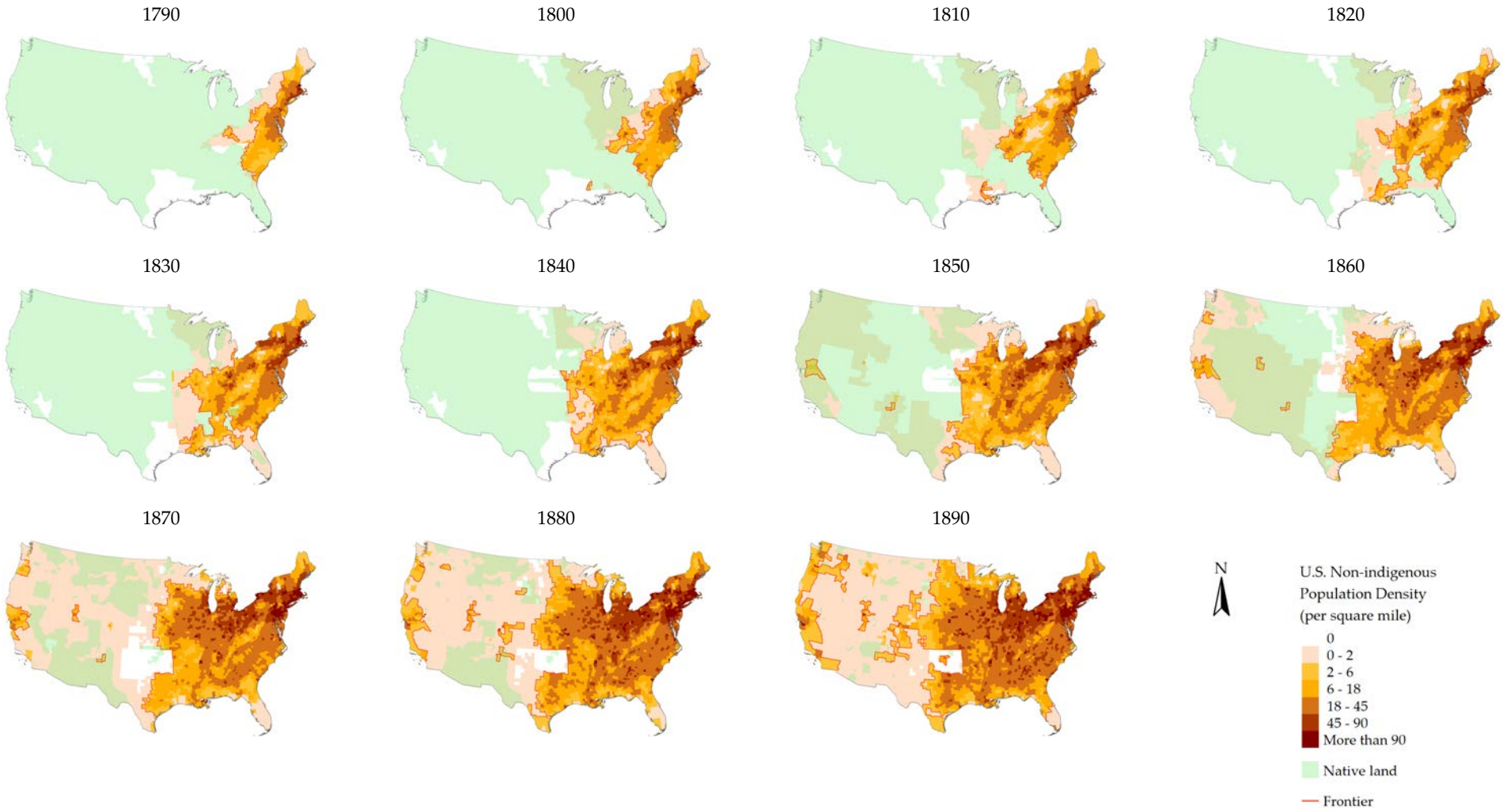
Figures

Figure 1: Historical Population Pyramids, by Frontier Status



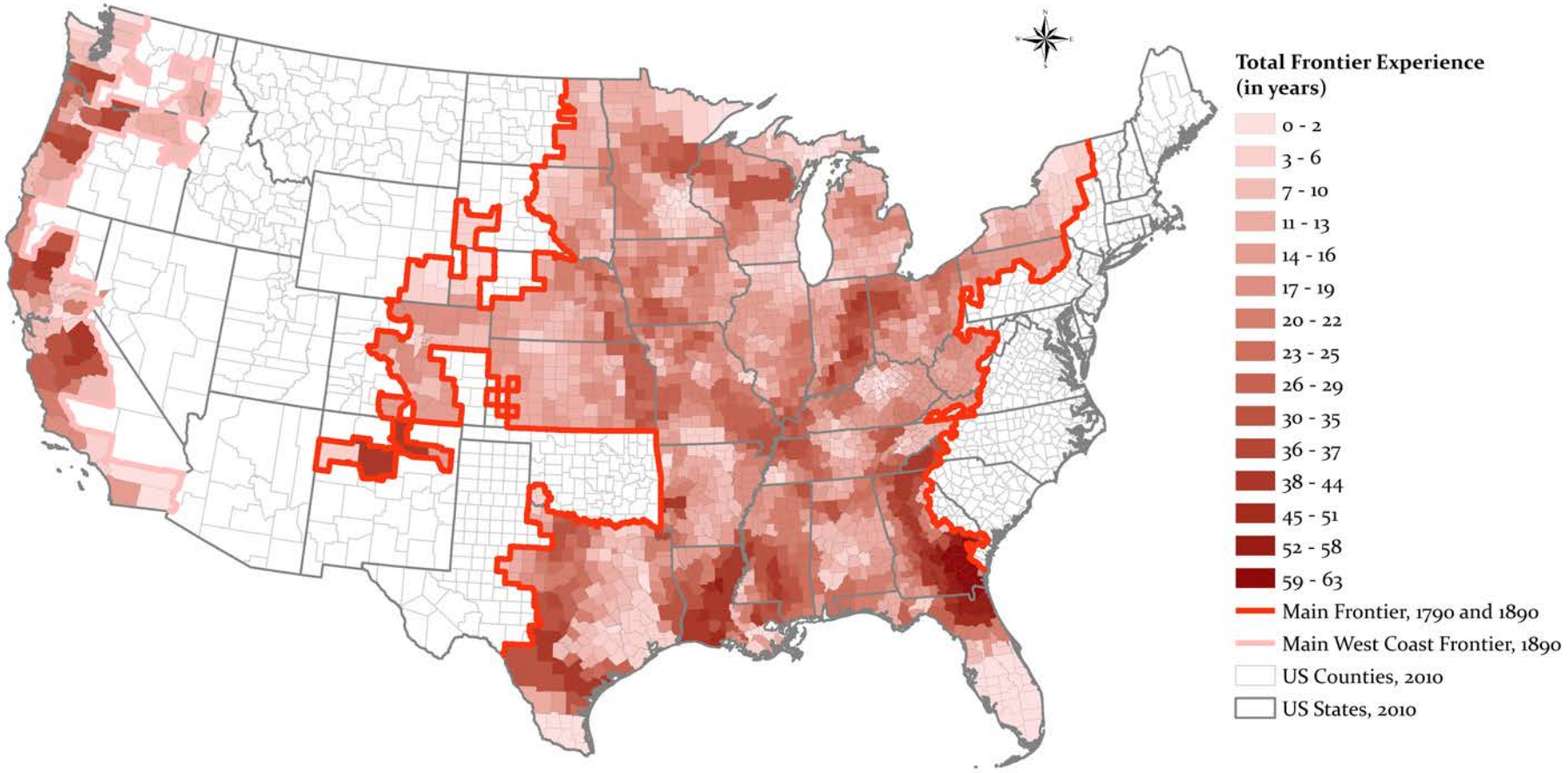
Notes: Based on complete-count Population Censuses from 1850 to 1880. Each bar reflects the share of the population in the given age×gender cell for frontier and non-frontier counties, respectively.

Figure 2: The Evolution of the Frontier, 1790 to 1890



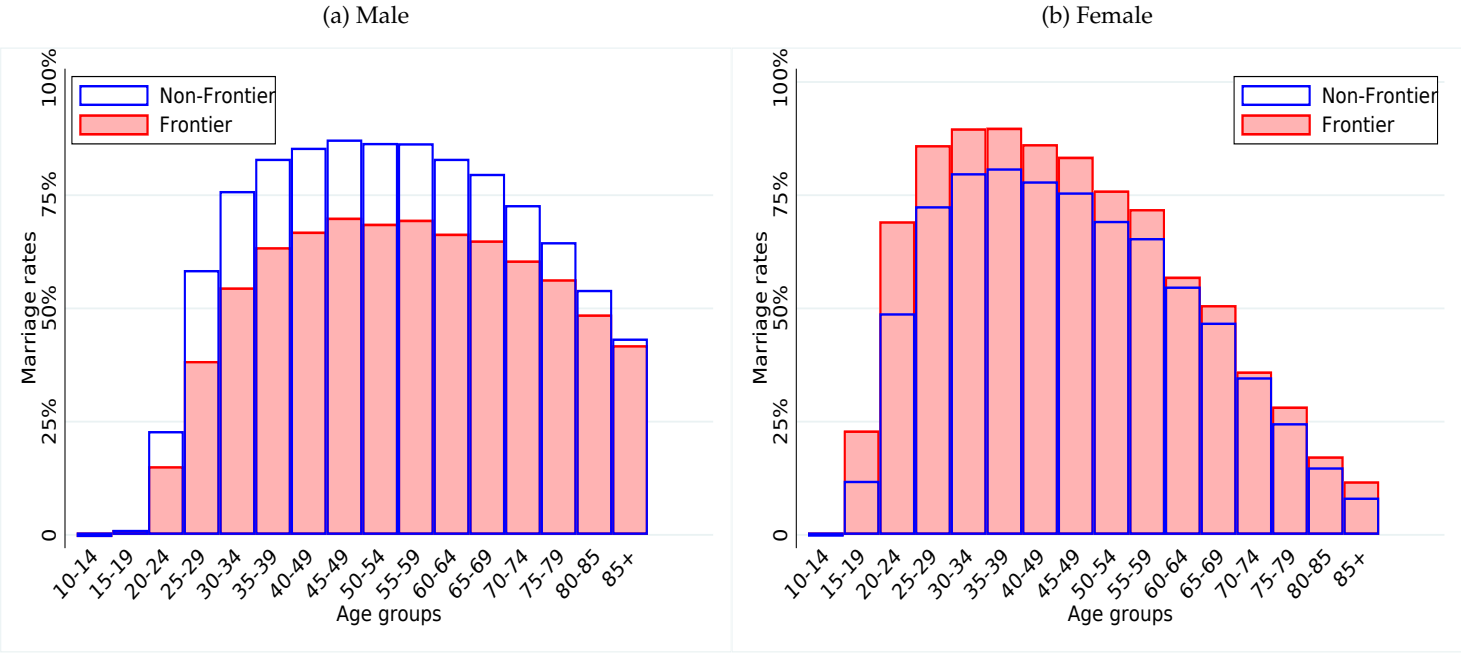
Notes: The frontier lines demarcate the contour of counties with U.S. population density below and above 2 people per square mile. We exclude smaller "island frontiers" in the interior and contour line segments less than 500 km (see Bazzi et al., 2020, for details). Native land demarcation is based on shapefiles of land transfers digitized by Claudio Saunt from an 1899 publication of the Bureau of American Ethnology supervised by Charles C. Royce (see the "Invasion of America" project at `https://usg.maps.arcgis.com/apps/webappviewer/index.html?id=eb6ca76e008543a89349ff2517db47e6`).

Figure 3: Total Frontier Experience, 1790 to 1890



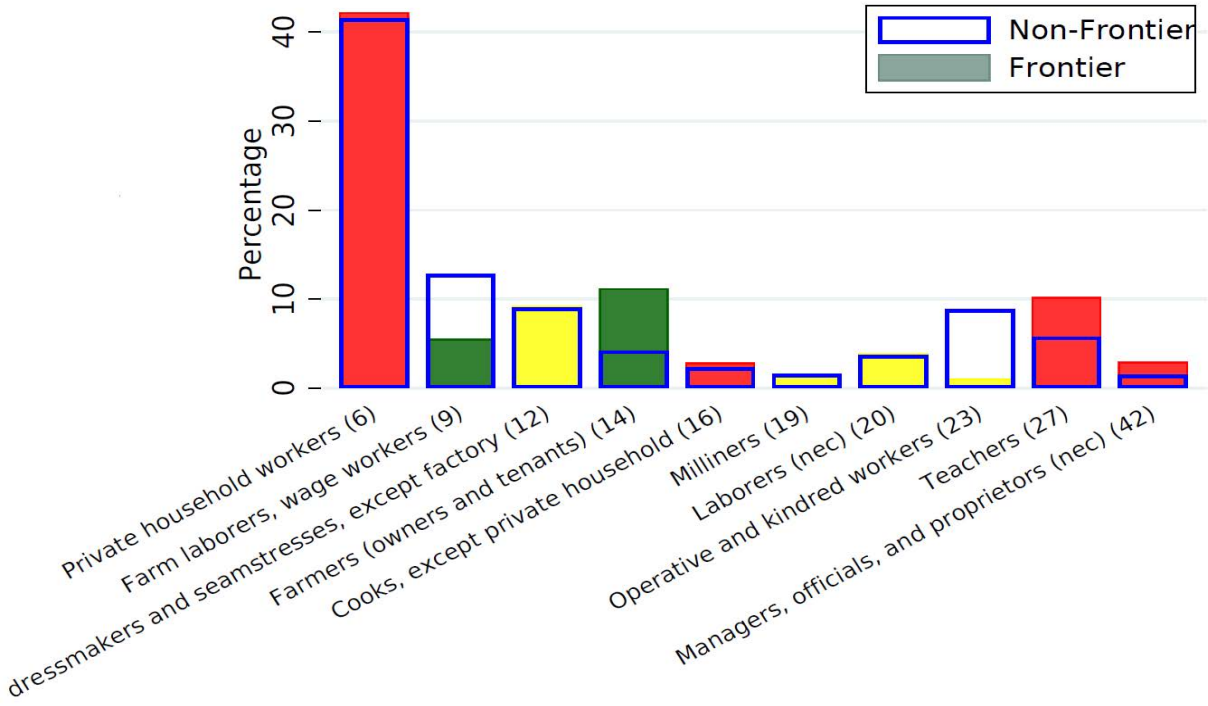
Notes: Total frontier experience is the total number of years the county was within 100 km of the frontier line and its population density was below 6 people per square mile, between 1790–1890. The white areas to the east of the 1790 main frontier line are counties for which we do not know frontier history given the lack of Population Census data before 1790. The white areas to the west are beyond the 1890 frontier line and hence not included in our baseline sample, which is restricted to the frontier era as defined by Porter et al. (1890) in the Census *Progress of the Nation* report. The West Coast frontier is excluded in the baseline analysis but considered in additional exercises. This figure is reproduced from Figure 3 in Bazzi et al. (2020).

Figure 4: Marriage Rates at Different Ages by Gender, Frontier vs. Non-Frontier, 1880



Notes: Based on complete-count Population Censuses from 1880.

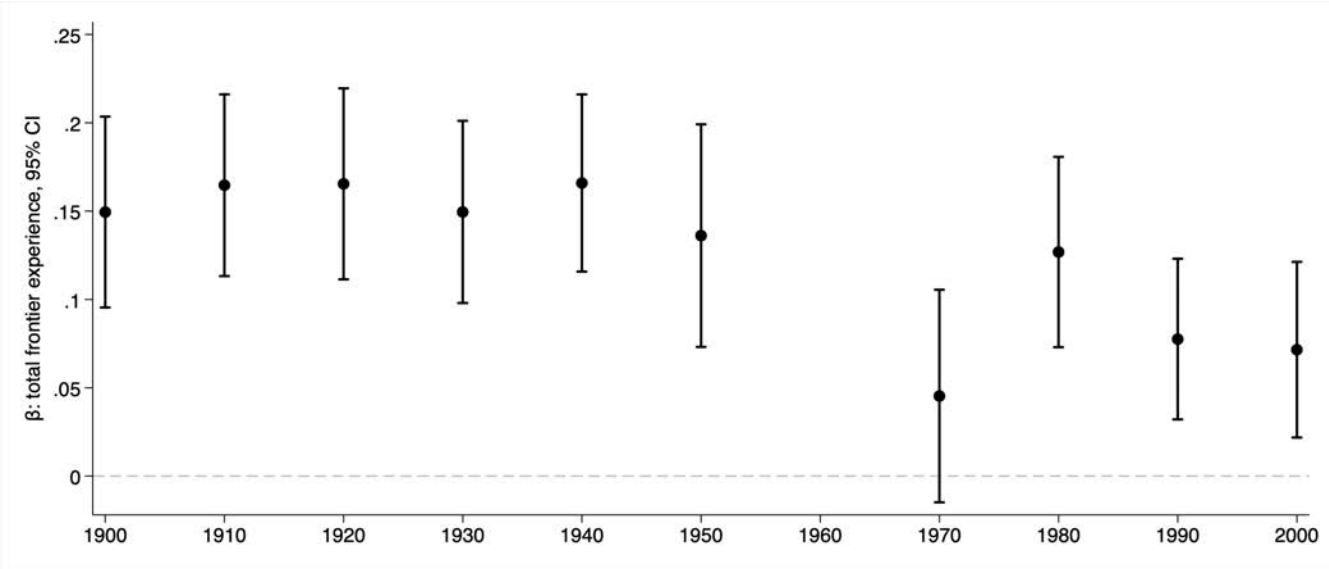
Figure 5: Main Female Occupations, Frontier vs. Non-Frontier (1860–1880)



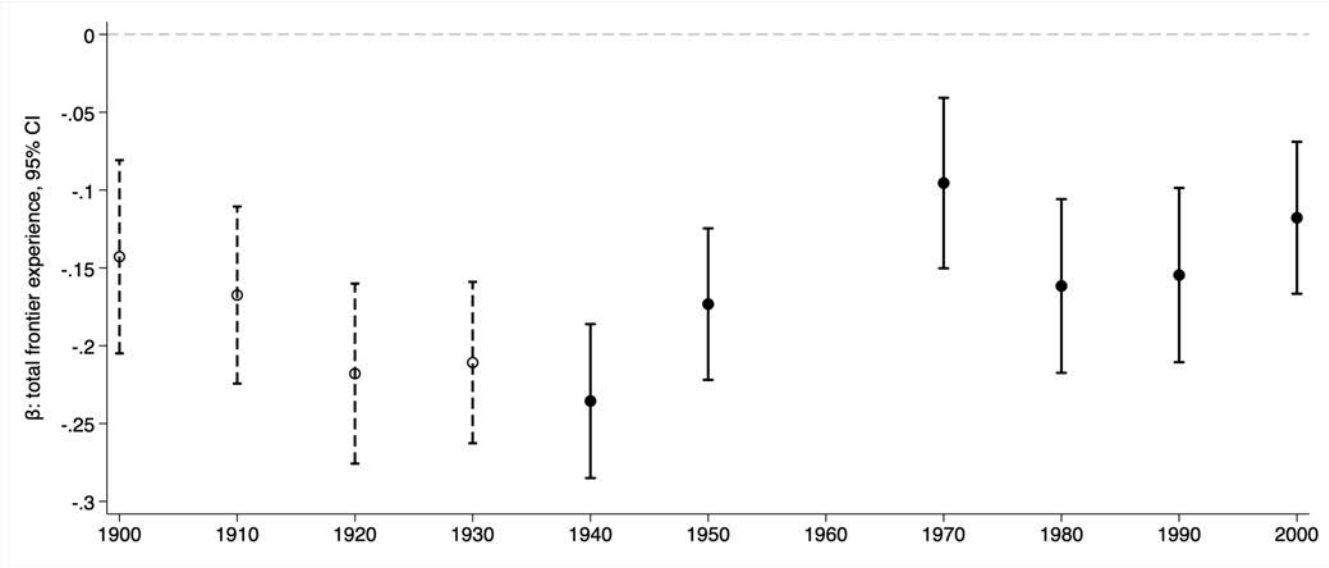
Notes: Based on complete-count Population Censuses from 1860, 1870 and 1880. Colored bars reflect frontier areas and empty bars reflect non-frontier areas. We rely on "occ1950" occupational categories from IPUMS. Occupations are lumped into broader categories. The figure shows the shares of all women with gainful occupations for each occupational category. Green depicts agricultural occupations, yellow depicts manufacturing, and red depicts services. Occupational scores from Ruggles et al. (2019) are reported in parentheses; these range from 0 to 80 and assign each occupation a rescaled value representing the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950.

Figure 6: The Frontier Legacy for Fertility and FLFP

(a) Fertility (standardized)



(b) Female Employment (standardized)



Notes: Based on Population Censuses from 1900–2000. The sample includes U.S. counties for which the 1790–1890 period contains their entire frontier experience. OLS estimates are based on a panel analogue of equation (5) that allows the coefficient on *Total Frontier Experience*$_c$ (in decades) to vary over time with state FE and all $\mathbf{x}$ controls interacted with year FE. Figure (a) shows results for fertility computed as the number of children under the age of 5 over the number of women in their childbearing age (15–49) times 1000. Figure (b) shows results for female rates of gainful employment until 1940 and labor force participation from 1940 onward for the female population aged 16 plus. The dependent variables are standardized decade by decade. 1960 is excluded from the analysis due to missing data. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. 95% confidence intervals are displayed.

Tables

Table 1: Fertility, Marriage, and Family Patterns on the American Frontier

	Fertility: Child-Women Ratio	Share of Women Ever Married	Share of Men Ever Married	Age Gap Between Spouses	Share of Divorced Women	Share of Households with ... more than 2 generations	grandmothers	extended family
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(A) Baseline Frontier Definition: Low Density and Proximity							
Frontier	68.67***	0.049***	-0.062***	0.239***	-0.001***	-0.010***	-0.006***	-0.006***
	(11.289)	(0.005)	(0.007)	(0.066)	(0.000)	(0.001)	(0.001)	(0.002)
	(B) Distinguishing Low Density and Proximity to Frontier Line							
Near Frontier Line	52.05***	0.034***	-0.018***	-0.004	-0.0011***	-0.004***	-0.002***	-0.005***
	(7.356)	(0.003)	(0.005)	(0.052)	(0.000)	(0.001)	(0.000)	(0.001)
Low Population Density	41.95***	0.025***	-0.035***	0.267***	-0.00	-0.007***	-0.004***	-0.001
	(7.371)	(0.003)	(0.006)	(0.058)	(0.000)	(0.001)	(0.000)	(0.001)
Dep. Var. Mean (non-frontier)	671	0.70	0.58	4.36	0.004	0.042	0.018	0.048
Dep. Var. Std. Dev. (non-frontier)	119	0.04	0.05	2.02	0.003	0.011	0.006	0.022
Number of County-Years	6,048	6,048	6,048	6,046	1,834	5,844	5,844	5,844

Notes: The unit of observation is a county. The sample includes U.S. counties from 1850–1880 Censuses for columns (1) to (4) and 1880 in column (5). The dependent variable in column (1) is a measure of fertility as captured by county-level child-women ratio computed as the number of children under the age of 5 over the number of women in their childbearing age (15–49) times 1000. The dependent variable in column (2) is the share of women aged 15 plus who were ever married and column (3) is the share of men aged 15 plus who were ever married. For pre-1880, marital status is inferred using two variables from the census: "relate" and "nchild". Column (4) is the age gap between male and female spouses computed for men and women who report head/spouse as a response to the "relate" question; column (5) is the share of women aged 15 plus who were divorced. The sample includes U.S. counties from 1850–1880 Censuses for columns (6) to (8). In column (6)-(8) we have, respectively, the share of household units with > 2 generations, the share of household units with a grandmother, and the share of household units with extended family within a single generation. *Frontier* is county frontier status at time t, *Near frontier line* is an indicator for counties within 100 km of the frontier line at time t, and *Low population density* is an indicator for population density below six people per square mile at time t. Regressions include Census division and year fixed effects. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 2: Women's Work on the American Frontier

	Gainful Employment Among ...			Occupational Score for ...	
	All Women	Women in Farming Households	Women in Non-farming Households	Women	Women Relative to Men
	(1)	(2)	(3)	(4)	(5)
	(A) Baseline Frontier Definition: Low Density and Proximity				
Frontier	-0.025***	-0.026***	-0.027***	1.052***	0.072***
	(0.007)	(0.006)	(0.008)	(0.278)	(0.020)
	(B) Distinguishing Low Density and Proximity to Frontier Line				
Near Frontier Line	-0.027***	-0.029***	-0.022***	0.561***	0.030**
	(0.006)	(0.006)	(0.007)	(0.186)	(0.012)
Low Population Density	-0.007	-0.006	-0.010	0.463**	0.039***
	(0.008)	(0.008)	(0.008)	(0.204)	(0.014)
Dep. Var. Mean (non-frontier)	0.12	0.10	0.16	12.6	0.74
Dep. Var. Std. Dev. (non-frontier)	0.13	0.13	0.13	2.92	0.17
Number of County-Years	4,905	4,891	4,877	4,795	4,795

Notes: The unit of observation is a county. The sample includes U.S. counties from 1860-1880 Censuses for all columns. Column (1) is computed as the number of women among females aged 16 and above that report gainful occupations. Column (2) is computed the same but restricting to all households with at least one male member in the household in agriculture. Column (3) is computed the same but restricting to all households without any male members in the household in agriculture. The dependent variable in column (4) is county-level average occupational score for women who are in the labor force and report a non zero occupational score. Occupational score variable from the Ruggles et al. (2019), ranges from 0 to 80 and assigns each occupation in all years a value representing the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950. The dependent variable in column (5) is the county-level gender gap in occupational score computed as the ratio of average occupational score for women over average occupational score for men, for women and men who are in the labor force and report a non zero occupational score. *Frontier* is county frontier status at time t, *Near frontier line* is an indicator for counties within 100 km of the frontier line at time t, and *Low population density* is an indicator for population density below six people per square mile at time t. Regressions include Census division and year fixed effects. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 3: Child Penalty for Female Employment, 1860–1880

	Number of children	Number of children below 5	Female Gainful Employment				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Frontier	0.052**	0.102***	-0.026**			-0.025**	-0.023**
	(0.026)	(0.011)	(0.010)			(0.010)	(0.010)
Number of children				-0.015***		-0.015***	
				(0.001)		(0.001)	
Number of children < 5					-0.030***		-0.030***
					(0.001)		(0.001)
Dep. Var. Mean (non-frontier)	2.09	0.55	0.14	0.14	0.14	0.14	0.14
Dep. Var. Std. Dev. (non-frontier)	2.3	0.84	0.35	0.35	0.35	0.35	0.35
Number of Observations	10,943,754	10,943,754	10,943,754	10,969,177	10,969,177	10,943,754	10,943,754

Notes: The unit of observation is an individual woman. The sample includes U.S. counties from 1860—1880 Censuses. The dependent variable in column (1) is the number of children in the household. The dependent variable in column (2) is the number of children below 5 in the household. In columns (3)–(7), the dependent variable is a binary indicator that takes the value of one if a woman reports a gainful occupation and zero otherwise. Regressions include Census division and year fixed effects. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 4: Assessing Bargaining Power: Marriage Before and After Frontier Migration

	Number of Children		Female Gainful Employment	
	(1)	(2)	(3)	(4)
	(A) Reference category: married women in settled areas			
Frontier women married in settled areas	0.226***	0.296***	-0.005**	-0.003
	(0.047)	(0.045)	(0.002)	(0.002)
Frontier women married on the frontier	0.132***	0.129***	-0.002***	-0.002***
	(0.012)	(0.012)	(0.000)	(0.000)
Fixed Effects	Division	State	Division	State
Flexible Age Controls	Yes	Yes	Yes	Yes
Number of Observations	2,161,144	2,161,144	2,161,144	2,161,144
Dep. Var. Mean (non-frontier)	3.08	3.08	0.02	0.02
Dep. Var. Std. Dev. (non-frontier)	2.21	2.21	0.14	0.14
	(B) Reference category: frontier women married elsewhere			
Frontier women married on the frontier	-0.293***	-0.396***	0.007**	0.007***
	(0.062)	(0.058)	(0.003)	(0.002)
Fixed Effects	Division	County	Division	County
Flexible Age Controls	Yes	Yes	Yes	Yes
Number of Observations	22,464	22,464	22,464	22,464
Dep. Var. Mean	3.23	3.23	0.02	0.02
Dep. Var. Std. Dev.	2.27	2.27	0.13	0.13

Notes: Estimates based on a linked sample of women across Census years 1860 and 1870 from the Census Tree data (`https://www.censustree.org/data`). The dependent variable is the total number of children in columns (1) and (2) and a binary indicator for female gainful employment status in columns (3) and (4). All dependent variables are measured in 1870. In Panel (A), the analysis distinguishes three categories of married women: (i) married women that live outside the frontier (omitted group); (ii) women living on the frontier who were married elsewhere; (iii) women living on the frontier and married on the frontier. We use cleaned crosswalks for 1860 and 1870 from Census Tree. We rely on the 1870 full count census to identify married frontier women and married women living in settled areas. Married frontier (non-frontier) women are those reporting a spouse for the question on relationship to the head of the household or those having children and residing in a frontier (non-frontier) county in 1870. We merge the identified married women in 1870 with the crosswalks, and finally merge the 1860 and 1870 datasets. Based on the women's marital status and county of residence frontier status in 1860, we identify those that married on the frontier, those that married elsewhere and those that married and lived in settled areas. Panel (B) repeats the same strategy focusing uniquely on married women living in frontier areas in 1870 and distinguishing between those that married on the frontier from those that married elsewhere. Regressions include Census division fixed effects in odd columns in Panels (A) and (B). Even columns include state fixed effects in Panel (A) and county fixed effects in Panel (B). Regressions include flexible controls for women's age in 1870, including age and age squared. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 5: Assessing Bargaining Power: The Role of Women's Economic Rights

	Share of Women Ever Married (1)	Fertility: Child-Women Ratio (2)	Female Gainful Employment (3)	Women's Occupational Scores (4)
Frontier	0.048***	86.36***	-0.038***	0.996***
	(0.005)	(12.24)	(0.008)	(0.379)
Women's Economic Rights	-0.019***	-35.62***	-0.000	0.234*
	(0.003)	(8.05)	(0.007)	(0.138)
Frontier × Women's Economic Rights	0.006	-57.34***	0.034***	0.143
	(0.011)	(21.00)	(0.011)	(0.543)
Dep. Var. Mean (non-frontier)	0.70	671	0.12	12.6
Dep. Var. Std. Dev. (non-frontier)	0.04	119	0.13	2.92
Number of County-Years	6,048	6,048	4,905	4,795

Notes: The unit of observation is a county. The sample includes U.S. counties from 1850–1880 censuses in columns (1)-(2) and 1860–1880 in columns (2)-(3). See the notes to Tables 1 and 2 for details on the outcomes. *Women's Economic Rights* is a binary indicator equal to one whenever the county's state law at time t affords women the right both to own property and retain labor earnings. *Frontier* is county frontier status at time t. Regressions include Census division and year fixed effects. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 6: The Frontier Legacy of Gender Inequality in the Long Run

	Fertility: Child-Women Ratio (1)	Share Ever Married Female (2)	Share Ever Married Male (3)	Female Labor Force Participation (4)	Gender Gap Labor Force Participation (5)	Gender Occupational Segregation (6)
	(A) Outcomes Measured in 1940					
total frontier experience	13.131***	0.005***	0.002**	-0.015***	-0.019***	0.007***
	(2.019)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Dep. Var. Mean	375.70	0.78	0.69	0.17	0.22	0.71
Dep. Var. Std. Dev.	79.15	0.03	0.04	0.06	0.07	0.06
Number of Counties	2,032	2,032	2,032	2,033	2,033	2,032
	(B) Outcomes Measured in 2000					
total frontier experience	2.493***	0.009***	0.008***	-0.008***	0.001	n/a
	(0.881)	(0.001)	(0.001)	(0.002)	(0.003)	
Dep. Var. Mean	269.33	0.81	0.75	0.54	0.81	
Dep. Var. Std. Dev.	34.61	0.05	0.05	0.06	0.09	
Number of Counties	2,036	2,036	2,036	2,036	2,036	
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation is a county. The sample includes U.S. counties for which the 1790–1890 period contains their entire frontier experience. Each column reports the OLS estimate of equation (5) for 1940 in Panel (A) and 2000 for Panel (B). In column (1), the dependent variable is the baseline measure for fertility (child-women ratio) computed as the ratio of the number of children under 5 to the total number of women aged 15-49 times 1000. The dependent variable in column (2) is the county-level share of women aged 15 plus who were ever married. The dependent variable in column (3) is the county-level share of men aged 15 plus who were ever married. The dependent variable in column (4) is county-level female labor force participation computed as the number of women in the labor force over the female population aged 16 plus. The dependent variable in column (5) is the gender gap in LFP computed as the ratio of female over male labor force participation rates. The dependent variable in column (6) of Panel (A) is gender occupational segregation, which ranges between 0 (perfect gender integration within the workforce) and 1 (complete gender segregation within the workforce) and identifies the percentage of employed women (or men) who need to change occupations for the occupation distribution of men and women to be equal. Total Frontier Experience is scaled in decades. State fixed effects and predetermined or fixed county-level covariates (latitude, longitude, mean temperature, mean rainfall, mean elevation, distance to coast, river and lake and average agricultural productivity) are included. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 7: The Frontier Legacy of Gender Inequality in Time Use

	Minutes Per Day Allocated to ...			
	Leisure	Household Activities	Work	Other Activities
	(1)	(2)	(3)	(4)
	(A) Women Only			
total frontier experience	-7.357***	3.627*	3.792*	0.086
	(1.807)	(1.884)	(1.945)	(2.424)
Dep. Var. Mean	266.0	224.6	137.1	799.9
Dep. Var. Std. Dev.	181.0	183.8	220.0	184.2
Number of Individuals	10,177	10,177	10,177	10,177
	(B) Men Only			
total frontier experience	0.672	2.936	-3.581	0.123
	(2.733)	(1.864)	(2.427)	(2.181)
Dep. Var. Mean	316.2	135.3	220.5	756.2
Dep. Var. Std. Dev.	216.9	155.1	270.7	187.0
Number of Individuals	9,416	9,416	9,416	9,416
State Fixed Effects	Yes	Yes	Yes	Yes
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Individual Demographic Controls	Yes	Yes	Yes	Yes

Notes: The unit of observation is a respondent. Data on time use is based on the American Time Use Survey (ATUS) dataset for the 2003–2020 period. Panel (A) restricts to female respondents and Panel (B) restricts to male respondents. The dependent variable in column (1) is the number of minutes per day each respondent reported spending in personal interest or leisure activities such as communicating with others and attending parties and meetings; and leisure activities such as relaxing, playing (passive) games (unless playing with children only), watching television, playing or listening to music, reading, writing, and all hobbies. The dependent variable in column (2) is the number of minutes per day each respondent reported spending in household activities such as maintaining their household, household management and organizational activities. The dependent variable in column (3) is the number of minutes per day each respondent reported spending on work activities such as working, doing activities as part of one's job, engaging in income-generating activities (not as part of one's job), and looking for jobs and interviewing. The dependent variable in column (4) captures the number of minutes spent on other activities, including sleep (and hence the high mean). In addition to state FE and baseline geographic controls in Table 6, we also include survey wave fixed effects and individual-level demographic controls: age, age squared, education, race, household size and the presence of children under 18 in the household. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 8: The Frontier Legacy around Gender Politics

	Congressional District		County			
	Rep. Voted For Suffrage 1919 (1)	Share Women House Reps. 1917–2020 (2)	Excess Voting Turnout 1924–1916 (3)	NWP Actions For Suffrage 1914–1922 (4)	Temperance Movement 1870s (5)	Share Women All Politics 1900–2000 (6)
total frontier experience	0.044	-0.002	-0.532**	-0.005*	-0.0259***	-0.015*
	(0.027)	(0.009)	(0.239)	(0.003)	(0.007)	(0.008)
Dep. Var. Mean	0.70	0.07	-11.28	0.01	0.18	0.09
Dep. Var. Std. Dev.	0.45	0.13	11.46	0.10	0.39	0.34
Number of Observations	223	226	1,907	2,034	1,743	5,856
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects			Yes	Yes	Yes	Yes

Notes: The unit of observation is a congressional district in columns (1) and (2) and a county in columns (3)–(6). In columns (1) and (2), *total frontier experience* (in decades) and control variables are area-weighted across all counties within the given congressional district. The dependent variable in column (1) is a dummy for whether congressional representatives voted for the 19th amendment in 1919. The dependent variable in column (2) is the mean share of female house representatives in a given congressional district computed as the ratio of the number of female elected house representatives over male and female house representatives in the congressional district. The analysis covers the 65th to 116th congress (since 1917, when the first woman, Representative Jeannette Rankin of Montana, served in Congress). In column (3), the dependent variable is the excess voter turnout measured as the difference in turnout from the 1924 and 1916 presidential elections (i.e., post subtracted by pre ERA). We rely on ICPSR county level data on presidential election turnout computed on the basis of estimated eligible voters. This regression also controls for the share of voting-age men and the share of voting-age women in 1910 and 1920. The dependent variable in column (4) is a dummy that takes the value of one if an action related to the National Woman's Party (NWP) happened and zero otherwise. Data on NWP actions is obtained from "Mapping American Social Movements" Project. The data includes information about arrests, conferences, demonstrations, legal actions, legislative involvement, meetings, and other activities that occurred between 1914–1922. Actions that took place in U.S. cities are geocoded at the county-state level. In column (5), the dependent variable is a dummy that takes the value of one if an activity related to temperance movement occurred and zero otherwise. Data is obtained from García-Jimeno et al. (2022) and includes information about the events related to the temperance crusade that took place, and the nature of these events, classified as meetings, petitions, or marches. Actions that took place in U.S. towns are geocoded at the county-state level. In column (6), the unit of observation is county of residence of people in office. Data is obtained from the Political Graveyard online database. The dependent variable is the county-level share of women in political offices computed as the number of women in office over the number of men and women in office in a given county, normalized by the share of women in the labor force. The latter is computed as the number of women in the labor force out of the entire county-level labor force population (men and women). Political offices included and are not limited to members of Congress, rather, they include elected state officeholders, federal officials, federal judges, etc. We report robust standard errors in columns (1) and (2) and cluster based on grid-cell clustering in the other columns. Baseline geographic controls are included throughout. We also control for the share of male and female population aged 21 and over in 1910 and 1920 in column (3). Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table 9: The Frontier Legacy of Conservative Gender Attitudes

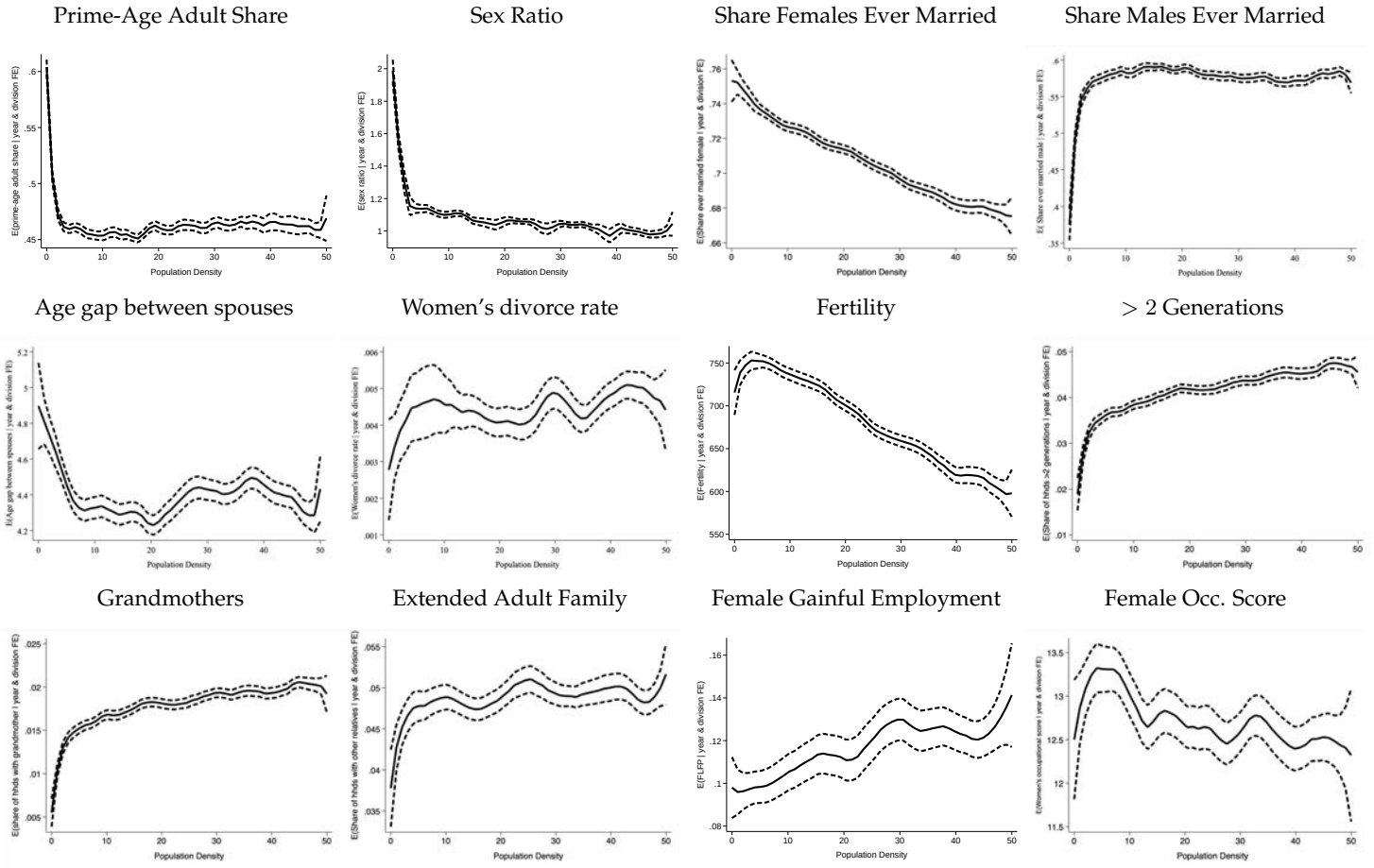
	Life Style Survey (LSS)					*General Social Survey (GSS)*				
	A Woman's Place is in Home	Anti-Women's Rights Movement	Men Better Leaders	Men Smarter	Mean Summary Index	Women Want Home & Kid	Not Approve Women Working	Not Vote Woman President	Women Take care Home not Country	Mean Summary Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(A) Both Men and Women									
total frontier experience	0.010***	0.017***	0.010**	0.004	0.010***	0.053***	0.016	0.015***	0.015	0.028***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.002)	(0.016)	(0.010)	(0.005)	(0.011)	(0.008)
Number of Individuals	25,609	25,569	17,198	25,505	25,763	1,467	3,133	4,523	3,096	5,712
Dep. Var. Mean	0.30	0.41	0.30	0.18	0.30	0.49	0.19	0.07	0.16	0.20
	(B) Men Only									
total frontier experience	0.003	0.016***	0.010	0.004	0.008**	0.048*	0.047***	0.020***	0.006	0.027***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.004)	(0.027)	(0.012)	(0.007)	(0.014)	(0.010)
Number of Individuals	11,449	11,436	7,745	11,378	11,512	629	1,347	1,949	1,325	2,481
Dep. Var. Mean	0.33	0.43	0.43	0.29	0.37	0.52	0.18	0.08	0.16	0.21
	(C) Women Only									
total frontier experience	0.015***	0.017***	0.009**	0.004	0.012***	0.052***	-0.008	0.012	0.023	0.028***
	(0.003)	(0.005)	(0.004)	(0.003)	(0.002)	(0.018)	(0.012)	(0.008)	(0.014)	(0.009)
Number of Individuals	14,160	14,133	9,453	14,127	14,251	838	1,786	2,574	1,771	3,231
Dep. Var. Mean	0.29	0.39	0.20	0.09	0.25	0.47	0.19	0.07	0.16	0.20
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey Wave Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Demographic $\mathbf{X}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation is a respondent. The sample includes U.S. counties for which the 1790–1890 period contains their entire frontier experience. Panel (A) reports estimates pooling men and women, panel (B) men only, and panel (C) women only. For the Lifestyle Survey (LSS) in columns (1)-(5): the dependent variables are binary indicators for whether the respondent believes (1) a woman's place is in the home, (2) that the women's rights movement is a bad thing, (3) men are better leaders than women, and (4) men are smarter than women; (5) is a summary mean index across (1)-(4). For the General Social Survey (GSS) in columns (6)-(10): the dependent variables are binary indicators for whether the respondent believes (6) that most women really want a home and kids, (7) women should not work, (8) they would not vote for a woman president, and (9) they think that women should take care of the home and not the country; (10) is a summary mean index across (6)-(9). In addition to state FE and baseline geographic controls in Table 6, we also include survey wave fixed effects and individual-level demographic controls: age, age squared, and race. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Appendix

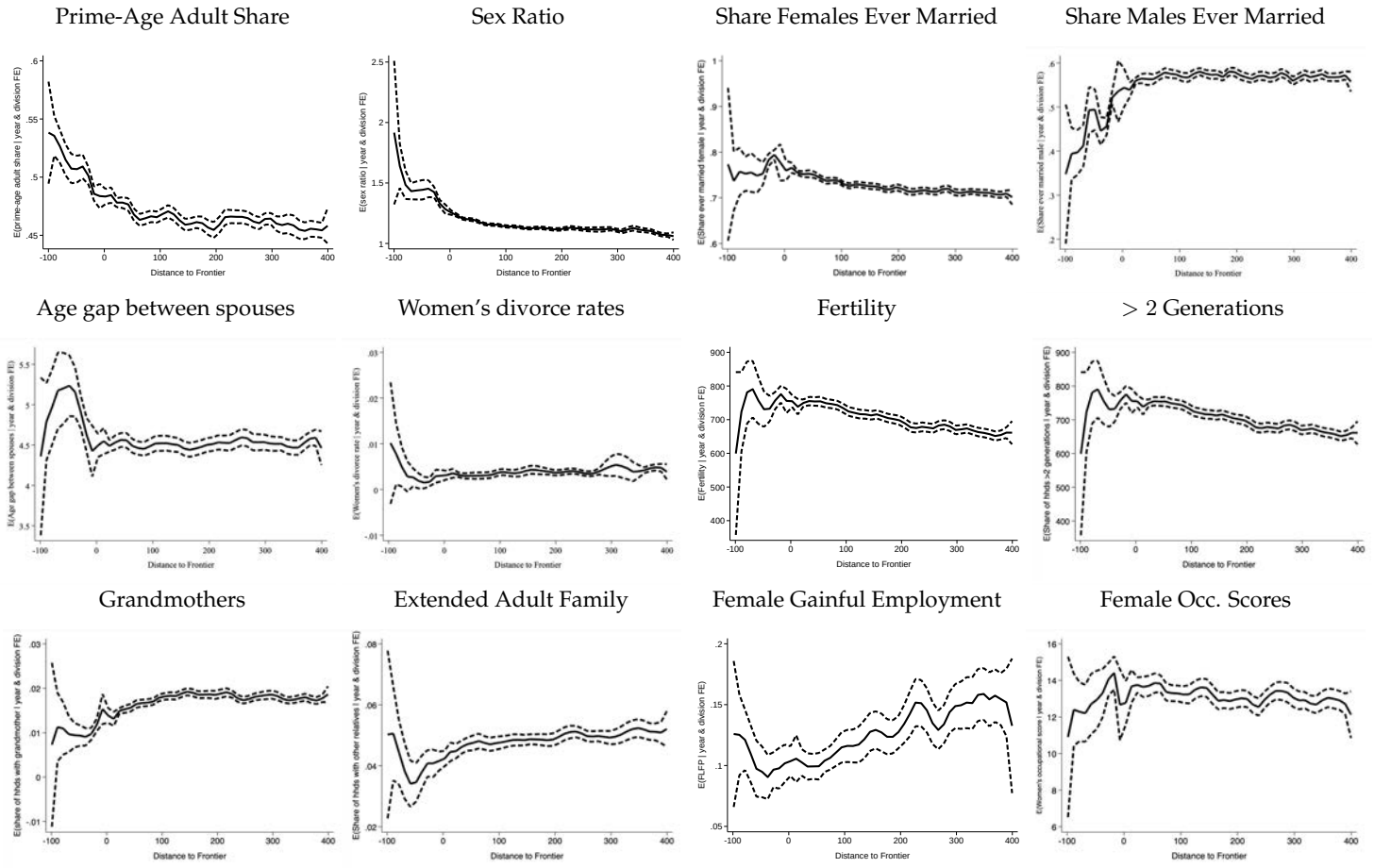
A Appendix Figures and Tables

Figure A.1: Population Density Gradients: Semiparametric Estimates



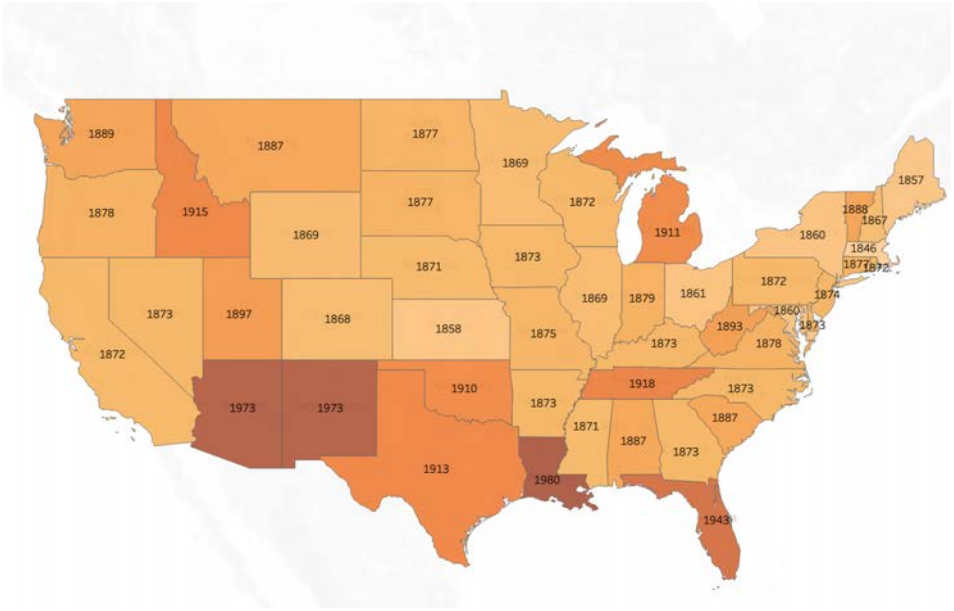
Notes: These figures plot semiparametric estimates of equation (3) where the curves $g(\cdot)$ are based on the Robinson (1988) partially linear approach, pooling across all available years 1790–1890 for each county c. The specification includes Census division and year fixed effects, which are partialled out before estimating these shapes, and are based on an Epanechnikov kernel and rule-of-thumb bandwidth. The dashed lines are 95 percent confidence intervals. The estimates are recovered over all counties, but the figure zooms in on those with less than 50 people/mi^2 for presentational purposes. (a) *Prime-Age Adult Share* is the fraction of whites aged 15–49 over the total number of whites. (b) *Sex Ratio* for whites is the ratio of the number of white males over white females. Both of these are reproduced from Figure 4 in Bazzi et al. (2020). See the notes to Tables 1 and 2 for details on the other outcomes.

Figure A.2: Frontier Proximity Gradients: Semiparametric Estimates



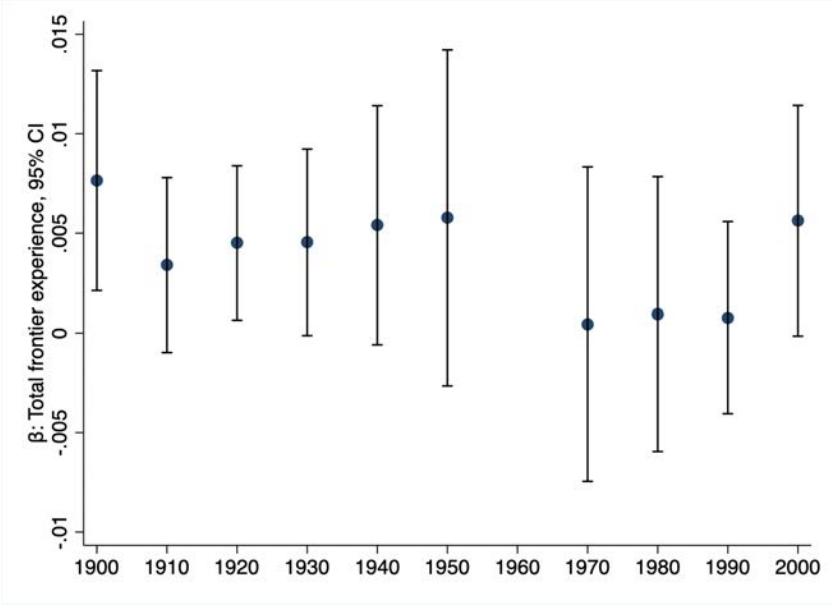
Notes: These figures plot semiparametric estimates of equation (3) relating proximity to the frontier line to demographic characteristics prominent in historical accounts of the frontier. Prime-age adult share and sex ratio graphs are reproduced from Appendix Figure G.2 in Bazzi et al. (2020). See the notes to Appendix Figure A.1 for further details on the specification and outcomes.

Figure A.3: Women's Economic Rights, Year Granted by State



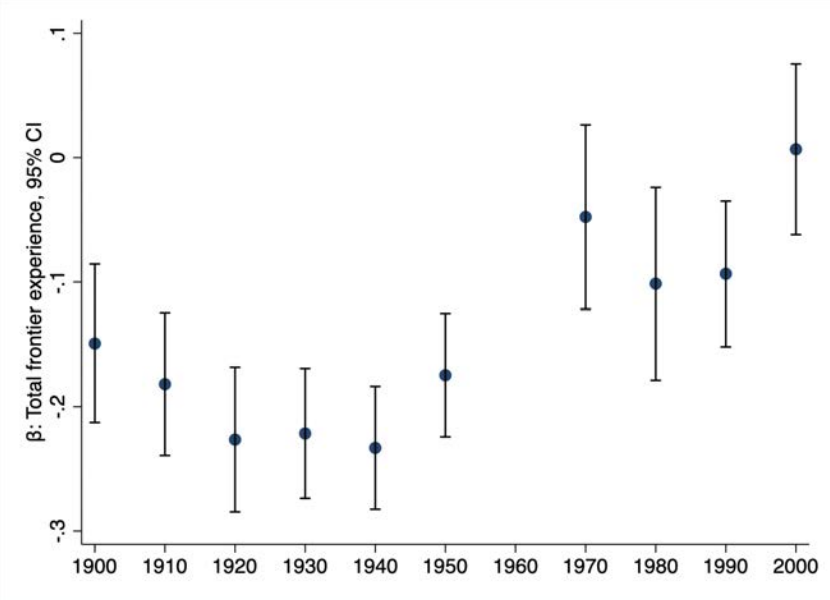
Notes: This map plots the year in which each U.S. state granted women full rights to retain property and labor earnings. The data are collected from Table 1 in Hazan et al. (2019).

Figure A.4: Negligible Male-to-Female Sex Ratio Imbalance in the Long Run



Notes: This figure adopts the same specification as in Figure 6 with the dependent variable being the sex ratio. The point estimates are quite small relative to the mean sex ratios, which go from 1.085 in 1900 to 0.982 in 2000. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Bars show 95% confidence intervals.

Figure A.5: The Frontier Legacy for the Gender Gap in LFP



Notes: This figure adopts the same specification as in Figure 6 with the dependent variable being the gender gap in labor force participation computed as the ratio of female over male labor force participation rates. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Bars show 95% confidence intervals.

Table A.1: Fertility on the Frontier: Micro-data Analysis

	All Women				Ever-Married Women	
	Number of children	Number of children below 5	Number of children	Number of children below 5	Number of children	Number of children below 5
	(1)	(2)	(3)	(4)	(5)	(6)
Frontier	0.149***	0.114***	0.148**	0.101***	0.045	0.043***
	(0.047)	(0.017)	(0.055)	(0.017)	(0.053)	(0.014)
Dep. Var. Mean	1.81	0.507	1.81	0.507	2.63	0.73
Dep. Var. Std. Dev.	2.16	0.81	2.16	0.81	2.16	0.89
Number of Observations	23,579,954	23,579,954	23,579,954	23,579,954	16,264,206	16,264,206
Division FE	Yes	Yes	Yes	Yes	Yes	Yes
Flexible Age Controls	No	No	Yes	Yes	Yes	Yes

Notes: The unit of observation is an individual woman. The sample includes U.S. counties from 1850—1880 Censuses. The dependent variable in columns (1), (3), and (5) is the number of children in the household. The dependent variable in columns (2), (4) and (6) is the number of children below 5 in the household. The sample includes all women across all ages in columns (1)–(4) and restricts to ever-married women of all ages in columns (5) and (6). Columns (3)–(6) include flexible controls for women's age, including age and age squared. Regressions include Census division fixed effects. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.2: Marriage Dissolution on the Frontier, 1870–1880

	Married Spouse Present	Married Spouse Absent	Divorced	Widower
	(1)	(2)	(3)	(4)
Frontier	-0.060***	0.043***	0.002**	0.015***
	(0.009)	(0.007)	(0.001)	(0.004)
Dep. Var. Mean	0.91	0.02	0.00	0.06
Dep. Var. Std. Dev.	0.29	0.14	0.06	0.25
Number of Observations	1,068,954	1,068,954	1,068,954	1,068,954
Division FE	Yes	Yes	Yes	Yes
Individual-level Controls	Yes	Yes	Yes	Yes

Notes: Estimates based on a linked sample of married men in 1870 (with spouse present in the household) from the Census Linking Project (Abramitzky et al., 2020). The dependent variables are binary indicators that take the value of one if the man is (1) married with a spouse present in the household in 1880, (2) married and the spouse is absent in 1880, (3) if the man is divorced in 1880, and (4) if the man is a widower in 1880, respectively, and zero otherwise. Individual-level controls include man's age in 1880, man's age squared, race (binary indicator that takes the value of one if the man is of white race and zero otherwise), and literacy (binary indicator that takes the value of one if the man reads and writes and zero otherwise). Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.3: Selection Patterns

	Number of Children		Spouse's Age Gap		Female Employment		Female Occ. Score	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(A) All Linked Couples							
Frontier Migrant	-0.131***	-0.109***	-0.292***	-0.287***	-0.004***	-0.005***	-0.033	-0.044**
	(0.021)	(0.021)	(0.056)	(0.057)	(0.001)	(0.001)	(0.022)	(0.022)
Dep. Var. Mean (non-frontier migrant)	2.84	2.84	4.89	4.89	0.02	0.02	0.29	0.29
Dep. Var. Std. Dev. (non-frontier migrant)	2.20	2.20	5.87	5.87	0.15	0.15	2.18	2.18
Number of Observations	1,024,495	1,024,495	1,024,495	1,024,495	1,023,707	1,023,707	1,024,495	1,024,495
	(B) Linked Couples with Husband Employed in Agriculture							
Frontier Migrant	-0.145***	-0.137***	-0.332***	-0.324***	-0.006***	-0.007***	-0.059***	-0.069***
	(0.029)	(0.029)	(0.073)	(0.073)	(0.002)	(0.002)	(0.019)	(0.019)
Dep. Var. Mean (non-frontier migrant)	3.02	3.02	4.87	4.87	0.02	0.02	0.27	0.27
Dep. Var. Std. Dev. (non-frontier migrant)	2.28	2.28	5.96	5.96	0.16	0.16	1.77	1.77
Number of Observations	646,909	646,909	646,909	646,909	646,293	646,293	646,909	646,909
State of residence in 1870 FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupational Score Husband	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Estimates based on a linked sample of married men in 1870 (with spouse present in the household) from the Census Linking Project (Abramitzky et al., 2020). The dependent variables are : the total number of children in columns (1) and (2); the age gap between male and female spouses in columns (3) and (4); binary indicator for female gainful employment status in columns (5) and (6); and female occupational score in columns (7) and (8). All dependent variables are measured in 1870. Frontier Migrant is a binary indicator that takes the value of one if the couple migrated to the frontier and zero otherwise. Panel (B) restricts to farming couples, i.e., husbands in agriculture in 1870. Regressions include state fixed effects for the place of residence in 1870. Even columns include husband's occupational score in 1870. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.4: The Frontier Legacy for FLFP and Fertility

	1900 (1)	1910 (2)	1920 (3)	1930 (4)	1940 (5)	1950 (6)	1970 (7)	1980 (8)	1990 (9)	2000 (10)
	(A) Dep. Var.: Female Labor Force Participation									
total frontier experience	-0.016***	-0.021***	-0.018***	-0.016***	-0.015***	-0.011***	-0.006***	-0.011***	-0.011***	-0.008***
	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Dep. Var. Mean	0.15	0.23	0.17	0.18	0.17	0.21	0.35	0.44	0.51	0.54
Dep. Var. Std. Dev.	0.10	0.12	0.08	0.07	0.06	0.06	0.06	0.06	0.07	0.06
Number of Counties	1,906	1,934	1,967	1,986	2,033	2,034	2,034	2,035	2,035	2,035
	(B) Dep. Var.: Fertility									
total frontier experience	18.67***	20.41***	16.06***	12.63***	13.13***	9.62***	2.45	5.35***	3.26***	2.49***
	(3.434)	(3.243)	(2.668)	(2.215)	(2.019)	(2.265)	(1.656)	(1.154)	(0.971)	(0.881)
Dep. Var. Mean	546.5	521.3	470.8	413.0	375.7	485.6	375.3	289.5	294.7	269.3
Dep. Var. Std. Dev.	125.0	124.0	97.1	84.5	79.2	70.6	53.9	41.9	41.7	34.6
Number of Counties	1,949	1,978	2,011	2,032	2,032	2,033	2,034	2,034	2,034	2,034
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the year-specific estimates with non-standardized outcomes from Figure 6. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.5: The Frontier Legacy for the Gender Gap in LFP

	1900 (1)	1910 (2)	1920 (3)	1930 (4)	1940 (5)	1950 (6)	1970 (7)	1980 (8)	1990 (9)	2000 (10)
total frontier experience	-0.018***	-0.023***	-0.020***	-0.019***	-0.019***	-0.014***	-0.004	-0.009**	-0.008***	0.001
	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
Dep. Var. Mean	0.17	0.25	0.19	0.21	0.22	0.27	0.50	0.62	0.73	0.81
Dep. Var. Std. Dev.	0.11	0.12	0.08	0.08	0.07	0.08	0.08	0.08	0.08	0.09
Number of Counties	1,906	1,934	1,967	1,984	2,033	2,034	2,034	2,035	2,035	2,035
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports the year-specific estimates of the relationship between total frontier experience and the gender gap in LFP measured as the ratio of female over male LFP. The specification is identical to those in Table 6. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.6: The Frontier Legacy of Upper Tail Working Women

	Occupational Score		At least High School Graduates	
	Women's	Gender Gap	Share Female	Gender Gap
	(1)	(2)	(3)	(4)
	(A) Outcomes Measured in 1940			
total frontier experience	0.099*	0.017***	-0.010***	-0.002
	(0.051)	(0.003)	(0.002)	(0.005)
Dep. Var. Mean	18.04	0.91	0.21	1.33
Dep. Var. Std. Dev.	2.46	0.13	0.08	0.19
Number of Counties	2,032	2,032	2,032	2,032
	(B) Outcomes Measured in 2000			
total frontier experience	n/a	n/a	-0.008***	0.000
			(0.002)	(0.001)
Dep. Var. Mean			0.77	1.02
Dep. Var. Std. Dev.			0.08	0.04
Number of Counties			2,034	2,034
State FE	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes

Notes: The unit of observation is a county. The sample includes U.S. counties for which the 1790–1890 period contains their entire frontier experience. Each column reports the OLS estimate of equation (5) for 1940 in Panel (A) and 2000 for Panel (B). The dependent variables in columns (1) and (2) are, respectively, the county-level average occupational score for women who are in the labor force and report a non-zero occupational score and the county-level gender gap in occupational score computed as the ratio of average occupational score for women over average occupational score for men, for women and men who are in the labor force and report a non-zero occupational score. Occupational scores are not available for 2000. The dependent variables in columns (3) and (4) are the county-level share of women aged 25 plus who graduated high-school and the gender gap in those aged 25 plus who graduated high-school, respectively. See the notes to Table 6 for further details on the specification. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells.
Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.7: Accounting for Additional Confounders of TFE and FLFP in 2000

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
total frontier experience	-0.009***	-0.009***	-0.009***	-0.010***	-0.009***	-0.009***	-0.008***	-0.009***	-0.008***	-0.008***	-0.006***	-0.009***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Baseline controlling for...													
ruggedness		✓											✓
rainfall risk			✓										✓
distance to nearest portage site				✓									✓
distance to nearest mine					✓								✓
distance to nearest Indian battle						✓							✓
slave population share, 1860							✓						✓
immigrant share, 1890								✓					✓
Scottish and Irish immigrant share, 1890									✓				✓
birthplace diversity, 1890										✓			✓
years connected to railroad by 1890											✓		✓
manufacturing employment share, 1890												✓	✓
Dep. Var. Mean	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Dep. Var. Std. Dev.	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Number of Counties	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815	1,815
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table adds further controls to the baseline specification in for FLFP in 2000 in column 4 of Panel B in Table 6. The sample size is slightly reduced due to missing data for some of the variables. Detailed descriptions of these controls can be found in Bazzi et al. (2020). Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.8: Accounting for Additional Confounders of TFE and FLFP in the 20th Century

	1900	1910	1920	1930	1940	1950	1970	1980	1990
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
total frontier experience	-0.003	-0.006**	-0.008***	-0.009***	-0.009***	-0.007***	-0.004**	-0.009***	-0.008***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Dep. Var. Mean	0.16	0.23	0.17	0.18	0.18	0.22	0.36	0.44	0.51
Dep. Var. Std. Dev.	0.10	0.12	0.08	0.07	0.06	0.06	0.06	0.06	0.07
Number of Counties	1,700	1,726	1,757	1,772	1,814	1,814	1,814	1,815	1,815
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All Controls, Col. 13 of Table A.7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table repeats the specification in column 13 of Appendix Table A.7 for other years 1900 to 1990. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.9: Disentangling Population Density, FLFP in 1940

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
total frontier experience, years	-0.0015***	-0.0014***	-0.0009***	-0.0009***	-0.0009***	-0.0011***	-0.0011***
	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0002)
low density experience, years							-0.0063***
							(0.0011)
Contemporaneous Population Density		✓					
...Decile Within-State			✓				
Population Density-Neighbor Matching Within-State				✓			
Sample Restriction	None	None	None	None	$> 90th$ percentile urban pop. share	$\leq 90th$ percentile urban pop. share	None
Dep. Var. Mean	0.17	0.17	0.17	0.17	0.26	0.16	0.17
Dep. Var. Std. Dev.	0.06	0.06	0.06	0.06	0.05	0.05	0.06
Number of Counties	2,033	2,033	2,019	2,033	241	1,792	2,033
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table explores robustness of the FLFP results for 1940 (column 4, Table 6) to the population density confound. Column (2) controls for contemporaneous population density. Column (3) includes indicators for the decile of within-state population density. Column (4) implements a nearest-neighbor matching specification, including fixed effects within-state for pairs of counties that have the most similar population density. Columns (5) and (6) split the sample into counties above and below the 90th percentile of contemporaneous urban population shares. Column (7) controls for the total number of years that the country had population density less than 6 people/mi^2 from 1790–1890. This is one of the aspects of total frontier experience, the other being the total number of years that the county was within 100 km of the frontier line during that period. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.10: Instrumental Variables (IV) Strategy

	Fertility Child-Women Ratio (1)	Female Gainfule Employment (2)	LSS Mean Summary Index (3)
	(A) IV = Log Average Actual National Migration Inflows Over 30 Years		
total frontier experience	11.56***	-0.016***	0.008**
	(3.413)	(0.003)	(0.004)
Dep. Var. Mean	375.70	0.18	0.30
First-Stage F Statistic	188.6	188.2	31.5
Number of Observations	2,032	2,033	25,763
	(B) IV = Log Average Predicted National Migration Inflows Over 30 Years		
total frontier experience	14.28***	-0.016***	0.007*
	(3.941)	(0.003)	(0.004)
Dep. Var. Mean	375.7	0.18	0.30
First-Stage F Statistic	184.3	183.8	36.8
Number of Observations	2,032	2,033	25,763
State Fixed Effects	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes
Survey Wave Fixed Effects			Yes
Individual Demographic Controls			Yes

Notes: IV estimates for three core outcomes: fertility, female labor force participation, and a mean index of conservative gender attitudes from the Lifestyle Survey (LSS) (see Table 9 for details). Outcome variables in columns (1)–(2) are measured using 1940 Census data. Panel (A) reports the IV estimates for the baseline sample and specification using the log of the average national annual actual migration inflows over the 30 years subsequent to the frontier line arriving within 110 km from the given county centroid. Panel (B) reports the estimates using the IV constructed based on annual migration inflows to the United States predicted by weather shocks in Europe. Further details on the construction of both instrumental variables can be found in Bazzi et al. (2020). Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.11: Alternative Measures of TFE and FLFP in 1940

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
TFE: 100 km, $\leq 6/mi^2$, no inner or outer islands	-0.015***													
	(0.002)													
TFE: 50 km, $\leq 6/mi^2$, no inner or outer islands		-0.015***												
		(0.002)												
TFE: 100 km, $\leq 18/mi^2$, no inner island lines			-0.012***											
			(0.002)											
TFE: 50 km, $\leq 18/mi^2$, no inner island lines				-0.011***										
				(0.002)										
TFE: 100 km, 2-$6/mi^2$, no inner island lines					-0.013***									
					(0.003)									
TFE: 50 km, 2-$6/mi^2$, no inner island lines						-0.012***								
						(0.003)								
TFE: 100 km, no density restriction, no inner island lines							-0.007***							
							(0.002)							
TFE: 50 km, no density restriction, no inner island lines								-0.008***						
								(0.002)						
TFE: 100 km, $\leq 6/mi^2$, including inner island lines									-0.015***					
									(0.001)					
TFE: 50 km, $\leq 6/mi^2$, including inner island lines										-0.016***				
										(0.002)				
TFE: 100 km, $\leq 6/mi^2$, main single contour line											-0.013***			
											(0.002)			
TFE: 50 km, $\leq 6/mi^2$, main single contour line												-0.014***		
												(0.002)		
TFE: 50 km, $\leq 6/mi^2$, no inner or outer island lines													-0.015***	
													(0.002)	
TFE: 50 km, $\leq 6/mi^2$, no inner or outer island lines														-0.016***
														(0.002)
Dep. Var. Mean	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Dep. Var. Std. Dev.	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Number of Counties	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033	2,033
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table reports estimates of column 4 in Table 6 using alternative measures of total frontier experience, each of which are described at length in Bazzi et al. (2020). Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.12: Adding West Coast and Regional Heterogeneity, FLFP in 1940

	Plus West Coast	Midwest Only	South Only	West Only
	(1)	(2)	(3)	(4)
	(A) Measurement of TFE from 1790 to 1890			
total frontier experience	-0.008***	-0.011***	-0.008***	-0.005
	(0.002)	(0.003)	(0.002)	(0.005)
Dep. Var. Mean	0.54	0.58	0.50	0.56
Dep. Var. Std. Dev.	0.06	0.05	0.06	0.06
Number of Counties	2,140	987	935	152
	(B) Measurement of TFE from 1790 to 1950			
total frontier experience	-0.007***	-0.011***	-0.007***	-0.005
	(0.001)	(0.003)	(0.002)	(0.003)
Dep. Var. Mean	0.54	0.57	0.50	0.55
Dep. Var. Std. Dev.	0.06	0.05	0.05	0.06
Number of Counties	2,498	1,038	1,073	321
State Fixed Effects	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes

Notes: This table extends our baseline sample of counties and examines FLFP in 1940 with region-by-region sample splits. Column (1) adds 105 counties along the secondary West Coast frontier (see Appendix Figure 3). Column (2) restricts to counties in the Midwest Census region, column (3) restricts to the South region, and column (4) restricts to the West, which includes the 105 counties added in column (1) plus 47 others in states in the West region but falling inside the 1890 main east-to-west frontier line. Panel (A) uses our baseline measure of TFE. Panel (B) expands the column 1 sample to include counties beyond the (main and secondary) 1890 frontier lines but inside the eventual frontier line realized by 1950, using a new measure of TFE computed over that longer time horizon. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.

Table A.13: Excess Voting Turnout: Pre- and Post- Equal Rights Amendment

	1916–1912	1920–1916	1924–1916	1924–1920
	(1)	(2)	(3)	(4)
total frontier experience	0.262	-0.471**	-0.532**	-0.069
	(0.200)	(0.224)	(0.239)	(0.207)
Number of Observations	1,902	1,902	1,907	1,902
Dep. Var. Mean	3.82	-9.59	-11.28	-1.70
Dep. Var. Std. Dev.	7.50	10.27	11.46	-1.70
State Fixed Effects	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Share Male and Female	Yes	Yes	Yes	Yes

Notes: The unit of observation is a county. The dependent variable is the excess voter turnout measured as the difference in turnout from two presidential elections. We rely on ICPSR county level data on presidential election turnout computed on the basis of estimated eligible voters. We report robust standard errors clustered based on grid-cell clustering. Baseline geographic controls are included throughout. We also control for the share of male and female population aged 21 and over in 1910 and 1920. Standard errors are clustered based on Bester et al. (2011) grid-cell clustering with 60×60 square-mile cells. Significance levels: $*$: 10% $**$: 5% $***$: 1%.