

Online Appendix

“The Gendered Legacies of the Frontier and Military Enlistment Behavior”

This Appendix provides additional tables and figures to complement the analyses in the main manuscript. More specifically, Table A.1 presents descriptive statistics for the main outcome and explanatory variables based on the baseline counties we use in our main analyses (excluding the West). Table A.2 presents the same descriptive statistics for the non-baseline counties and Table A.3 for *all* counties. In addition, Table A.4 shows the correlations between the total frontier experience variable and our control variables.

The next set of tables complements Table 1 in the main text. Table A.5 presents the full regression results of our main analysis, Table A.6 repeats the main analysis while including the West Coast frontier, Table A.7 uses all counties from the baseline states, Table A.8 includes all counties, Table A.9 excludes state fixed effects, and Table A.10 uses Conley standard errors.

Table A.11 shows that our results are mostly robust to using different subsets of a county’s female population as the denominator when calculating enlistment rates (e.g., only women aged 20-50 or without kids under 14). Finally, Table A.12 complements Figure 5 in the main text and shows the full regression results for the models linking total frontier exposure and the 1940 Census socio-demographic outcome variables.

Figures A.1 and A.2 show the geographic variation in our main explanatory variable: total frontier exposure. Whereas Figure 4 in the main text follows the main analysis in Bazzi, Fiszbein, and Gebresilasse (2010) and only shows this variation for the East to West frontier (i.e., excluding frontier areas past the 1890 frontier line), Figure A.1 shows the variation for all counties and Figure A.2 shows it for our baseline set of counties (East to West frontier) and the West Coast frontier.

Figure A.3 plots coefficient estimates for the effect of a county’s total frontier exposure on the respective county’s share of female population (based on Census data per decade).

These estimates are based on our main estimation equation and include the usual control variables and fixed effects. The results show that between 1820 and 1870, counties with higher levels of frontier exposure had a lower share of female population (i.e., relatively more men than women compared to counties with lower levels of frontier exposure). However, this difference becomes insignificant in 1880 and is actually positive between 1890 and 1990 (i.e., counties with more frontier exposure had relatively more women for this 100 year span). The very recent data (2000 and 2010) seems to suggest that this trend could be reverting back to pre-1900 levels again.

Figure A.4 complements Figure 6 in the main text and displays scatter plots with regression lines between selected 1940 Census variables and enlistment rates among *men*.

Table A.1: Summary statistics (baseline counties)

Variable	N	Mean	Std.Dev.	Min	Max
Male enlistment count	2035	439.292	1595.735	0	53268
Male enlistment rate	2035	2.003	0.931	0	11.632
Female enlistment count	2035	33.17	165.339	0	5429
Female enlistment rate	2035	0.11	0.078	0	0.518
Male population	2035	18555.367	60628.348	389	2010751
Female population	2035	18387.285	61586.511	311	2052591
Total population	2035	36942.651	122195.474	700	4063342
Total frontier experience	2040	1.817	1.121	0	6.3
Log county area	2040	6.361	0.545	2.017	8.815
Latitude	2040	37.761	4.861	25.425	48.777
Longitude	2040	-89.997	6.368	-108.262	-73.678
Mean temperature	2036	12.714	4.647	-0.629	23.721
Mean rainfall	2036	1017.362	302.083	261.696	1640.075
Mean elevation	2036	316.522	356.512	-1259.143	3368.917
Distance to the coast	2040	672644.266	410033.881	436.165	1568270.375
Distance to rivers	2040	42930.139	39602.266	1.267	289567.75
Distance to lakes	2040	177441.089	120964.68	0	572221.375
Potential agricultural productivity	2040	0.513	0.129	0.001	0.691

Table A.2: Summary statistics (non-baseline counties)

Variable	N	Mean	Std.Dev.	Min	Max
Male enlistment count	1054	702.41	2541.016	0	42492
Male enlistment rate	1054	2.376	1.562	0	27.821
Female enlistment count	1054	57.442	243.796	0	4921
Female enlistment rate	1054	0.158	0.125	0	1.485
Male population	1054	26851.443	87612.554	150	1364831
Female population	1054	26745.312	90725.731	132	1420812
Total population	1054	53596.755	178322.728	285	2785643
Total frontier experience	1069	0.695	1.177	0	5.7
Log county area	1069	6.725	1.233	0.693	9.909
Latitude	1069	39.272	4.629	29.812	48.826
Longitude	1069	-94.834	17.055	-124.157	-67.637
Mean temperature	1049	11.392	4.352	-1.559	22.382
Mean rainfall	1049	806.579	389.814	112.042	2164.922
Mean elevation	1049	656.781	713.585	-6663	3502
Distance to the coast	1069	432684.758	421253.143	65.408	1612509.75
Distance to rivers	1069	45662.985	38435.787	65.049	281624.812
Distance to lakes	1069	142115.937	85747.371	0	388563.219
Potential agricultural productivity	1069	0.366	0.232	0	0.692

Table A.3: Summary statistics (all counties)

Variable	N	Mean	Std.Dev.	Min	Max
Male enlistment count	3089	529.071	1973.461	0	53268
Male enlistment rate	3089	2.13	1.198	0	27.821
Female enlistment count	3089	41.452	195.975	0	5429
Female enlistment rate	3089	0.126	0.099	0	1.485
Male population	3089	21386.077	71092.386	150	2010751
Female population	3089	21239.133	72943.904	132	2052591
Total population	3089	42625.21	144017.213	285	4063342
Total frontier experience	3109	1.431	1.258	0	6.3
Log county area	3109	6.486	0.865	0.693	9.909
Latitude	3109	38.28	4.835	25.425	48.826
Longitude	3109	-91.661	11.482	-124.157	-67.637
Mean temperature	3085	12.265	4.591	-1.559	23.721
Mean rainfall	3085	945.689	349.035	112.042	2164.922
Mean elevation	3085	432.221	531.879	-6663	3502
Distance to the coast	3109	590136.478	429271.121	65.408	1612509.75
Distance to rivers	3109	43869.802	39220.402	1.267	289567.75
Distance to lakes	3109	165294.873	111390.329	0	572221.375
Potential agricultural productivity	3109	0.462	0.185	0	0.692

Table A.4: Correlation between total frontier experience and main covariates

Variables	Correlation with TFE
Log county area	-0.10
Latitude	-0.24
Longitude	-0.04
Mean temperature	0.21
Mean rainfall	0.23
Mean elevation	-0.09
Distance to the coast	0.00
Distance to rivers	-0.03
Distance to lakes	0.07
Potential agricultural productivity	0.21

Table A.5: The effect of frontier experience on WWII enlistment rates

	Male enlistment rates	Female enlistment rates
Total frontier experience	−0.020 (0.021)	−0.007** (0.002)
Log county area	0.189*** (0.047)	0.005 (0.005)
Latitude	0.148* (0.057)	0.015* (0.006)
Longitude	0.058** (0.019)	0.003* (0.002)
Mean temperature	0.168** (0.055)	0.014* (0.006)
Mean rainfall	0.000 (0.000)	0.000 (0.000)
Mean elevation	0.001** (0.000)	0.000* (0.000)
Distance to the coast	0.000 (0.000)	−0.000* (0.000)
Distance to rivers	−0.000 (0.000)	0.000 (0.000)
Distance to lakes	0.000*** (0.000)	−0.000 (0.000)
Potential agricultural productivity	−0.475 (0.754)	0.022 (0.055)
R ²	0.392	0.215
Adj. R ²	0.380	0.199
RMSE	0.732	0.070
N Clusters	380	380
State-fixed effects	✓	✓
Num. obs.	2034	2034

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women. Both models include state fixed effects and clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.6: The effect of frontier experience on WWII enlistment rates (including the West Coast frontier)

	Male enlistment rates	Female enlistment rates
Total frontier experience	-0.030 (0.020)	-0.008*** (0.002)
Log county area	0.169*** (0.043)	0.003 (0.005)
Latitude	0.117** (0.044)	0.008 (0.005)
Longitude	0.046** (0.016)	0.001 (0.002)
Mean temperature	0.137** (0.044)	0.007 (0.005)
Mean rainfall	-0.000 (0.000)	-0.000 (0.000)
Mean elevation	0.001** (0.000)	0.000 (0.000)
Distance to the coast	0.000 (0.000)	-0.000* (0.000)
Distance to rivers	-0.000 (0.000)	0.000 (0.000)
Distance to lakes	0.000*** (0.000)	-0.000 (0.000)
Potential agricultural productivity	0.153 (0.724)	0.064 (0.055)
R ²	0.399	0.238
Adj. R ²	0.386	0.221
RMSE	0.731	0.072
N Clusters	386	386
State-fixed effects	✓	✓
Num. obs.	2139	2139

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women, adding the sample of the West Coast frontier to the baseline counties. Both models include state fixed effects and clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.7: The effect of frontier experience on WWII enlistment rates (baseline states with all counties)

	Male enlistment rates	Female enlistment rates
Total frontier experience	-0.004 (0.019)	-0.006** (0.002)
Log county area	0.125** (0.046)	0.006 (0.005)
Latitude	0.014 (0.040)	0.006 (0.004)
Longitude	0.050** (0.016)	0.002 (0.001)
Mean temperature	0.032 (0.036)	0.006 (0.003)
Mean rainfall	0.000 (0.000)	0.000 (0.000)
Mean elevation	0.000* (0.000)	0.000* (0.000)
Distance to the coast	0.000*** (0.000)	-0.000 (0.000)
Distance to rivers	-0.000* (0.000)	0.000 (0.000)
Distance to lakes	0.000*** (0.000)	-0.000 (0.000)
Potential agricultural productivity	-0.900 (0.594)	0.019 (0.044)
R ²	0.375	0.164
Adj. R ²	0.365	0.151
RMSE	0.833	0.085
N Clusters	438	438
State-fixed effects	✓	✓
Num. obs.	2623	2623

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women, including all counties from the baseline states. Both models include state fixed effects and clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.8: The effect of frontier experience on WWII enlistment rates (all counties)

	Male enlistment rates	Female enlistment rates
Total frontier experience	-0.014 (0.017)	-0.006*** (0.002)
Log county area	0.048 (0.046)	-0.001 (0.004)
Latitude	0.053 (0.029)	0.005 (0.003)
Longitude	0.015 (0.014)	-0.001 (0.001)
Mean temperature	0.051 (0.029)	0.005 (0.003)
Mean rainfall	0.000 (0.000)	0.000 (0.000)
Mean elevation	0.000** (0.000)	0.000** (0.000)
Distance to the coast	0.000** (0.000)	-0.000 (0.000)
Distance to rivers	-0.000 (0.000)	-0.000 (0.000)
Distance to lakes	0.000*** (0.000)	-0.000 (0.000)
Potential agricultural productivity	-0.358 (0.551)	0.045 (0.039)
R ²	0.309	0.224
Adj. R ²	0.295	0.209
RMSE	1.002	0.088
N Clusters	469	469
State-fixed effects	✓	✓
Num. obs.	3077	3077

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women, including all counties. Both models include state fixed effects and clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.9: The effect of frontier experience on WWII enlistment rates (without state fixed effects)

	Male enlistment rates	Female enlistment rates
Total frontier experience	-0.024 (0.028)	-0.008*** (0.002)
Log county area	0.130* (0.053)	0.019*** (0.005)
Latitude	-0.034 (0.053)	0.007 (0.005)
Longitude	0.046*** (0.012)	-0.000 (0.001)
Mean temperature	0.023 (0.051)	0.005 (0.005)
Mean rainfall	-0.002*** (0.000)	-0.000*** (0.000)
Mean elevation	-0.000 (0.000)	0.000 (0.000)
Distance to the coast	-0.000 (0.000)	-0.000*** (0.000)
Distance to rivers	-0.000 (0.000)	-0.000 (0.000)
Distance to lakes	0.000 (0.000)	-0.000* (0.000)
Potential agricultural productivity	-0.115 (0.886)	0.151** (0.056)
Constant	8.586** (3.210)	-0.262 (0.303)
R ²	0.155	0.123
Adj. R ²	0.150	0.118
RMSE	0.858	0.073
N Clusters	380	380
State-fixed effects	-	-
Num. obs.	2034	2034

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women. Both models include clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.10: The effect of frontier experience on WWII enlistment rates (using Conley standard errors and state fixed effects)

	Male enlistment rates	Female enlistment rates
Total frontier experience	−0.025 (0.020)	−0.008* (0.003)
Log county area	0.182*** (0.038)	0.005 (0.003)
Mean temperature	0.025 (0.033)	0.000 (0.002)
Mean rainfall	−0.000 (0.000)	−0.000 (0.000)
Mean elevation	0.000 (0.000)	0.000 (0.000)
Distance to the coast	0.000 (0.000)	−0.000 (0.000)
Distance to rivers	−0.000 (0.000)	0.000 (0.000)
Distance to lakes	0.000* (0.000)	−0.000 (0.000)
Potential agricultural productivity	0.200 (0.774)	0.070 (0.057)
R ²	0.384	0.206
Adj. R ²	0.372	0.191
State-fixed effects	✓	✓
Num. obs.	2034	2034

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among men and women. Both models include state fixed effects and Conley standard errors. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.11: The effect of frontier experience on WWII enlistment rates (with different subsets of female population)

	Female enlistees divided by different county-level female pop.			
	total female pop.	aged 20-50 w/o kids under 14	w/o kids under 14	aged 20-50
Total frontier experience	-0.007** (0.002)	-0.007 (0.010)	-0.009** (0.003)	-0.013** (0.005)
Log county area	0.005 (0.005)	0.024 (0.021)	0.007 (0.007)	0.011 (0.011)
Latitude	0.015* (0.006)	0.073** (0.026)	0.019* (0.008)	0.035** (0.013)
Longitude	0.003* (0.002)	0.018* (0.007)	0.004* (0.002)	0.008* (0.004)
Mean temperature	0.014* (0.006)	0.058* (0.025)	0.018* (0.008)	0.031* (0.013)
Mean rainfall	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Mean elevation	0.000* (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)
Distance to the coast	-0.000* (0.000)	-0.000** (0.000)	-0.000* (0.000)	-0.000* (0.000)
Distance to rivers	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Distance to lakes	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Potential agricultural productivity	0.022 (0.055)	-0.133 (0.256)	0.019 (0.072)	0.034 (0.123)
R ²	0.214	0.239	0.213	0.232
Adj. R ²	0.199	0.224	0.197	0.216
RMSE	0.070	0.329	0.091	0.158
N Clusters	380	380	380	380
State-fixed effects	✓	✓	✓	✓
Num. obs.	2034	2034	2034	2034

Note: Entries are estimates of the effect of frontier experience on WWII enlistment rates among women using different subsets of a county's female population as denominator (see column names). All models include state fixed effects and clustered standard errors based on 60-square-mile grid cells. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table A.12: The effect of frontier exposure on county-level socio-demographics (1940 Census)

	Labor force (women)	Houseworker (women)	Children (any)	Children (number)	Population (number)
Total frontier experience	-0.015*** (0.002)	0.007*** (0.002)	0.007*** (0.001)	0.068*** (0.014)	-11432.107*** (3066.707)
Log county area	0.005 (0.004)	-0.008* (0.004)	-0.000 (0.004)	0.001 (0.040)	19585.548 (11645.570)
Latitude	0.006 (0.004)	-0.010** (0.004)	0.003 (0.005)	0.050 (0.047)	10894.905 (10846.300)
Longitude	-0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.016)	4024.193 (2704.686)
Mean temperature	0.008* (0.004)	-0.007* (0.003)	0.001 (0.005)	0.007 (0.046)	11993.677 (10519.495)
Mean rainfall	-0.000* (0.000)	0.000 (0.000)	0.000** (0.000)	0.000* (0.000)	-56.601 (36.058)
Mean elevation	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	4.534 (56.483)
Distance to the coast	-0.000* (0.000)	0.000*** (0.000)	-0.000 (0.000)	-0.000*** (0.000)	0.002 (0.026)
Distance to rivers	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.003 (0.085)
Distance to lakes	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.107 (0.067)
Potential agricultural productivity	0.088* (0.041)	-0.029 (0.040)	-0.122*** (0.030)	-1.125*** (0.328)	133387.839* (58690.872)
R ²	0.313	0.289	0.173	0.303	0.056
Adj. R ²	0.300	0.275	0.157	0.289	0.037
RMSE	0.052	0.065	0.044	0.450	119948.548
N Clusters	380	380	380	380	380
State-fixed effects	✓	✓	✓	✓	✓
Num. obs.	2034	2034	2034	2034	2034

Note: Entries are estimates of the effect of frontier experience on labor force participation among women, share of houseworkers among women, the share of women who had at least one child, the average number of children per women, and county population. All outcomes are means at the county level and based on the 1940 Census. Figure 5 plots these coefficients and 95% confidence intervals. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

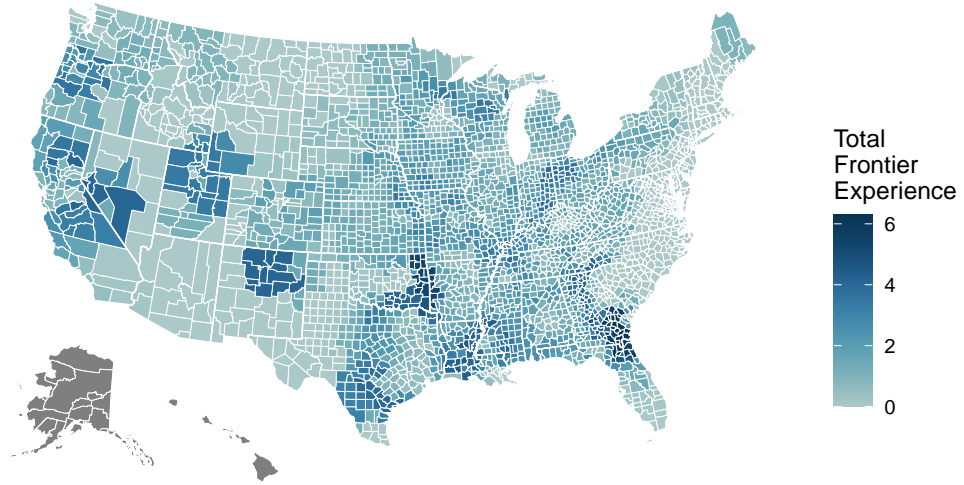


Figure A.1: Heat map of total frontier exposure (divided by decades). This map includes areas in the west are beyond the 1890 frontier line.

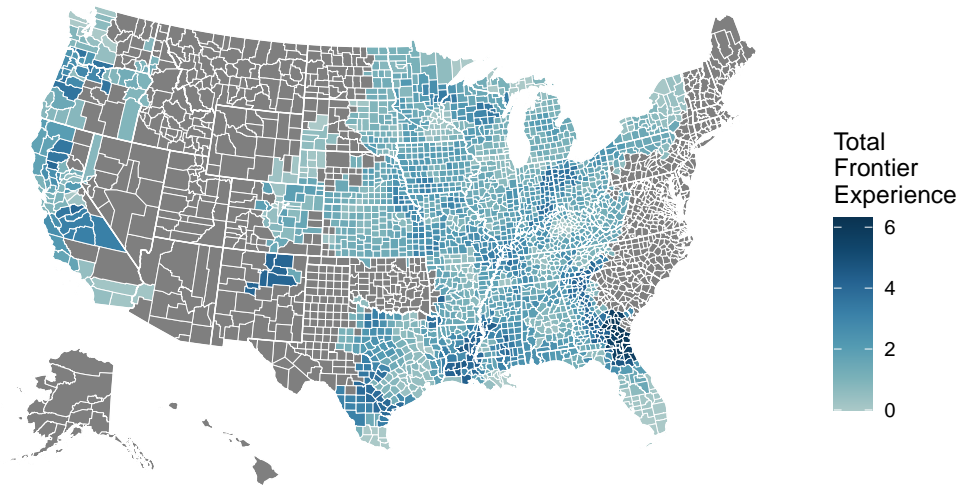


Figure A.2: Heat map of total frontier exposure (divided by decades). This map includes areas in both the baseline counties and the West Coast frontier.

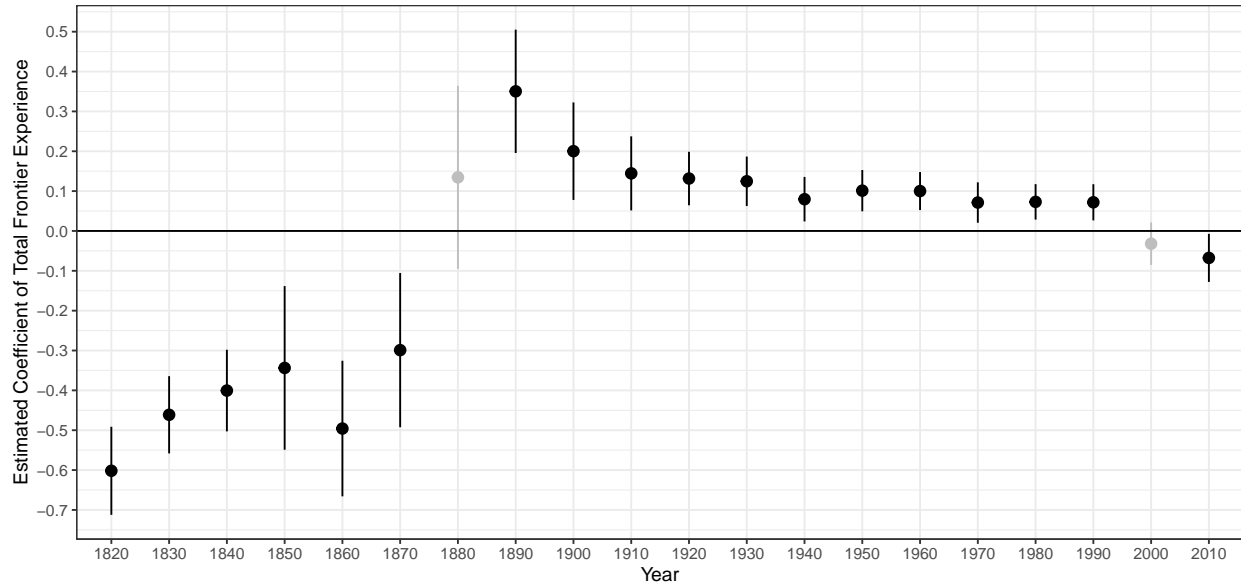


Figure A.3: Change in the proportion of women at the frontier over time. This caterpillar plot shows the marginal effect of total frontier exposure on the proportion of women per county (multiplied by 100) over time.

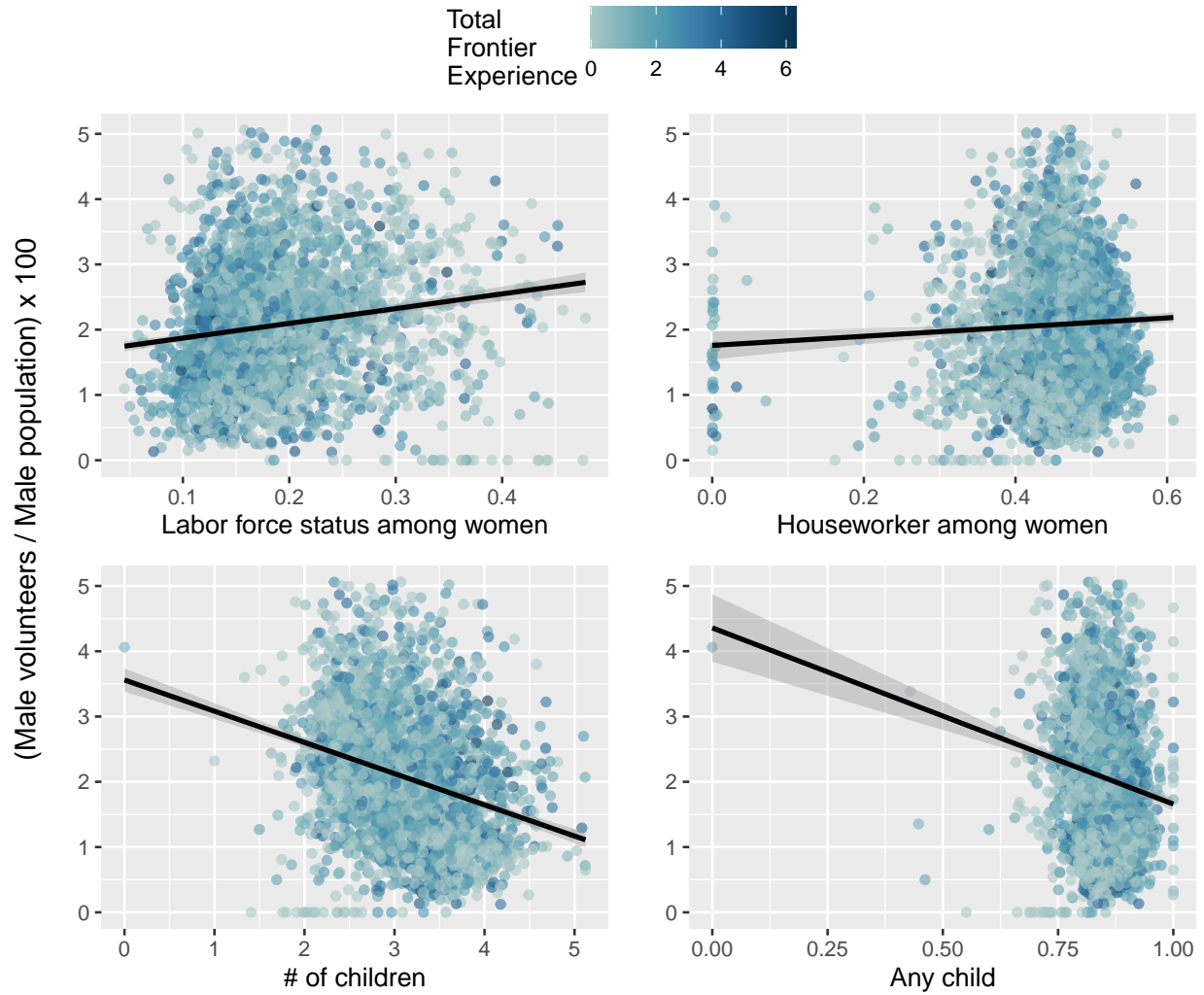


Figure A.4: Scatter plots depicting the descriptive relationships between male enlistment rates and demographic variables related to women’s labor force participation and number of children.