

# ONLINE APPENDIX FOR: MATERNAL MORTALITY AND WOMEN'S POLITICAL POWER

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Appendix A: Appendix Figures

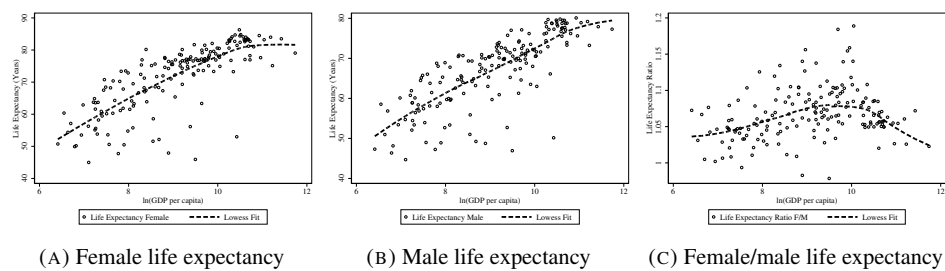


FIGURE A1. Life expectancy in 2010. Life expectancy at birth and PPP-adjusted GDP per capita data are collated by the World Bank Data Bank. These indicators are SP.DYN.LE00.FE.IN (Female life expectancy) SP.DYN.LE00.MA.IN (Male life expectancy) and NY.GDP.PCAP.PP.KD (PPP adjusted GDP per capita). The life expectancy ratio is calculated as female life expectancy divided by male life expectancy for each country. Lowess fits are overlaid on scatter plots, using a bandwidth of 0.8 for local linear smoothing.

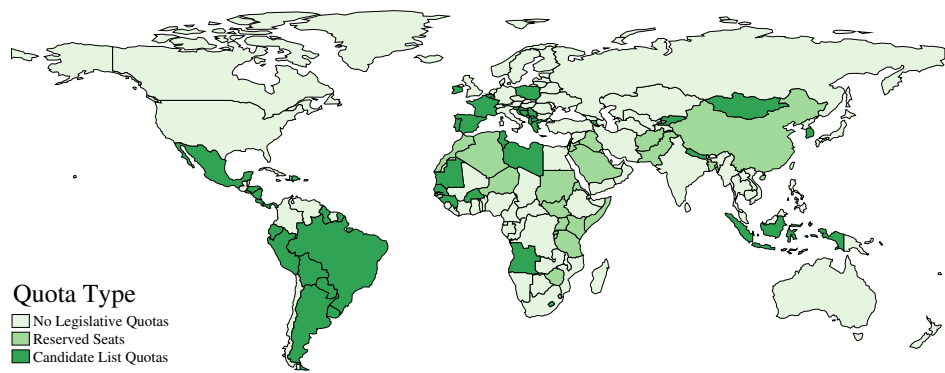


FIGURE A2. Quota coverage: 1990–2015. Geographic distribution of countries implementing a quota for reserved seats in parliament and candidate list quotas. Data is compiled from Dahlerup (2005) and updated with information for recent years from the online [quotaproject.org](http://quotaproject.org) database developed and maintained by the International Institute for Democracy and Electoral Assistance (IDEA), the Inter-Parliamentary Union, and Stockholm University. This database was consulted on 19th of July, 2016.

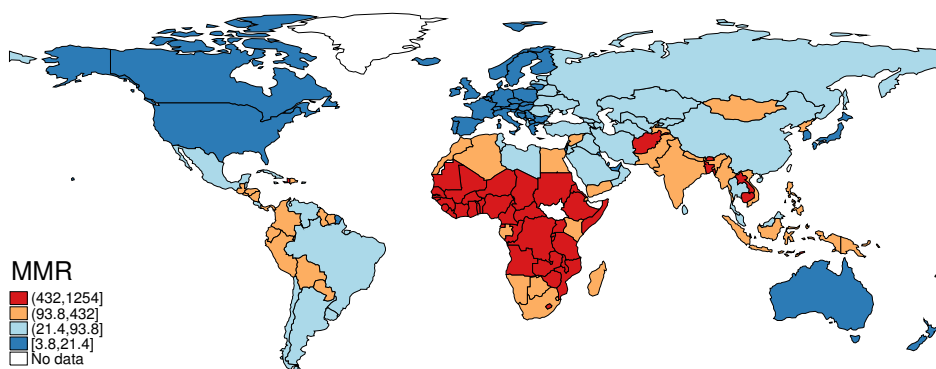


FIGURE A3. Maternal mortality ratio: 1990–2015. Average rates by country for the period 1990–2015. Values are calculated as deaths per 100,000 live births, and are provided by the MMEIG, an inter-agency project of the WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population Division.

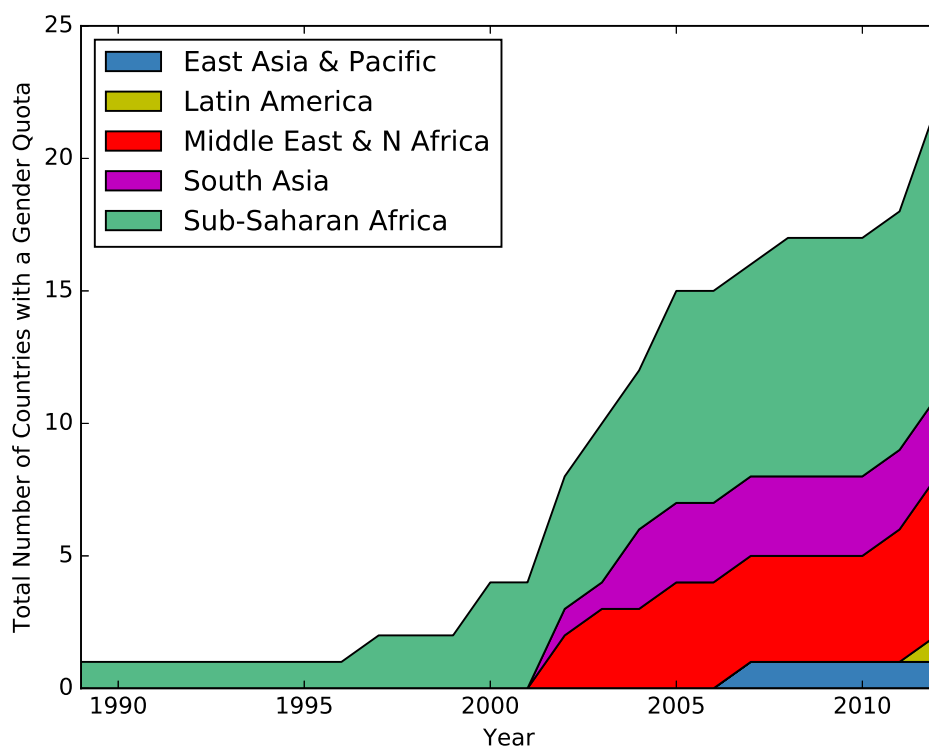


FIGURE A4. Reserved seat quota timing: 1990–2012. Timing of the implementation of reserved seats is documented by geographic region. Additional notes related to quota adoption are provided in Figure A2.

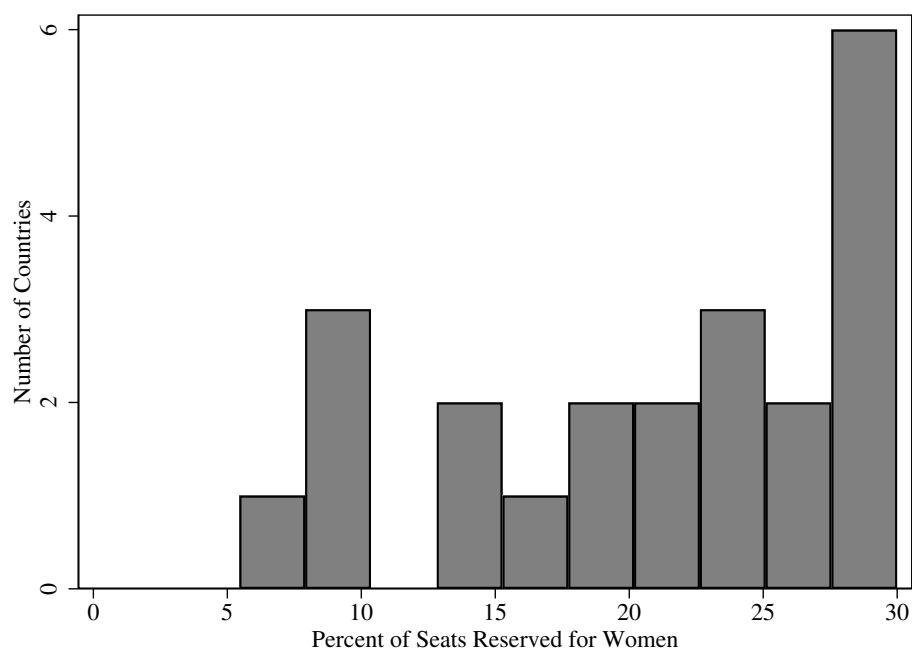
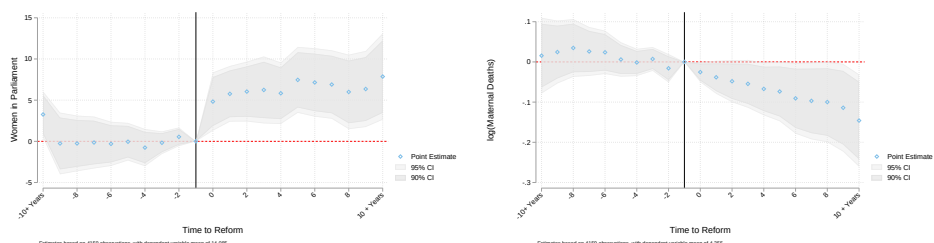
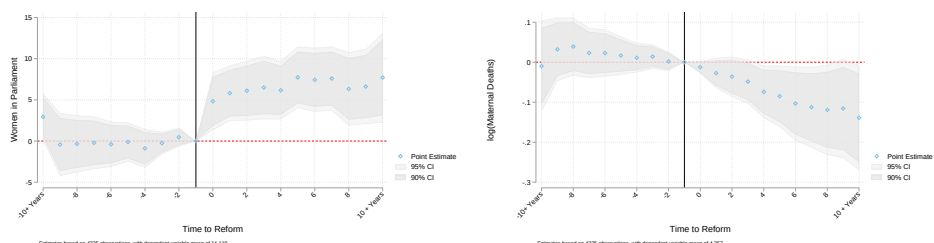


FIGURE A5. Reserved seat quota sizes. This histogram describes the quota size for each country which adopts a reserved seat quota. Each country (quota) is included as a single observation.

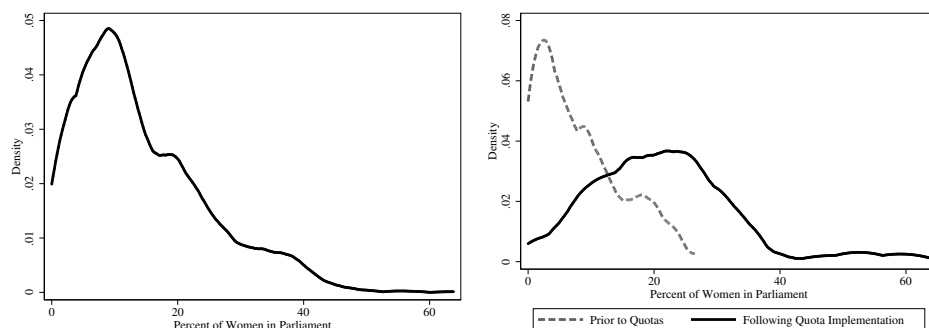


(A) Percent of women in parliament with time-varying controls (B) ln(maternal mortality ratio) with time-varying controls



(C) Percent of women in parliament with no controls (D) ln(maternal mortality ratio) with no controls

FIGURE A6. Gender quota impacts on women in parliament and maternal mortality. Point estimates of the lag and lead terms in the event study specification described in equation 1 are presented, along with their 95% confidence intervals. Estimates are conditional on country and year fixed effects. Panels (a) and (b) additionally control for the log of GDP per capita and an indicator of whether the country is a democracy. Time periods greater than 10 years from the reform date are displayed as a single “10 +” indicator. Standard errors are clustered by country. The omitted base category is taken as 1 year prior to the reform, indicated by the solid vertical line.



(A) All Countries

(B) Reserved Seat Countries Only

FIGURE A7. Proportion of women in parliament. Density plots describe the proportion of women in parliament in all countries and years under study (figure (a)), and the proportion of women in parliament in countries which at some point adopt a reserved seat quota (figure (b)). Plots are based on each country by year observation in the women in parliament data.

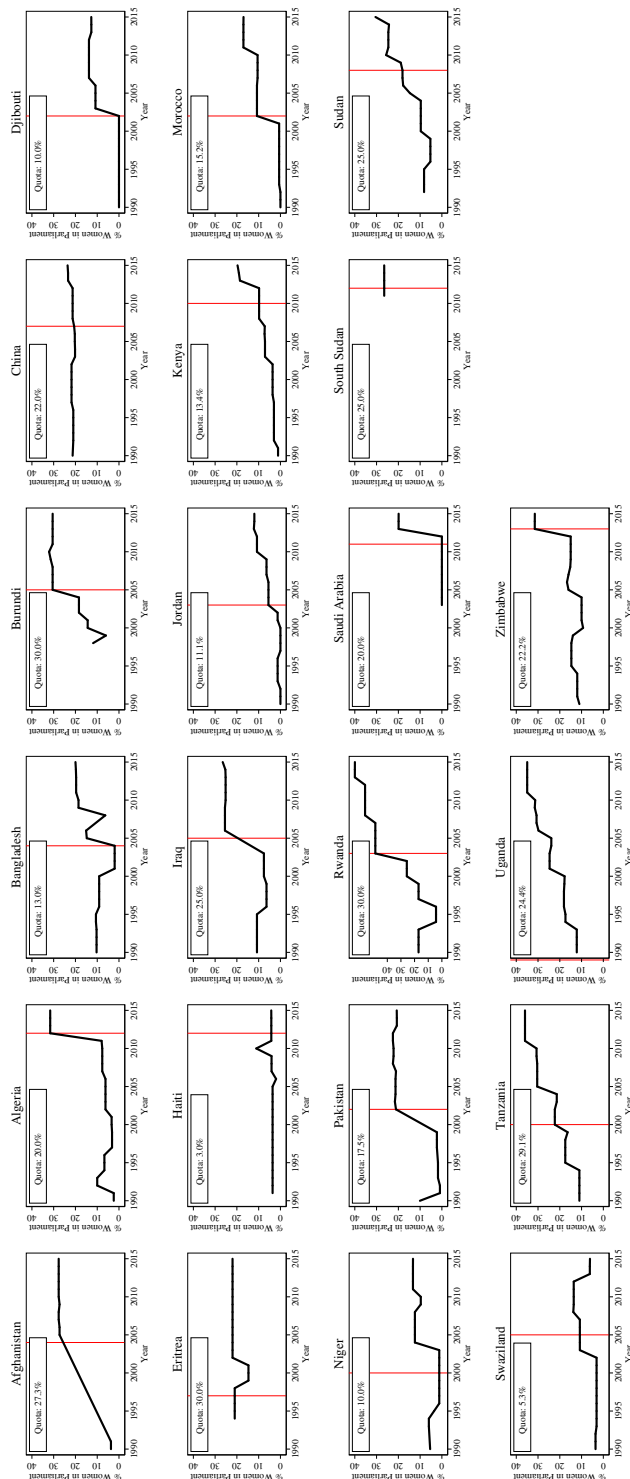
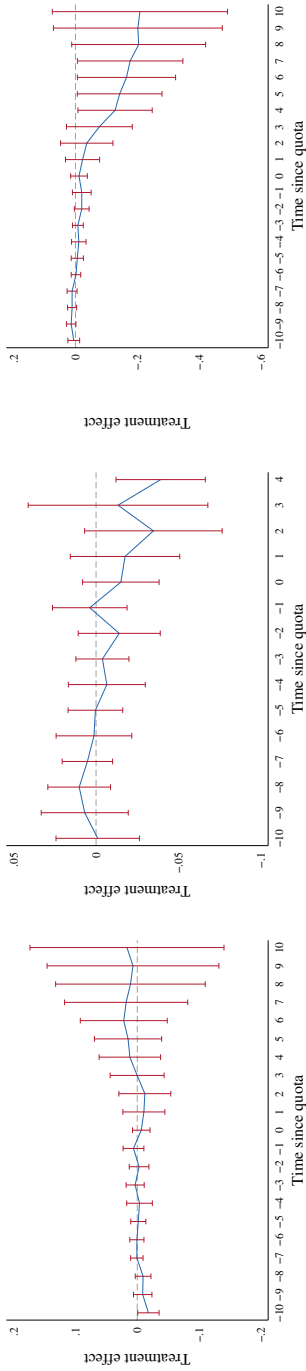


FIGURE A8. Country-specific changes in women in parliament after reserved seat quotas. In each panel, the vertical lines display the recorded date of the passage of a reserved seat quota for women in the national parliament, and the plots show the evolution of the percentage of women in parliament. Each figure shares a common y-axis for ease of comparison.

### Panel A: By Quota Size

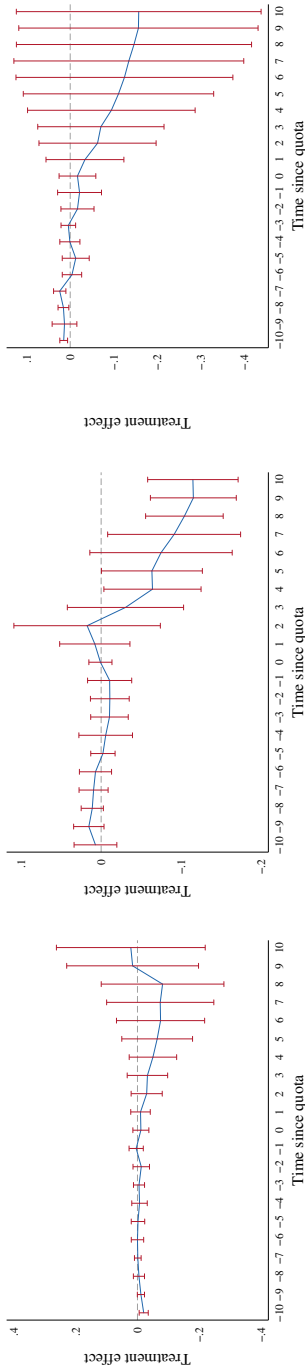


(A) Quota Size: 0-10

(B) Quota Size: 10-20

(C) Quota Size: 20-30

### Panel B: By Baseline Rates of Maternal Mortality



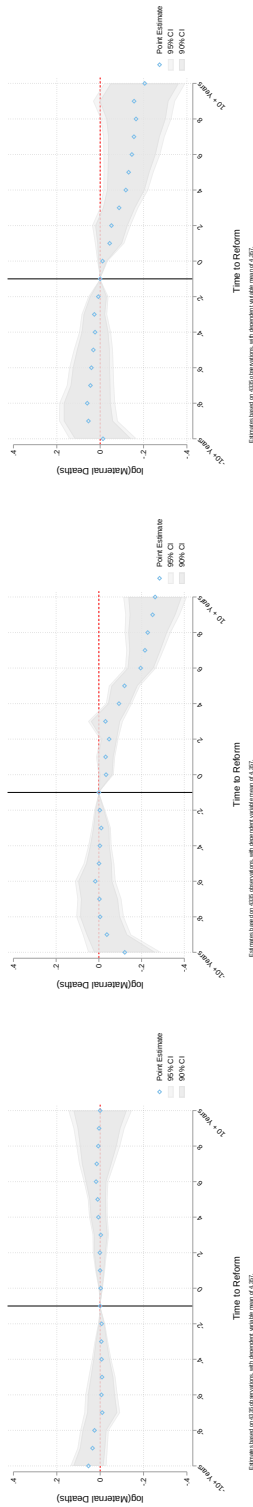
(D) "Low" baseline Rates (MMR <400)

(E) "Medium" baseline Rates (MMR [400,800))

(F) "High" baseline Rates (MMR ≥800)

FIGURE A9. Impact of quotas on MMR by size of gender quota (DID<sub>M</sub> estimates), de Chaisemartin and D'Haultfœuille (2020) DID<sub>M</sub> estimates are presented separately for countries with a different proportion of seats reserved in their quota (Panel A) or with different rates of maternal mortality at baseline (Panel B). These are presented in three bins. Bins approximately separate quota countries into three evenly sized groups. Baseline rates of maternal mortality are calculated as average values in countries prior to the year 2000. Each set of coefficients is estimated as separate DID<sub>M</sub> models, removing all quota countries which are not classified as part of that group, and using all non-quota countries as untreated controls. Remaining details follow Figure 2.

Panel A: By Quota Size

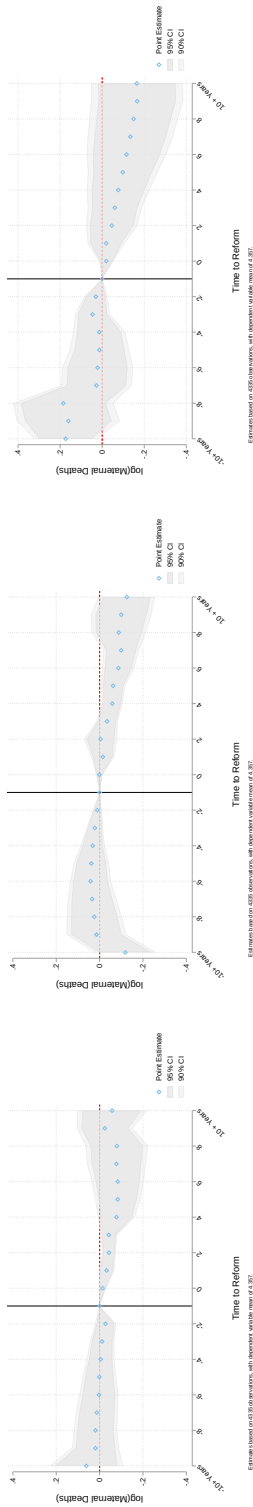


(A) Quota Size: 0-10

(B) Quota Size: 10-20

(C) Quota Size: 20-30

Panel B: By Baseline Rates of Maternal Mortality



(D) "Low" baseline Rates (MMR <400)

(E) "Medium" baseline Rates (MMR [400,800))

(F) "High" baseline Rates (MMR ≥800)

FIGURE A10. Impact of quotas on MMR by size of gender quota (event study models). Event study estimates are presented separately for countries with a different proportion of seats reserved in their quota (Panel A) or with different rates of maternal mortality at baseline (Panel B). These are presented in three bins. Bins approximately separate quota countries into three evenly sized groups. Baseline rates of maternal mortality are calculated as average values in countries prior to the year 2000. Each set of coefficients is estimated in a single event study (one in Panel A and one in Panel B), and so are conditional on all other groups in the panel. In each case, the baseline group consists of countries which do not implement a quota. Remaining details follow Figure A6

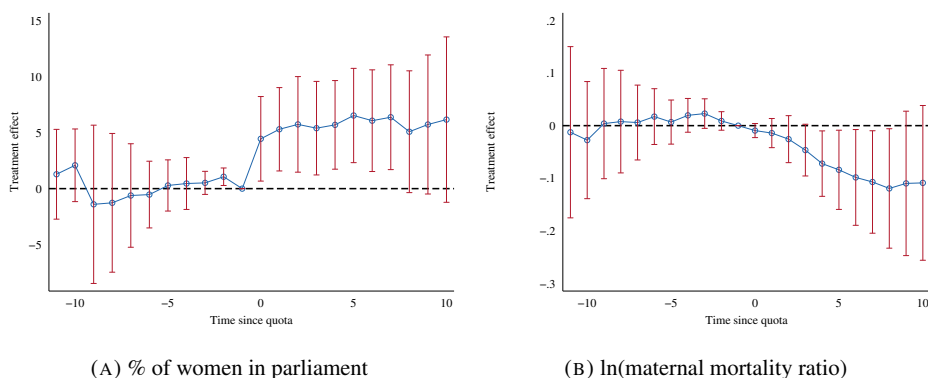


FIGURE A11. de Chaisemartin and D'Haultfoeuille (2022)'s  $DID_M$  estimator with long placebos. Results replicate those in Figure 2, however now using 'long placebos' described in de Chaisemartin and D'Haultfoeuille (2022) which consider movements in pre-periods consistently coared with period -1, rather than short placebos based on movements of one period (eg from -5 to -4, or -3 to -2) during the pre-treatment period. Post-treatment estimators are identical in both cases.

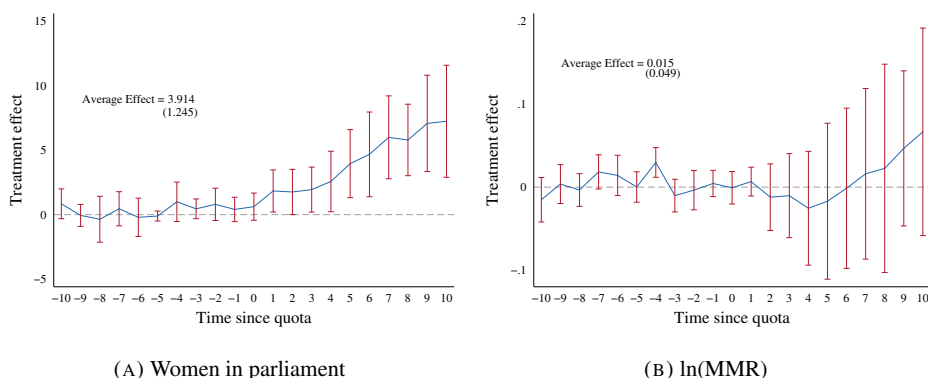


FIGURE A12. Candidate list quotas:  $DID_M$  estimates for women in parliament and maternal mortality. Identical specifications are estimated as in Figure 2 panels (a) and (b), however now with countries passing candidate list quotas. Average post-quota estimates and their block bootstrapped standard errors are provided in text on the plot. Countries implementing candidate list quotas in the period under study are Albania, Angola, Argentina, Armenia, Belgium, Bolivia, Bosnia and Herzegovina, Brazil, Burkina Faso, Costa Rica, Croatia, Dominican Republic, Ecuador, El Salvador, France, Greece, Guinea, Guyana, Honduras, Indonesia, Ireland, South Korea, Kyrgyz Republic, Lesotho, Macedonia, Mauritania, Mexico, Mongolia, Montenegro, Nepal, Nicaragua, Panama, Paraguay, Peru, Poland, Portugal, Senegal, Serbia, Slovenia, Spain, Tunisia and Uruguay.

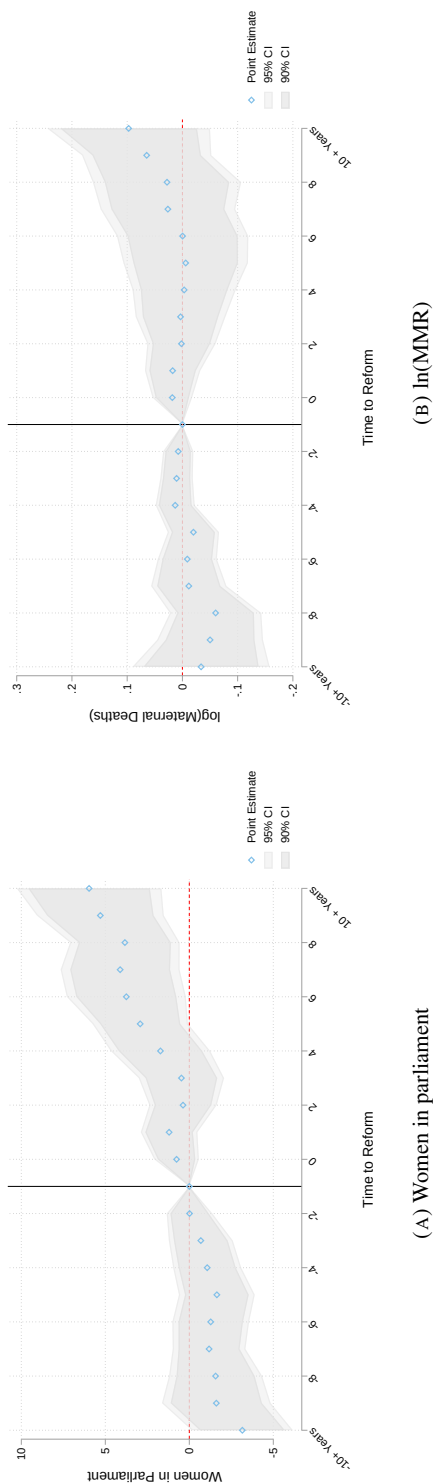


FIGURE A13. Candidate list quotas: event studies for women in parliament and maternal mortality. Identical specifications are estimated as in Figure A6, however now with countries passing candidate list quotas. Difference-in-difference estimates from a single-coefficient model suggest an increase in 1.776 (standard error 2.172) in the proportion of women in parliament following reserved seat quotas, and a reduction of 0.017 (standard error 0.071) in log(MMR). Countries implementing candidate list quotas in the period under study are provided in notes to Figure A12.

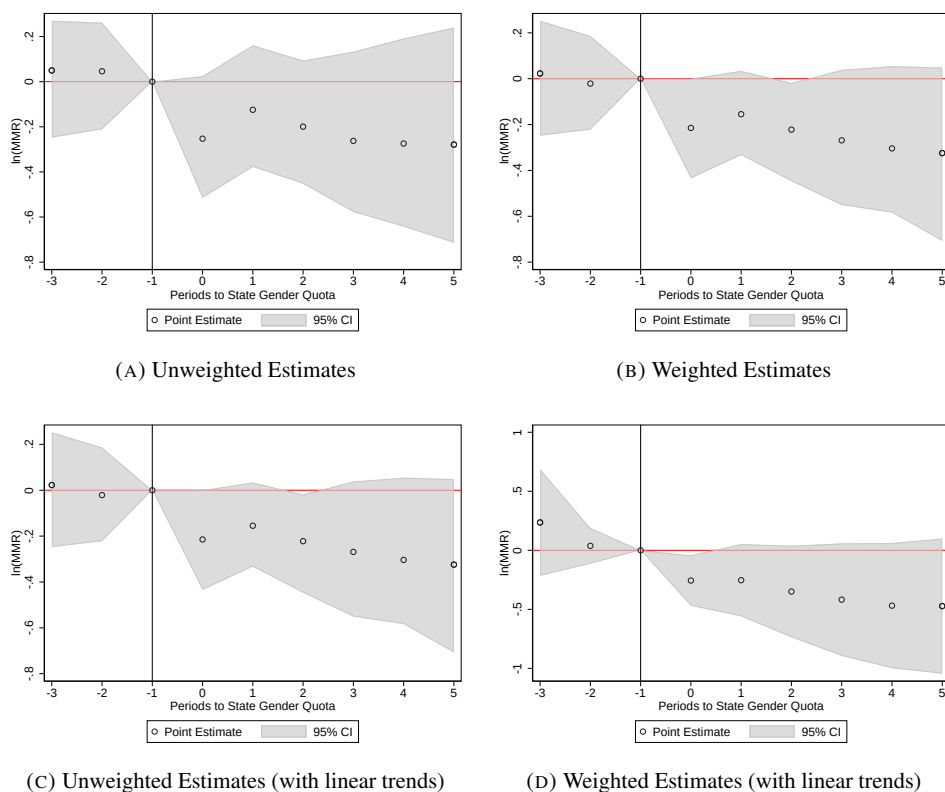


FIGURE A14. Event study analysis of reserved seats for women in large Indian states. Event studies are conducted using all available state-level estimates of maternal mortality in India, which are generated provided in the Office of the Registrar General & Census Commissioner's Sample Registration System (SRS) Bulletins. State level reforms refer to the reservation of seats for women in local councils, as described in Iyer et al. (2012). All standard errors are based on wild bootstrapped clustered standard errors (clustered by state), given the relatively low number of states.

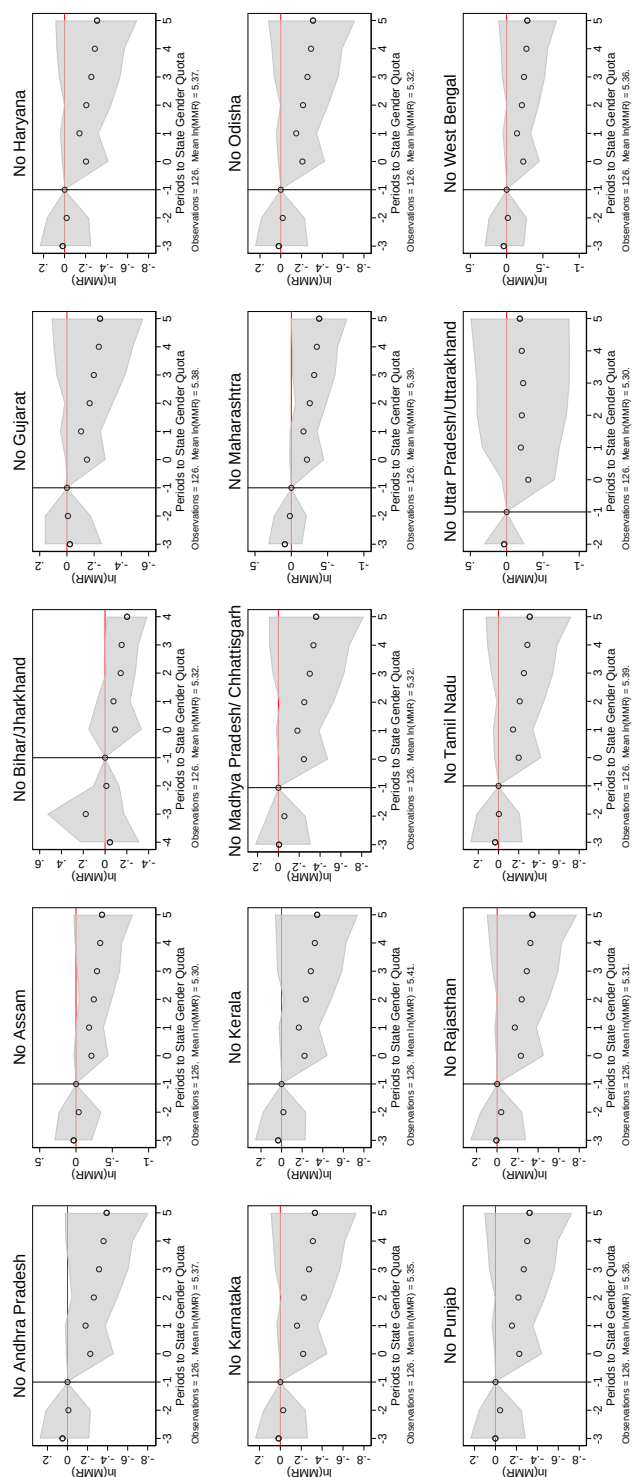


FIGURE A15. Leave-one-out event study estimates (India state reforms). Refer to notes to Figure A14. Here identical event studies are estimated, however removing one state in each case on a leave-one-out basis. The left-out state is indicated in each subplot's title.

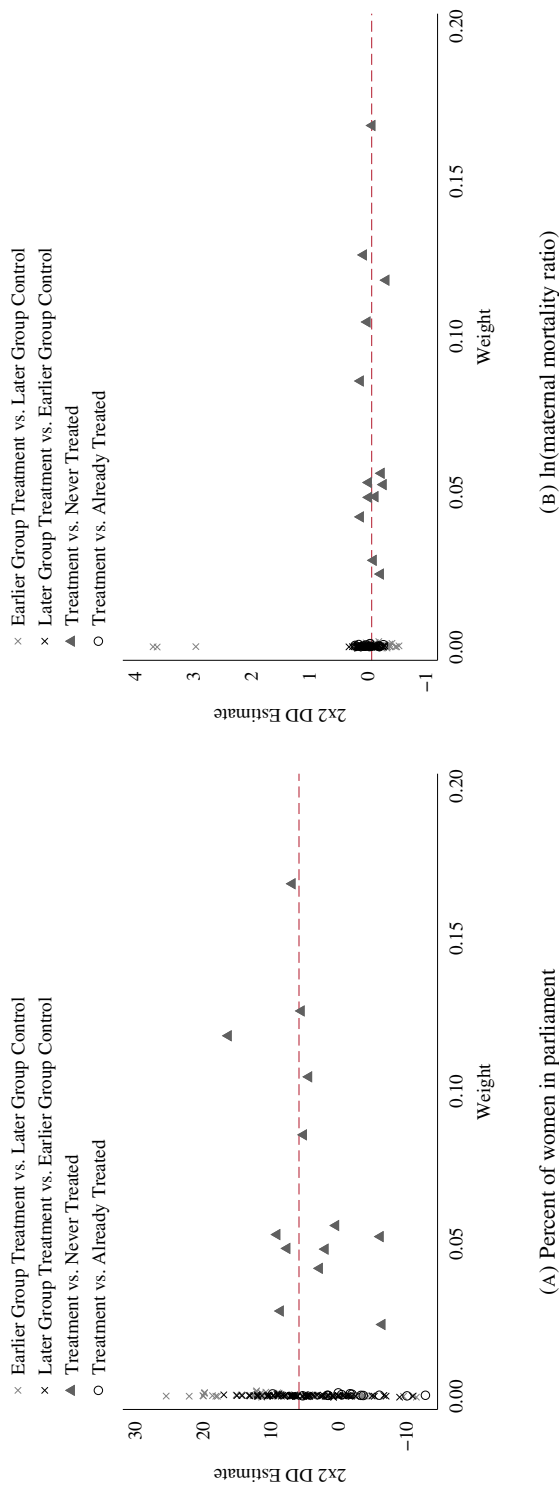


FIGURE A16. Goodman-Bacon (2021) decomposition based on  $2 \times 2$  difference-in-difference models. Figures document the Goodman-Bacon decomposition into a series of  $2 \times 2$  difference-in-differences models depending on the type of comparison unit. Plotted  $\times$  symbols represent cases where identification is drawn from timing-only comparisons. Darker shaded  $\times$  symbols represent comparisons between earlier-treated units (as treatment) and later-treated units (as controls). Lighter shaded  $\times$  symbols represent (problematic) comparisons between later-treated units (as treatment) and earlier treated units (as controls). Triangular symbols represent comparisons between treated (quota adopters) versus untreated pure controls (never adopters), with alternative estimates depending on the timing of adoption. Finally, a small number of hollow circles represent comparisons between units which adopted quotas before the beginning of the panel versus units which later became treated. Here each point on the graph considers an alternative adoption time period. The global decomposition for each of these four groups is given in Table A5.

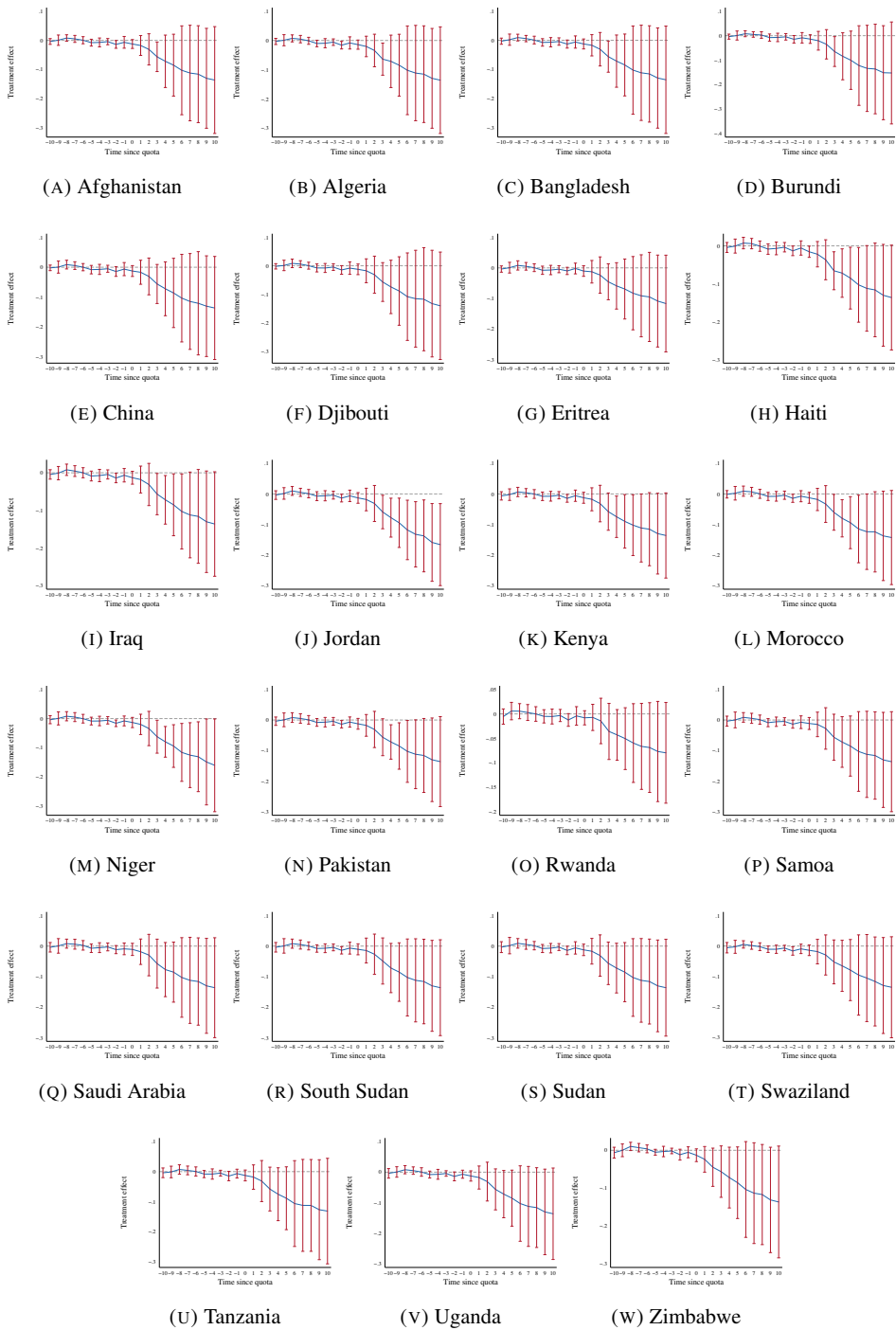


FIGURE A17. Leave-one-out analysis: maternal mortality. Plots replicate panel (b) of Figure 2, however leave out one quota-adopting country at a time. The title of each plot refers to the country which is removed when estimating each  $DID_M$  model. All additional details follow the model presented in Figure 2.

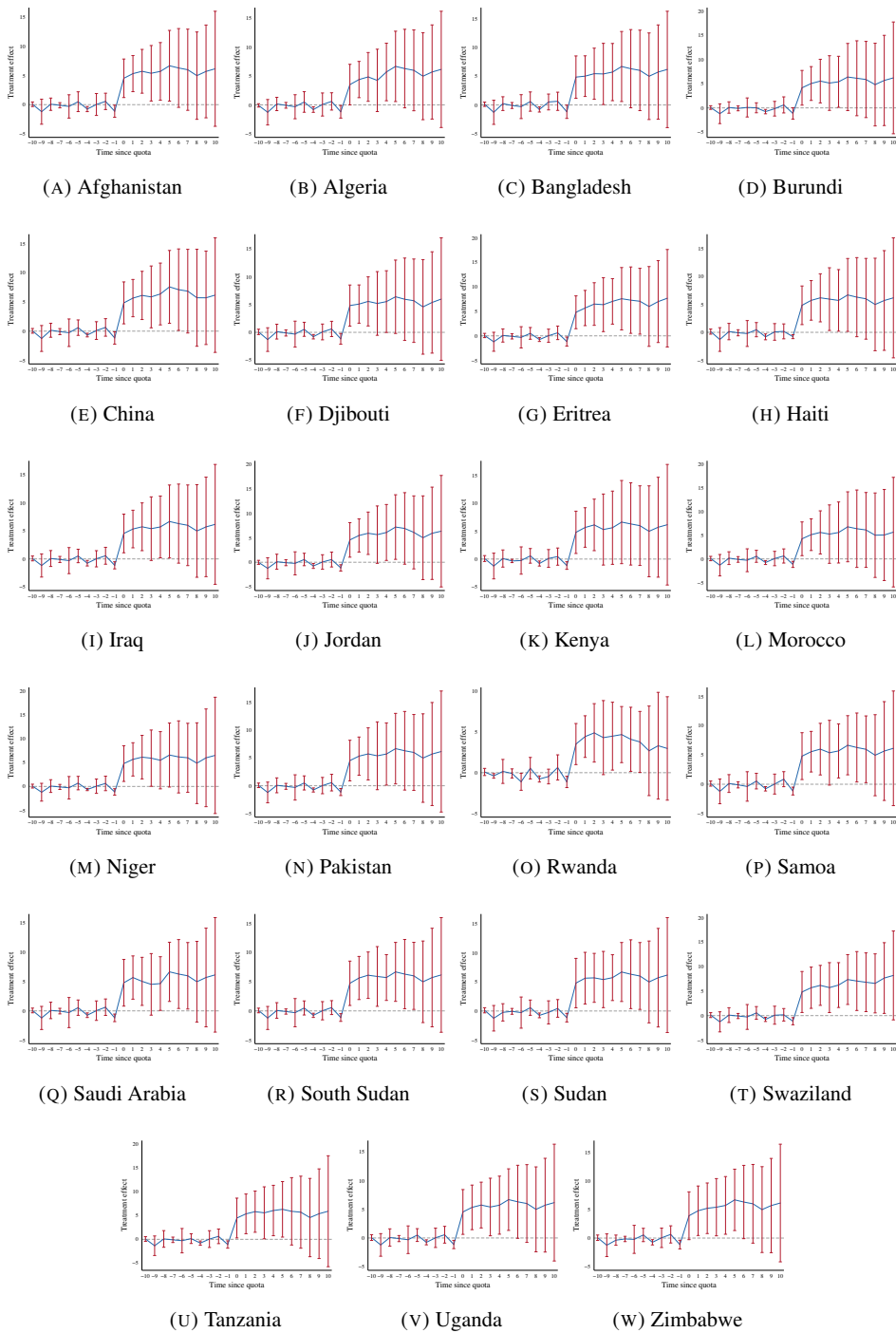


FIGURE A18. Leave-one-out analysis: women in parliament. Plots replicate panel (a) of Figure 2, however leave out one quota-adopting country at a time. The title of each plot refers to the country which is removed when estimating each  $DID_M$  model. All additional details follow the model presented in Figure 2.

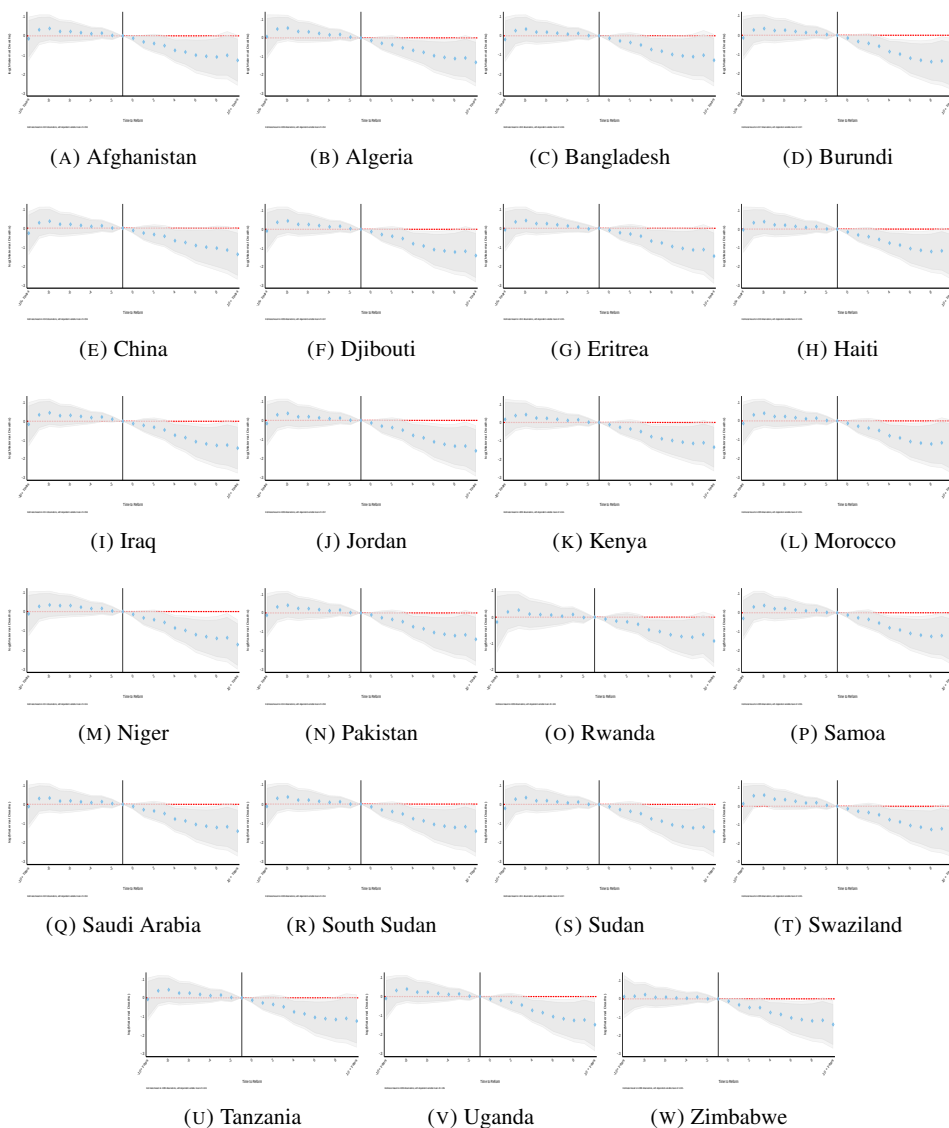


FIGURE A19. Leave-one-out analysis: maternal mortality. Plots replicate panel (a) of Figure A6, however leave out one quota-adopting country at a time. The title of each plot refers to the country which is removed when estimating each DIDM study model. All additional details follow the baseline model presented in Figure A6.

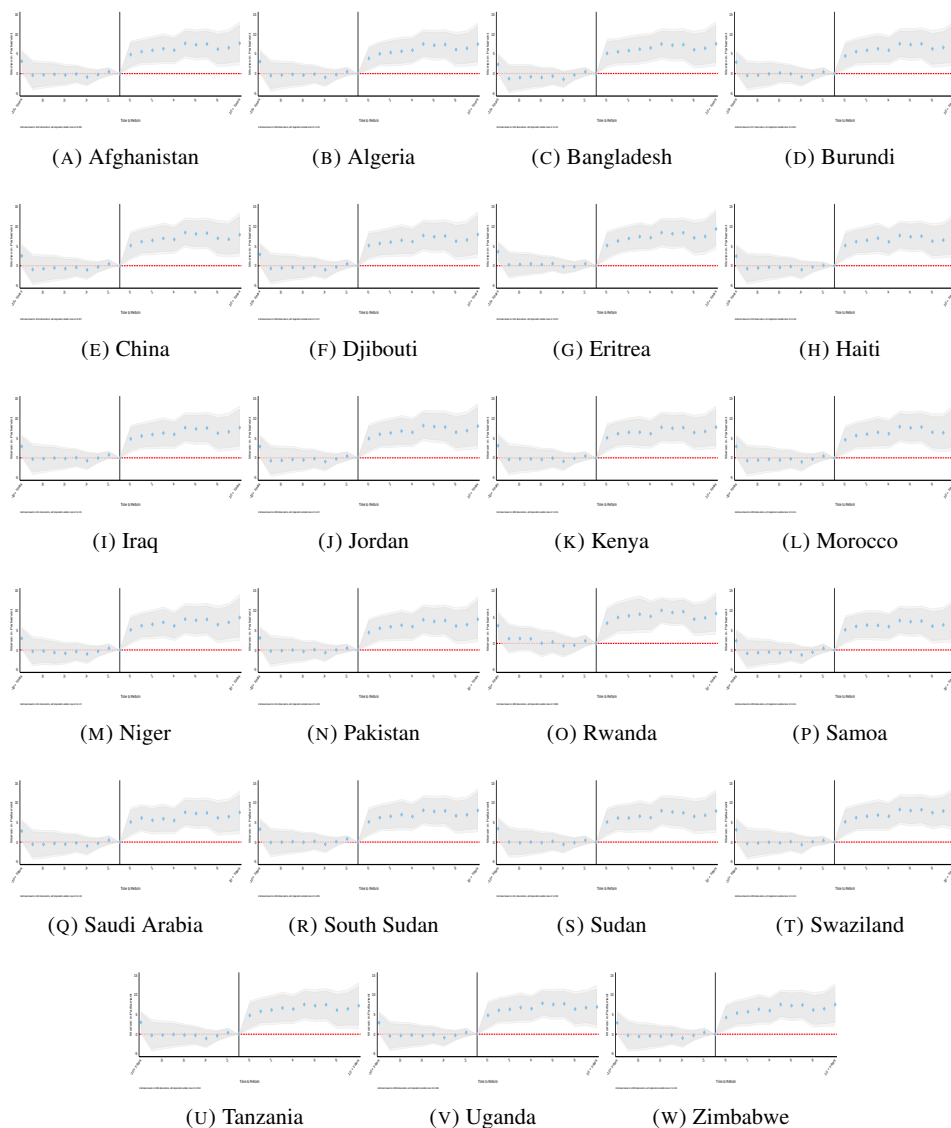


FIGURE A20. Leave-one-out analysis: women in parliament. Plots replicate panel (b) of Figure A6, however leave out one quota-adopting country at a time. The title of each plot refers to the country which is removed when estimating each event study model. All additional details follow the baseline model presented in Figure A6.

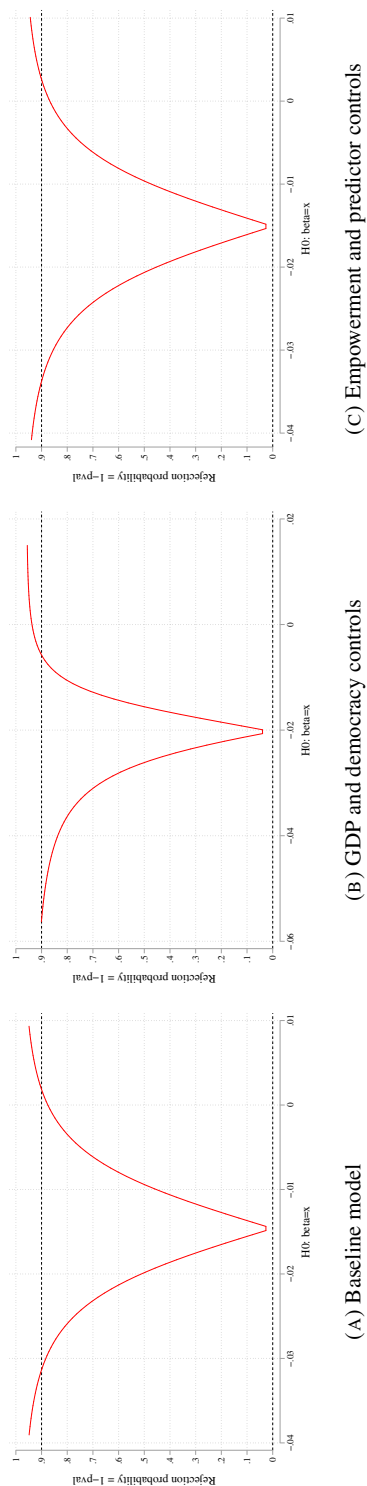
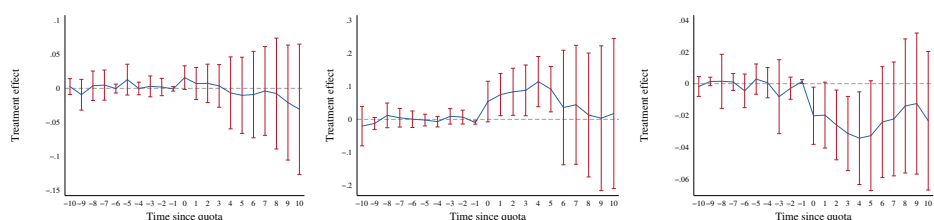
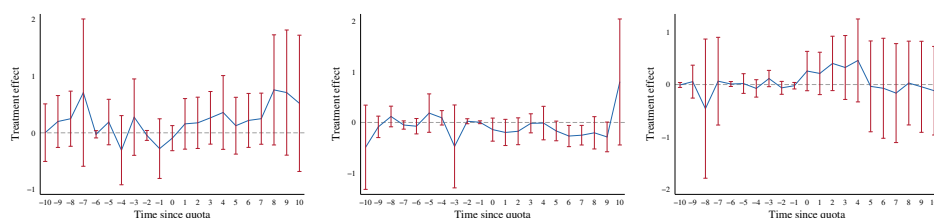


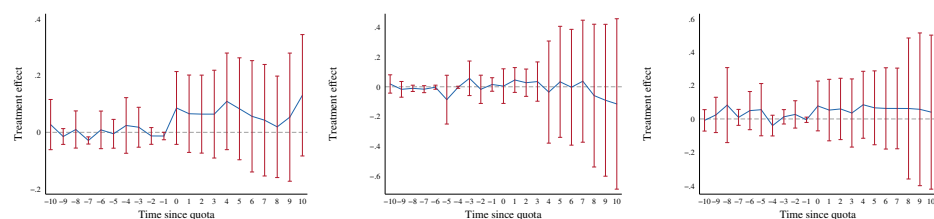
FIGURE A21. Weak-IV Robust Rejection Levels. The graphs plot the rejection probabilities of null hypotheses estimated in IV models described in Table A6, where the horizontal axis plots the (hypothesised) value of the population parameter, and the vertical axis reports the rejection probability of the null that the population parameter is equal to the value on the horizontal axis, robust to weak instruments following Anderson-Rubin. The plot shows which parameters can be rejected at the 90% level based on the A-R test— any part of the red curve above the dashed black line is a null that can be rejected, even if the IV is weak. The Anderson Rubin confidence sets described in Table A6 correspond to all values for which the null cannot be rejected (values for which the rejection curve falls below the dashed line). Plots are generated based on Finlay et al. (2013).



(A) Women's Civil Liberties Index (B) Women's Political Participation Index (C) Exclusion by Gender Index



(D) Relative Freedom of Movement for Women (E) Relative Access to Justice for Women (F) Relative Freedom of Discussion for Women



(G) Power distributed by gender (H) Freedom from forced labor for women (I) Property rights for women

FIGURE A22. de Chaisemartin and D'Haultfœuille estimates: women's rights and social standing from "Varieties of Democracy" data. de Chaisemartin and D'Haultfœuille (2020)  $DID_M$  estimates examine the variation of measures of women's rights and measures of relative social standing based on data collected in the Variety of Democracy dataset (Coppedge et al., 2020b). When generating ratios of women to male outcomes (in panels (d)-(f)) these are Winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles to avoid outliers in cases where the denominator is very small. We follow suggested practices in removing a small number of observations which are coded by 3 or fewer country experts (Coppedge et al., 2020b) in "C" type variables from the VDEM data which are based on the opinions of country experts. Lead (placebo) and lag (dynamic) effects are estimated for each variable.

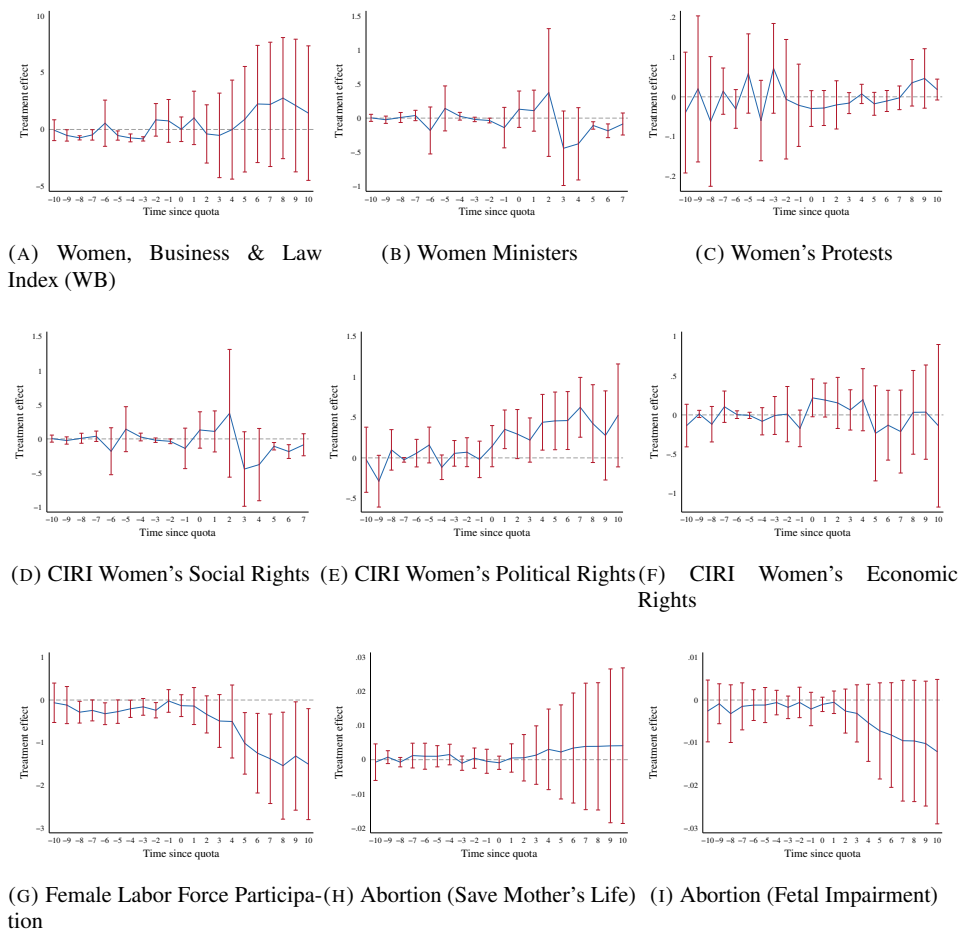


FIGURE A23. de Chaisemartin and D'Haultfœuille estimates: women's rights, empowerment, and women in politics. de Chaisemartin and D'Haultfœuille (2020)  $DID_M$  estimates are presented, with outcomes describing women's rights, empowerment or measures of participation in politics. Panel (a) is a recently generated index provided by the World Bank capturing Women's participation in Business and Lawmaking. Women Minister data is drawn from Inter-Parliamentary Union (IPU) Women in Politics data, women's protests as a share of all protests are calculated from data shared by Bell et al. (2019). Rights indexes are additionally defined by Cingranelli et al., and used in panels (d)-(f). Female labor force participation is drawn from the World Development Indicators, and abortion laws are coded based on Elías et al. (2017).

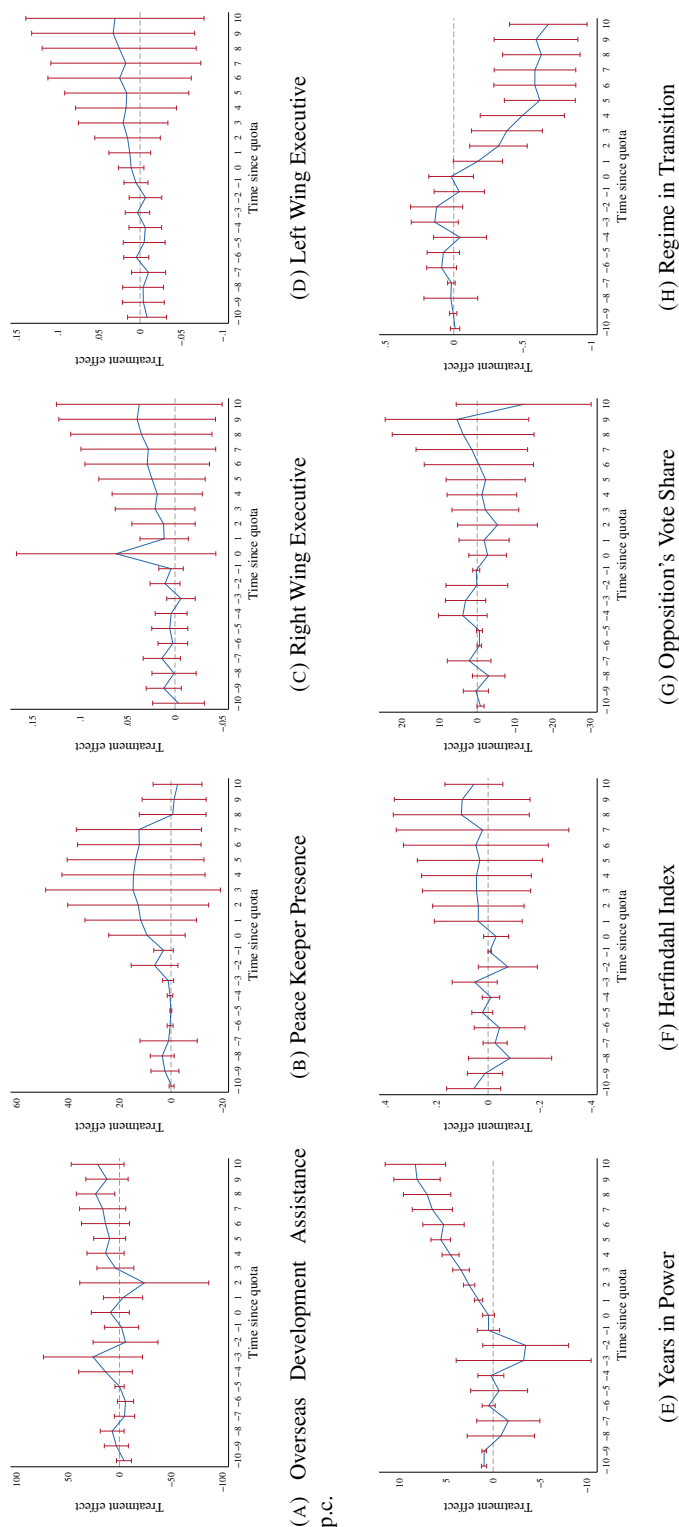


FIGURE A24. de Chaisemartin and D'Haultfœuille's  $DID_M$  estimator and predictors from political science literature. de Chaisemartin and D'Haultfœuille (2020)  $DID_M$  estimates of potential quota predictors suggested in the political science literature are displayed. All estimation details follow those described in notes to Figure 2. Overseas Development Assistance (ODA) is measured as per capita net inflows in current US dollars, and is generated from the World Bank Data Bank. Peacekeepers (measured in 1000s) are from the IPI Peacekeeping Database, and political measures including the orientation of leader's party, the leader's time in power, Herfindahl Index of parties, vote shares and regime types and changes are recorded by the Database of Political Institutions. Indicators for the executive's political leaning are coded from the Database of Political Institutions, based on a classification of leaders into left (31.4%), right (22.8%), center (7.4%) or not-applicable (38.4%).

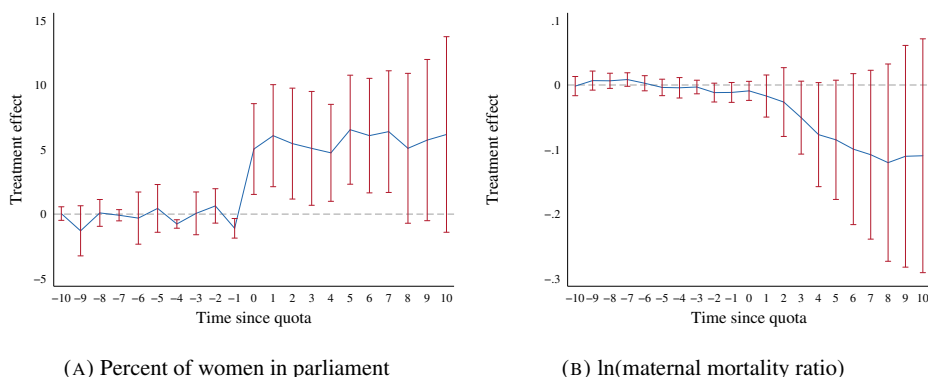


FIGURE A25.  $DID_M$  Estimates conditioning on potential quota predictors – gender quota impacts on women in parliament and maternal mortality. Plots present de Chaisemartin and D’Haultfœuille (2020)  $DID_M$  estimates replicating those in Figure 2, however now controlling for indexes constructed from baseline measures of 7 potential predictors of quota timing from the political science literature (Figure A49) and for 18 indicators of women’s rights (Figures A37, A38) interacted with post quota indicators. Two separate index  $\times$  post quota variables are constructed given different phenomena of interest: a first index considering quota predictors, and a second considering empowerment controls. Standard errors are based on a block bootstrap by country.

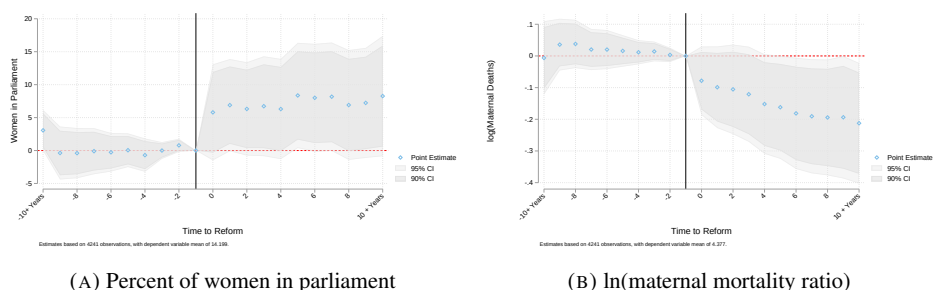


FIGURE A26. Conditioning on potential quota predictors – gender quota impacts on women in parliament and maternal mortality. Event studies replicate those in Figure A6, however now controlling for indexes based on baseline measures of 7 potential predictors of quota timing from the political science literature (Figure A49) and for 18 indicators of women’s rights (Figures A37, A38) interacted with post quota indicators. Two separate index  $\times$  post quota variables are constructed given different phenomena of interest: a first index considering quota predictors, and a second considering empowerment controls. Point estimates of the lag and lead terms in the event study specification described in equation 1 are presented, along with their 95% confidence intervals. Estimates are conditional on country and year fixed effects. Time periods greater than 10 years from the reform date are displayed as a single “10 +” indicator. Standard errors are clustered by country. The omitted base category is taken as 1 year prior to the reform, indicated by the solid vertical line.

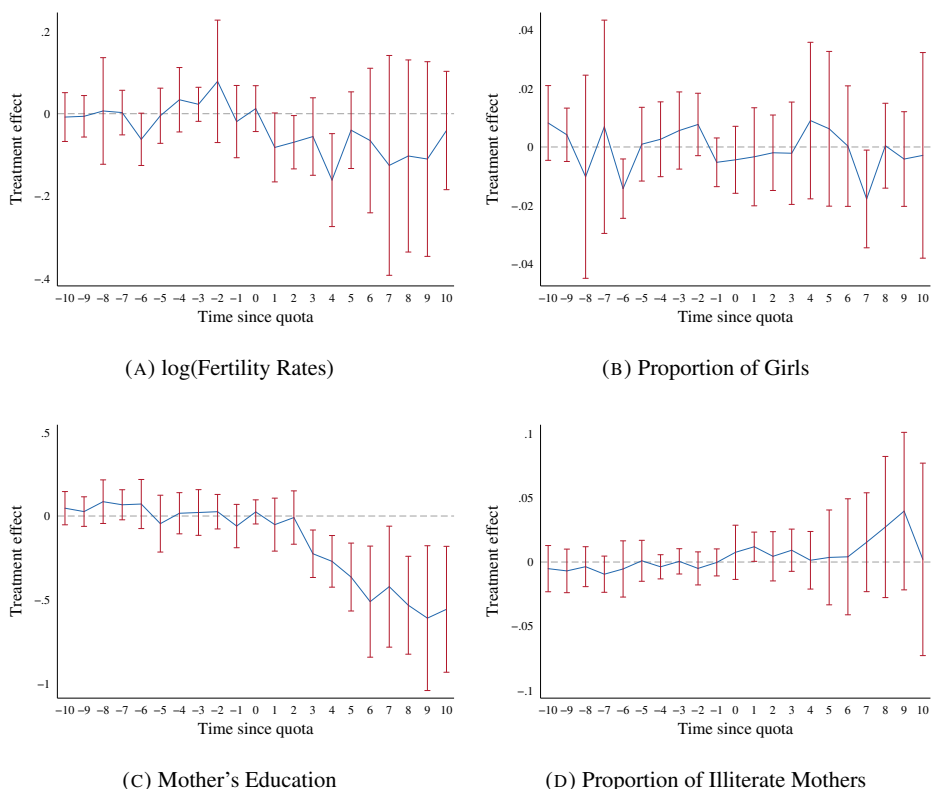


FIGURE A27. Characteristics of births and mothers:  $DID_M$  estimates from DHS birth pseudo-panel. de Chaisemartin and D'Haultfœuille (2020)  $DID_M$  estimates are presented based on country by year averages generated from a pseudo-panel of births created from Demographic and Health Survey data. Fertility rates refers to the log of the total fertility rate, calculated as the total number of births a woman would have if completing her fertile life based on current age-specific fertility rates. The proportion of girls refers to the proportion of girl births among all births. Mother's education refers to the average years of education of mothers (women having given birth) in each country and year. Proportion of illiterate mothers refers to the total proportion of all mothers (women having given birth) in each country and year who report not being able to read and write. All additional details follow notes to Figure 2.

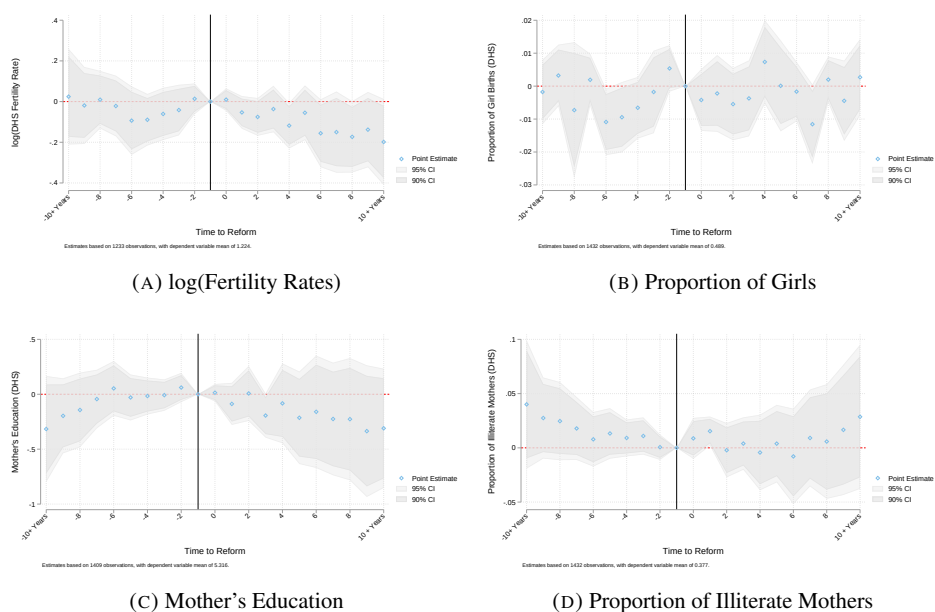


FIGURE A28. Characteristics of births and mothers: Event study estimates from DHS birth pseudo-panel. Event studies are estimated using country by year averages generated from a pseudo-panel of births created from Demographic and Health Survey data. Fertility rates refers to the log of the total fertility rate, calculated as the total number of births a woman would have if completing her fertile life based on current age-specific fertility rates. The proportion of girls refers to the proportion of girl births among all births. Mother's education refers to the average years of education of mothers (women having given birth) in each country and year. Proportion of illiterate mothers refers to the total proportion of all mothers (women having given birth) in each country and year who report not being able to read and write. All additional details follow notes to Figure A6.

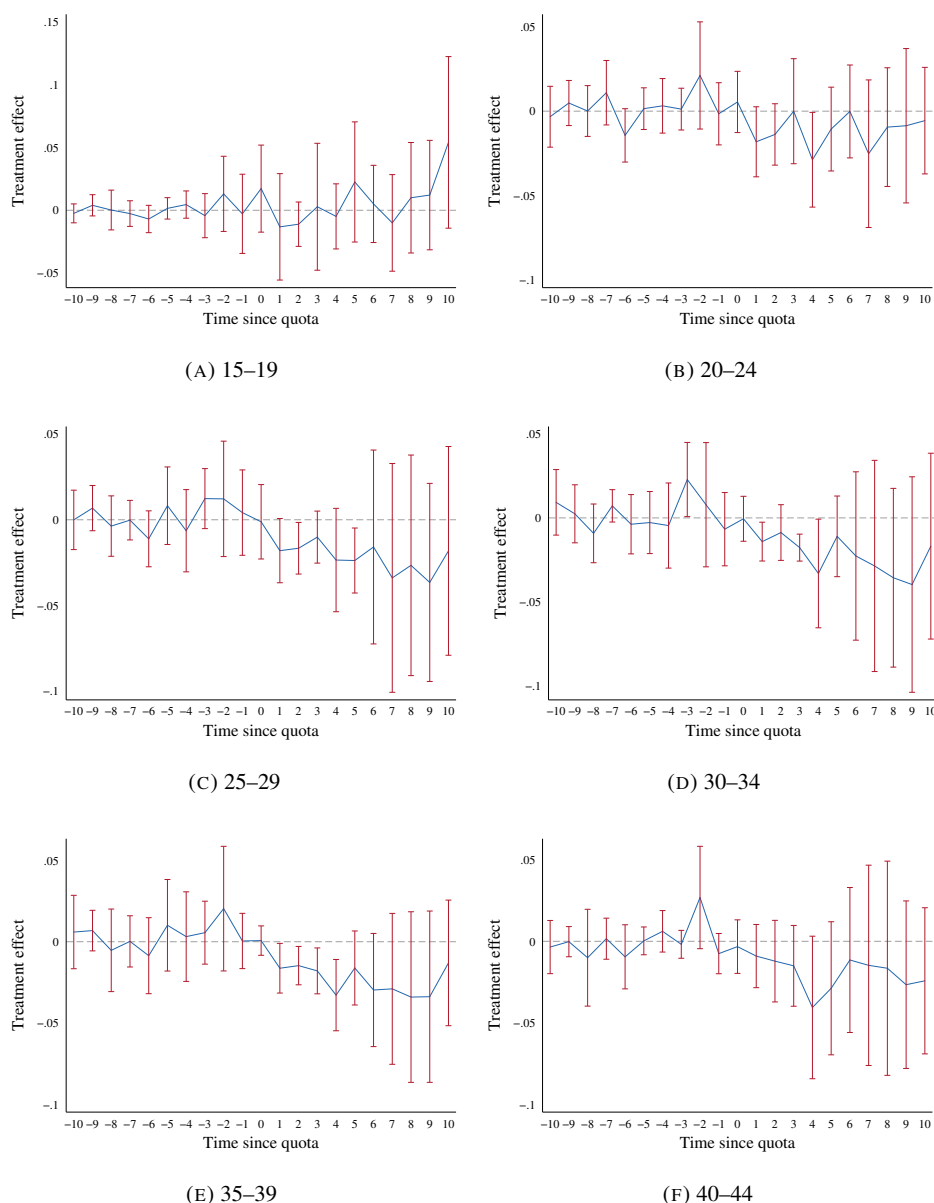


FIGURE A29. de Chaisemartin and D’Haultfœuille estimates for impacts of gender quotas on age-specific birth rates calculated from DHS birth pseudo-panel. de Chaisemartin and D’Haultfœuille (2020)’s “ $DID_M$ ” models are estimated using country by year averages generated from a pseudo-panel of births created from Demographic and Health Survey data. Birth rates in each figure are calculated from birth indicators in the pseudo-panel based on women in each quinquennial age group in each country and year, where 1 indicates a surveyed woman (of this age) reported a birth in a given year, and 0 indicates they did not have a birth.

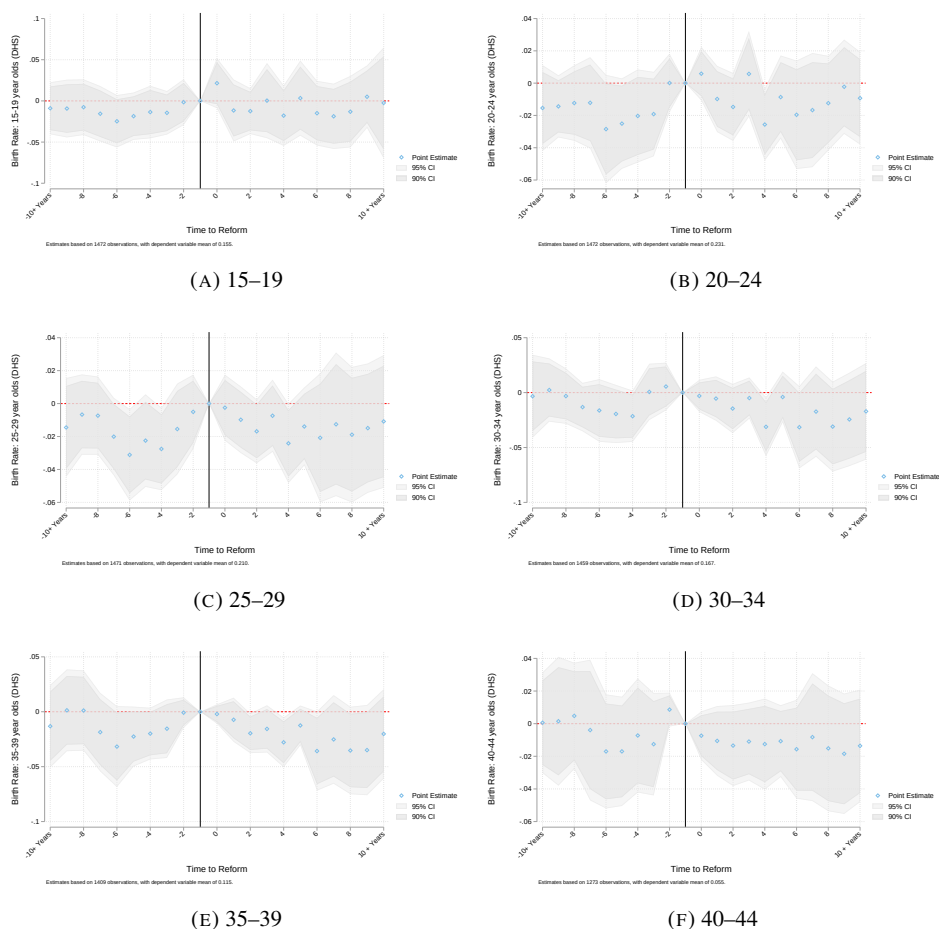


FIGURE A30. Age-specific birth rates calculated from DHS birth pseudo-panel. Event studies are estimated using country by year averages generated from a pseudo-panel of births created from Demographic and Health Survey data. Birth rates in each figure are calculated from birth indicators in the pseudo-panel based on women in each quinquennial age group in each country and year, where 1 indicates a surveyed woman (of this age) reported a birth in a given year, and 0 indicates they did not have a birth. Average birth rates across the full age range of 15–49 year-olds are documented in panel (a) of Figure A28.

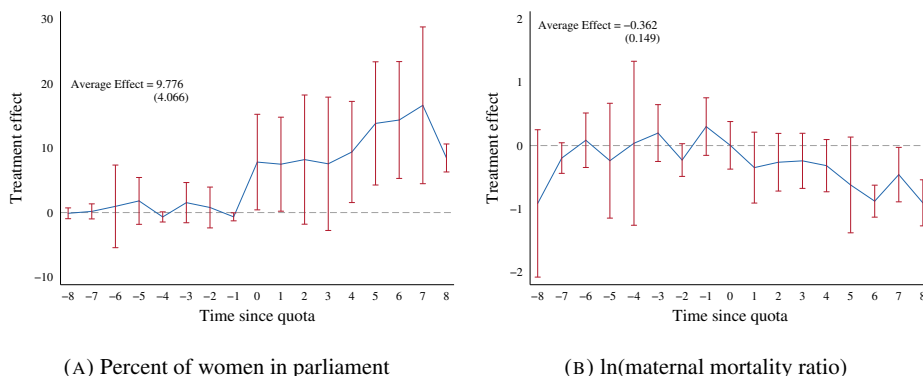


FIGURE A31. DHS microdata – gender quota impacts on women in parliament and MMR ( $DID_M$  Estimates). Specification replicates Figure 2, however now replacing world-wide estimates of MMR with maternal mortality calculated from microdata reports from the DHS.

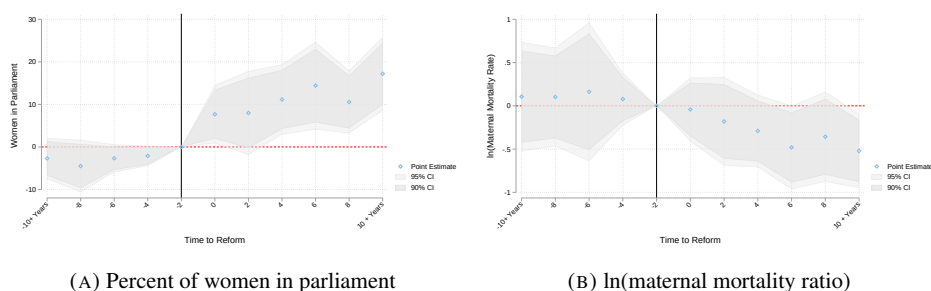


FIGURE A32. DHS microdata – gender quota impacts on women in parliament and MMR (event study estimates). Specification replicates Figure A6, however now replacing world-wide estimates of MMR with maternal mortality calculated from microdata reports from the DHS. As the DHS maternal mortality module is available in only a subsample of the DHS countries (44 of 68 countries with publicly available surveys), we estimate using 2 year lags/leads to reduce noise. Substantively similar results obtain if using yearly lags and leads.

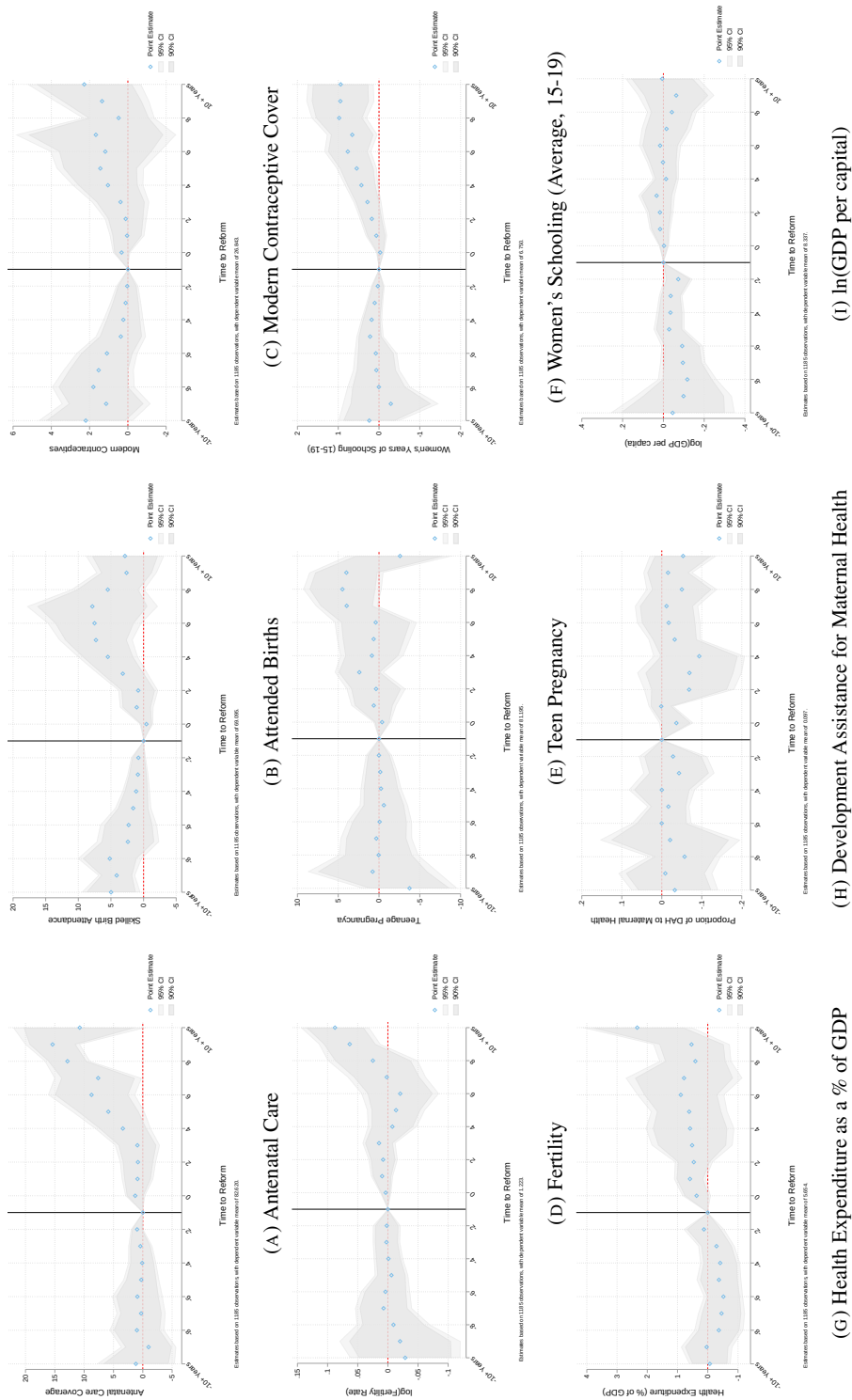


FIGURE A33. Mechanisms: event studies for impacts of gender quotas on intermediate outcomes based on a constant sample. Event study estimates of intermediate outcomes replicate those displayed in the paper in Figure A36. However here all models work with a common sample containing observations for each intermediate outcome considered. For additional notes, refer to Figure A36.

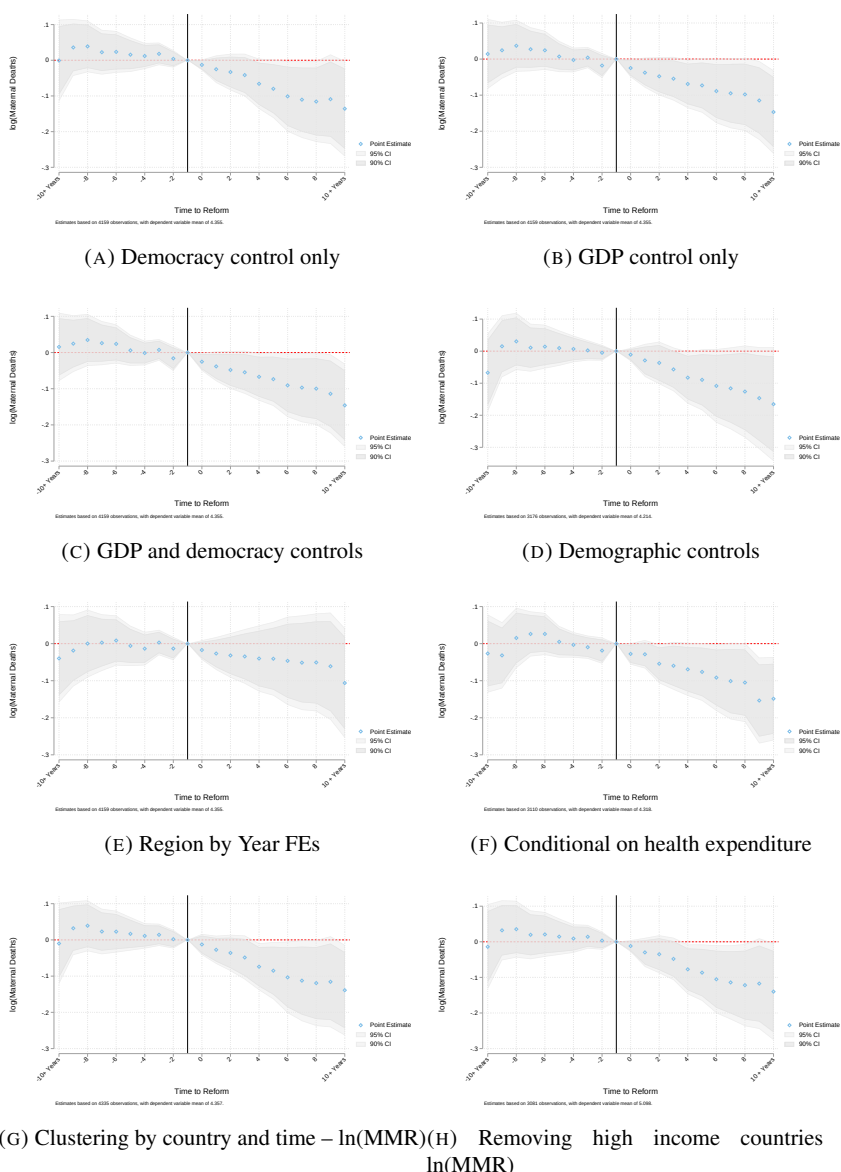
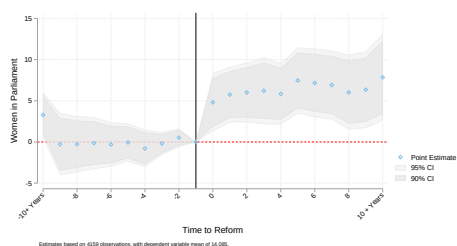
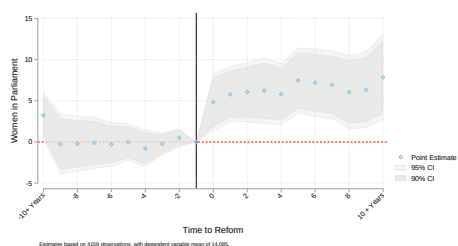


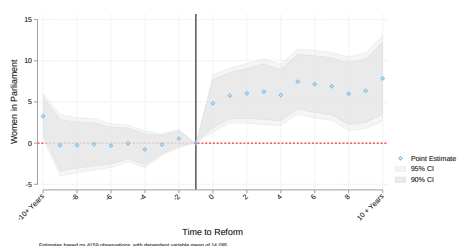
FIGURE A34. Alternative samples and specifications in quota event study (maternal mortality). Each panel documents an alternative specification of the event study shown in Figure A6 panel (a). Specifications are shown with alternative controls, estimation samples, or modelling choices. Demographic controls in panel (d) refer to time-varying controls of the education of fertile aged women, the proportion of the population in fertile ages, and the ethnic fractionalization of the population. Region by year FEs include separate year fixed effects for every sub-region based on the United Nations classification. Panel (f) additionally controls for health expenditure as a proportion of GDP, and Development Aid receipts for maternal health. Panel (g) estimates standard errors with double clustering (by country and year). Panel (h) removes high income countries from the control group. A static (2015) measure of high income is used to ensure consistency of the sample across years. Additional notes are provided in Figure A6.



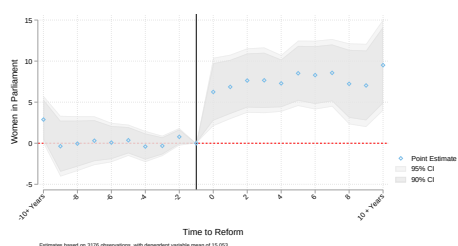
(A) Democracy control only



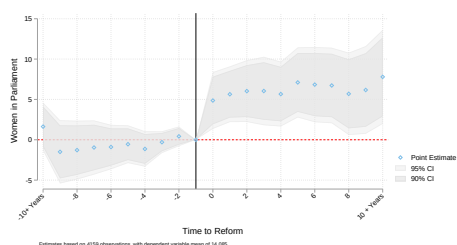
(B) GDP control only



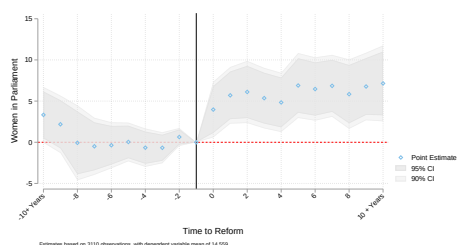
(C) GDP and democracy controls



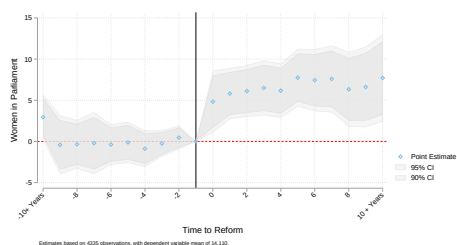
(D) Demographic controls



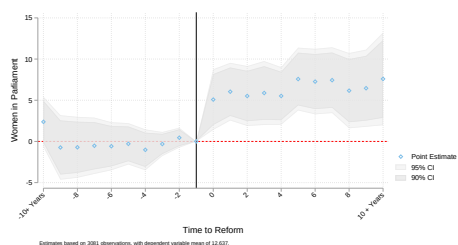
(E) Region by Year FEs



(F) Conditional on health expenditure



(G) Clustering by country and time – women in parliament



(H) Removing high income countries – women in parliament

FIGURE A35. Alternative samples and specifications in quota event study (women in parliament). Refer to notes to Figure A34. Identical plots or shown where the outcome is women in parliament.

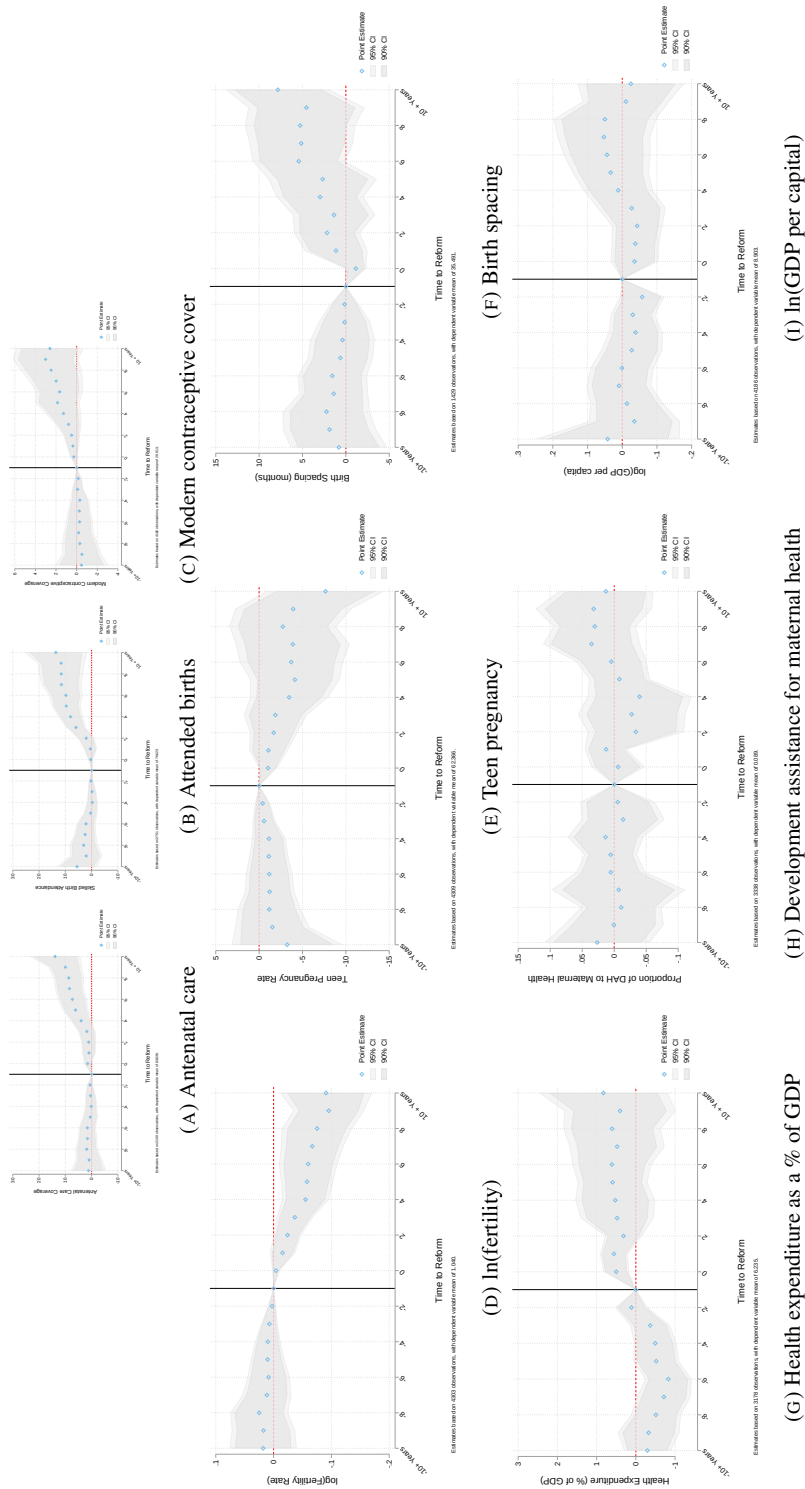


FIGURE A36. Mechanisms: Impacts of gender quotas on intermediate outcomes. Event-study estimates of intermediate outcomes replicate those from Figure 6, however now following specification 1. Estimates in Panels A and B use a linearly interpolated measure, event studies based on non-imputed values are available in Appendix Figure A54. All other details follow those of event studies in Figure A6, and variable definitions in Figure 6.

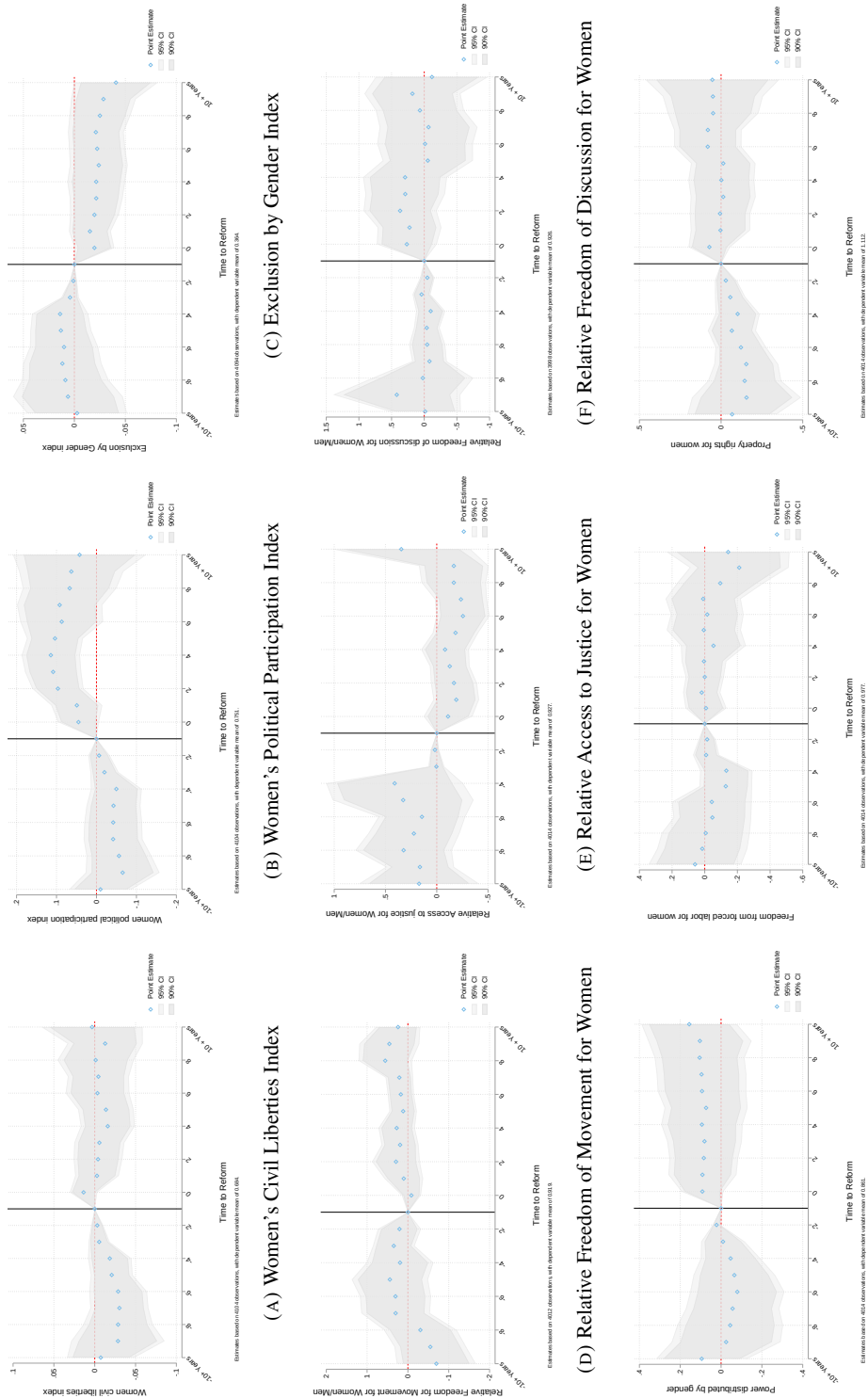


FIGURE A37. Event study estimates: Women's rights and social standing from "Varieties of Democracy" data. Refer to Notes to Figure A22. Here models based on identical outcome variables are estimated, however using the standard event study implementation described in equation 1.

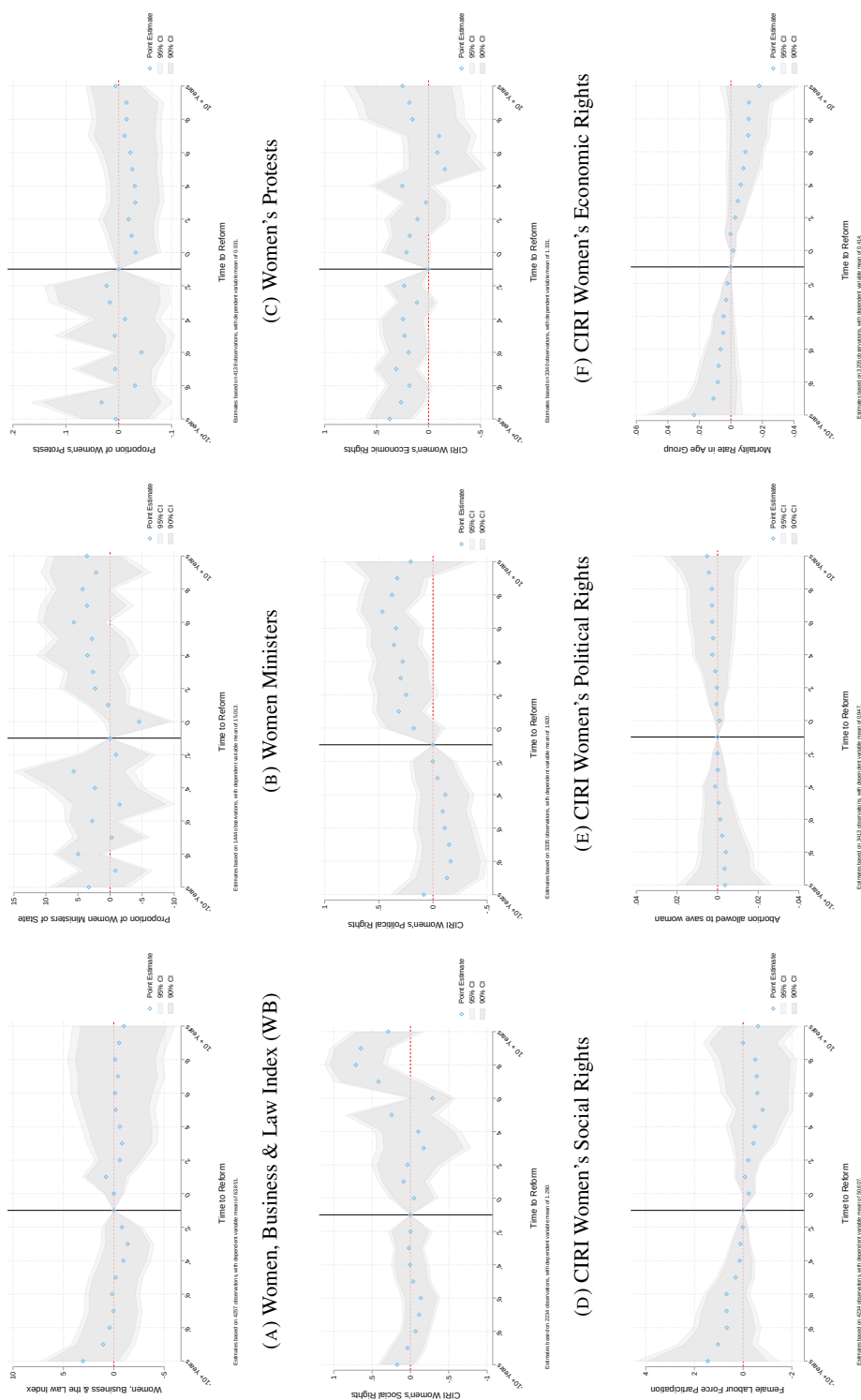
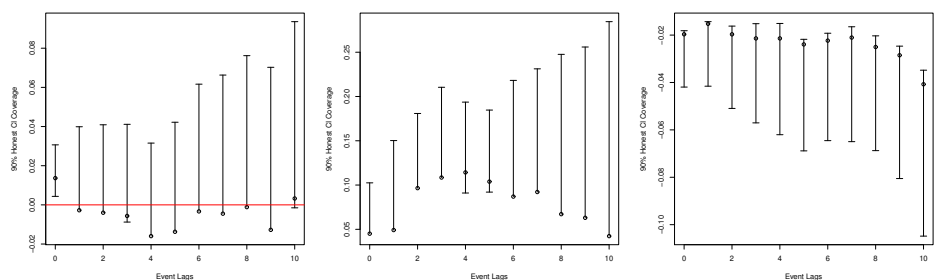
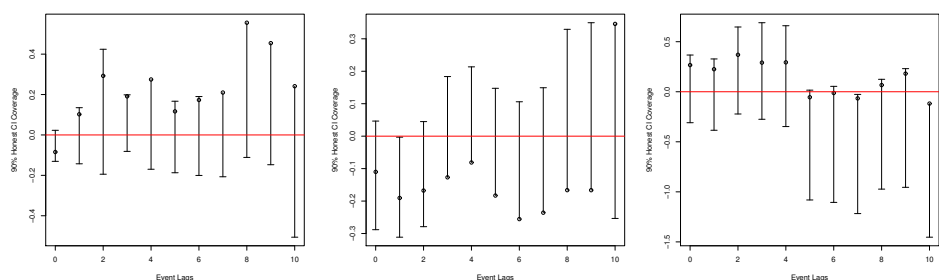


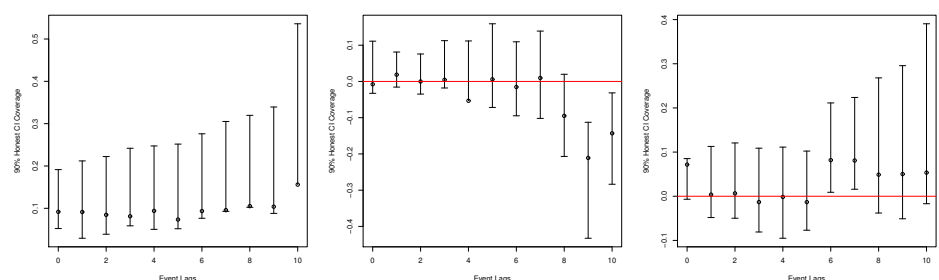
FIGURE A38. Event study estimates: Women's rights, empowerment, and women in politics. Refer to Notes to Figure A23. Here models based on identical outcome variables are estimated, however using the standard event study estimator following equation 1.



(A) Women's Civil Liberties Index (B) Women's Political Participation Index (C) Exclusion by Gender Index



(D) Relative Freedom of Movement for Women (E) Relative Access to Justice for Women (F) Relative Freedom of Discussion for Women



(G) Power distributed by gender (H) Freedom from forced labor for women (I) Property rights for women

FIGURE A39. Rambachan and Roth estimates: women's rights and social standing from "Varieties of Democracy" data. Refer to Notes to Figure A37. Here models based on identical outcome variables are estimated, however in this case, each post-quota coefficient from event study 1 is documented, along with valid inference under Rambachan and Roth (2020)'s "Honest DiD" methods. Additional notes are available in Figure 4.

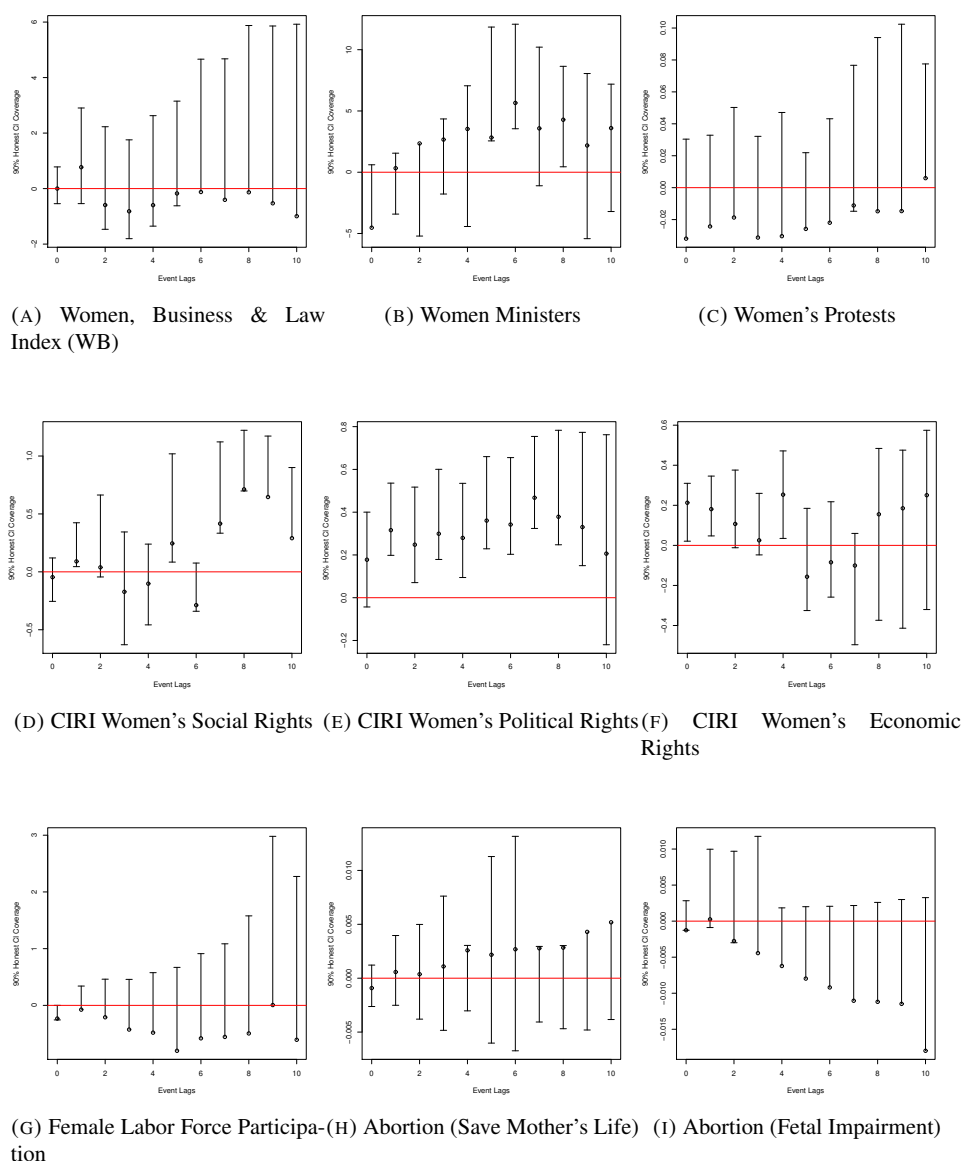


FIGURE A40. Rambachan and Roth estimates: women's rights, empowerment, and women in politics. Refer to Figure A38. Here models based on identical outcome variables are estimated, however in this case, each post-quota coefficient from event study 1 is documented, along with valid inference under Rambachan and Roth (2020)'s "Honest DiD" methods. Additional notes are available in Figure 4.

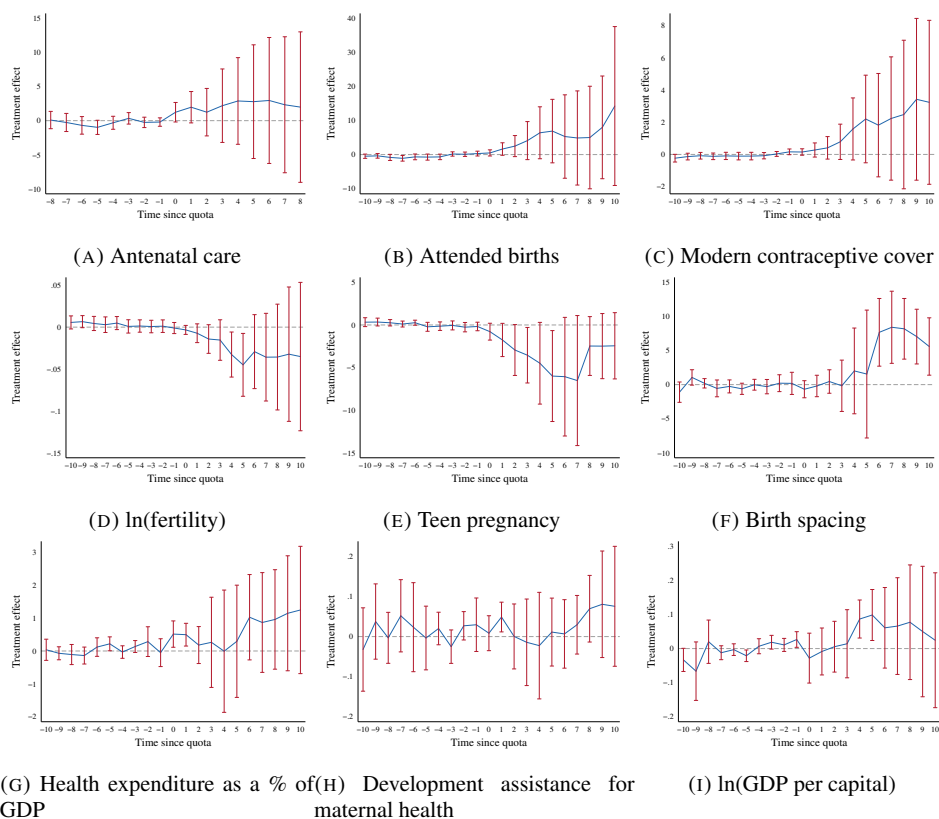
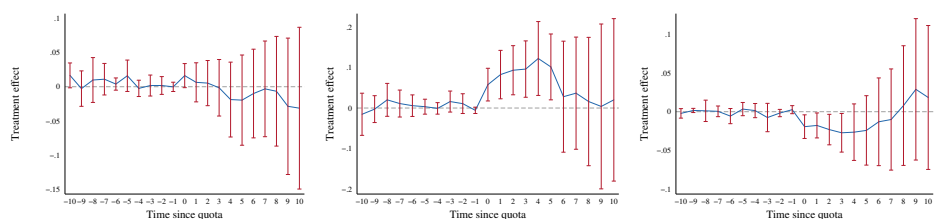
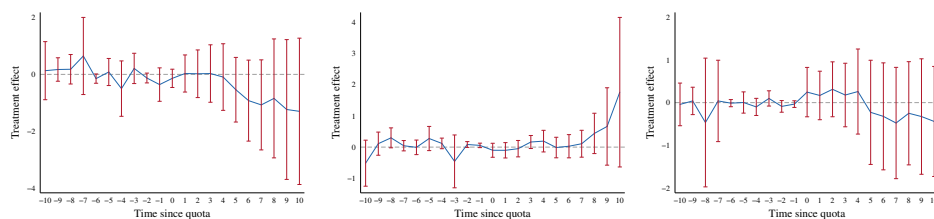


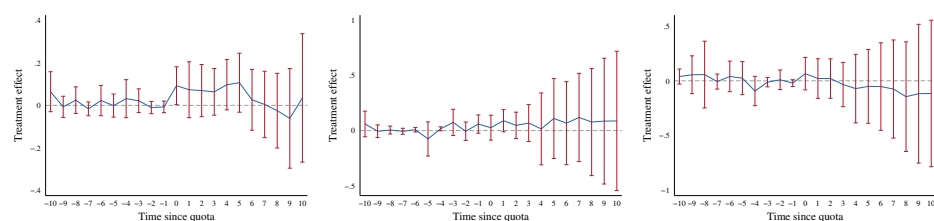
FIGURE A41. Mechanisms: de Chaisemartin and D'Haultfœuille estimates for impacts of gender quotas on intermediate outcomes with country-specific linear trends. Refer to notes to Figure 6. Identical models are estimated, however here including country-specific linear trends over time.



(A) Women's Civil Liberties Index (B) Women's Political Participation Index (C) Exclusion by Gender Index



(D) Relative Freedom of Movement for Women (E) Relative Access to Justice for Women (F) Relative Freedom of Discussion for Women



(G) Power distributed by gender (H) Freedom from forced labor for women (I) Property rights for women

FIGURE A42. de Chaisemartin and D'Haultfœuille estimates with country-specific time trends: women's rights and social standing from "Varieties of Democracy" data. Refer to notes to Figure A22. Identical models are estimated, however here including country-specific linear trends over time.

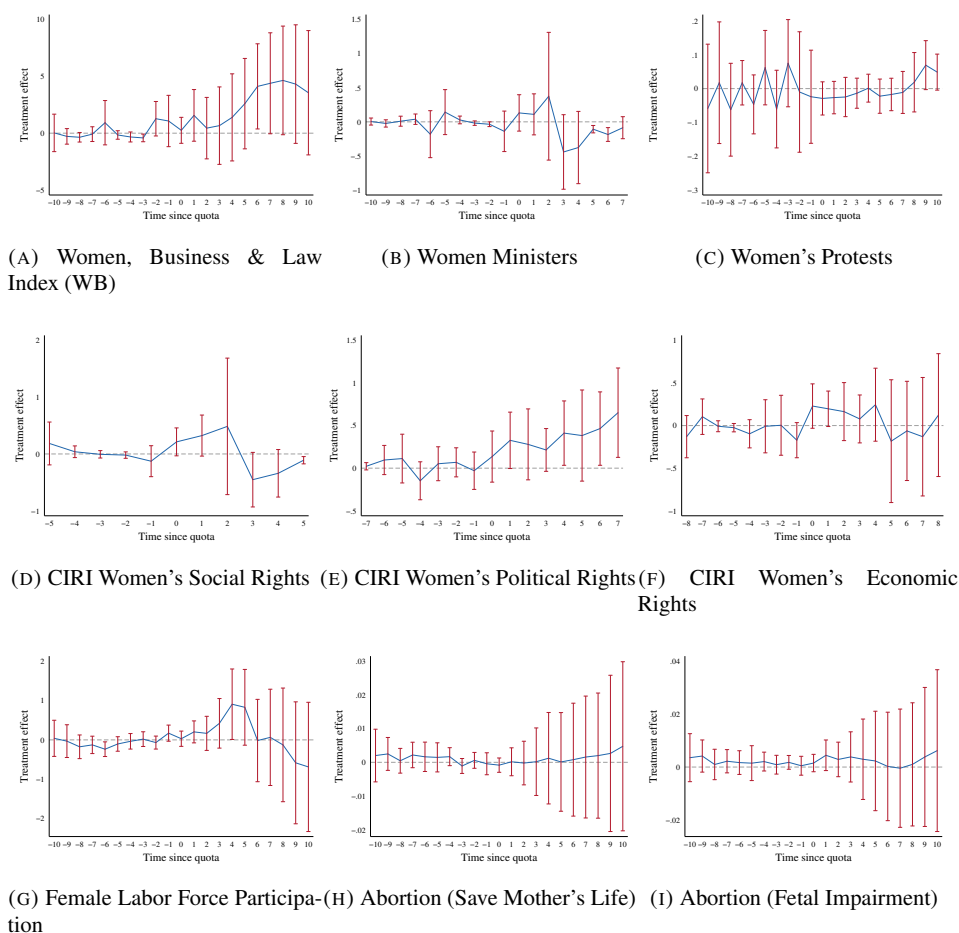


FIGURE A43. de Chaisemartin and D'Haultfœuille estimates with country-specific time trends: women's rights, empowerment, and women in politics. Refer to notes to Figure A23. Identical models are estimated, however here including country-specific linear trends over time.

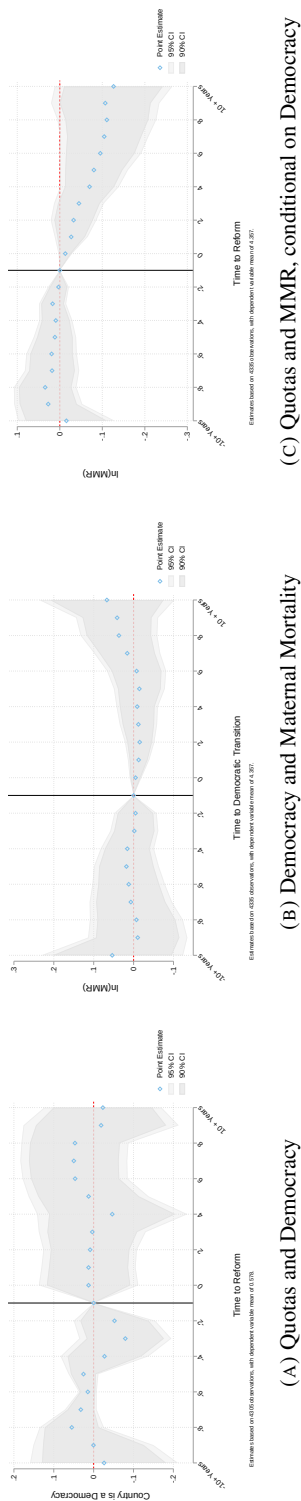


FIGURE A44. Quotas, Democratic Transitions and Maternal Mortality Declines – Event study estimates. Here we consider the potential role of democratization in observed impacts of quota adoption on maternal mortality. Left-hand panel estimates the impact of quota adoption on whether or not a country is classified as a democracy. Center panel estimates the impact of transition to a democracy (rather than quota adoption) on rates of maternal mortality. Right-hand panel reports the impacts of quota adoption on maternal mortality when additionally including as controls full lags and leads to the adoption of democracy in cases where countries are classified as moving from non-democratic to democratic. All other estimation details follow those in Figure A6.

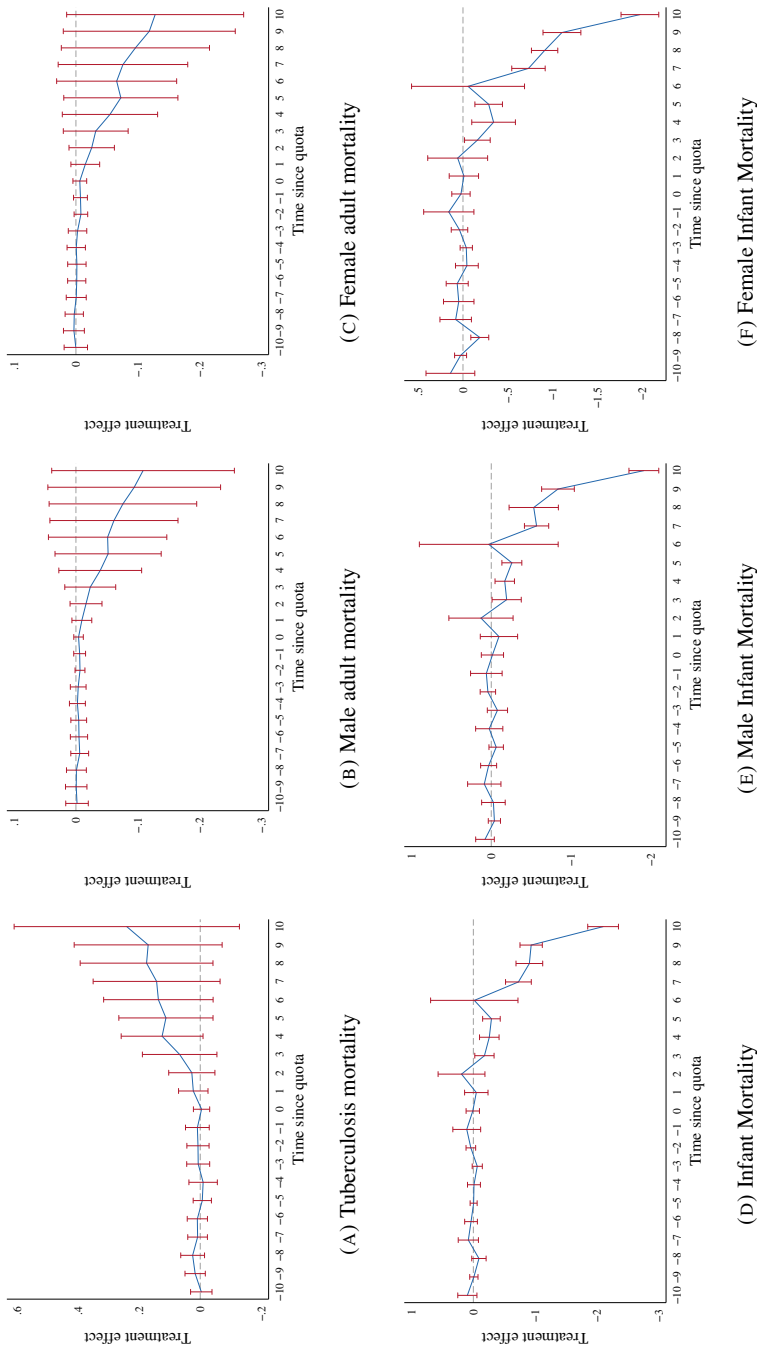


FIGURE A45. de Chaisemartin and D’Haultfœuille (2020)  $DID_M$  estimates for the impact of gender quotas on alternative health outcomes. Identical  $DID_M$  estimates are plotted to those in Figure 2, however examining quota impacts on alternative health outcomes. These outcomes are the rate of death due to TB per 100,000 individuals, and infant mortality per 1,000 live births, male mortality per 1,000 adult males (ages 15–60), and female mortality per 1,000 adult females (ages 15–60). For comparison with Figure A6d, the natural logarithm of each variable is used, with the exception of TB mortality, where an inverse sine transformation is used, given a small number of country-year observations where a rate of zero is observed. Infant mortality is recorded from Demographic and Health Survey (DHS) microdata where mothers report their full fertility history, any children who have died, their child’s age at death (if relevant) and the year of death (if relevant). We generate infant mortality rates using retrospective fertility and survival histories for DHS surveys in the 68 publicly available DHS countries.

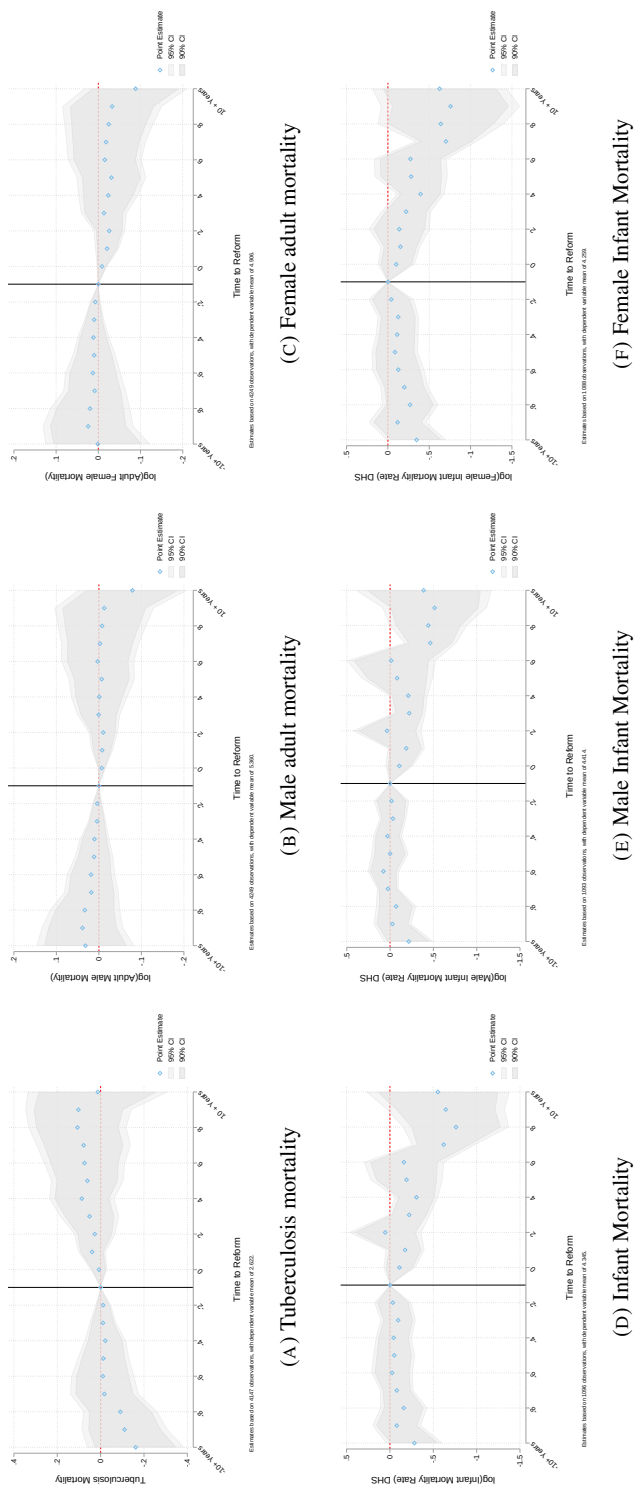


FIGURE A46. Event Studies for the impact of gender quotas on alternative health outcomes. Identical event studies are plotted to those in Figure A6, however examining quota impacts on alternative health outcomes. These outcomes are the rate of death due to TB per 100,000 individuals, and infant mortality per 1,000 live births, male mortality per 1,000 adult males (ages 15–60), and female mortality per 1,000 adult females (ages 15–60). For comparison with Figure A6d, the natural logarithm of each variable is used, with the exception of TB mortality, where an inverse sine transformation is used, given a small number of country-year observations where a rate of zero is observed. Infant mortality is recorded from Demographic and Health Survey (DHS) microdata where mothers report their full fertility history, any children who have died, their child's age at death (if relevant) and the year of death (if relevant). We generate infant mortality rates using retrospective fertility and survival histories for DHS surveys in the 68 publicly available DHS countries.

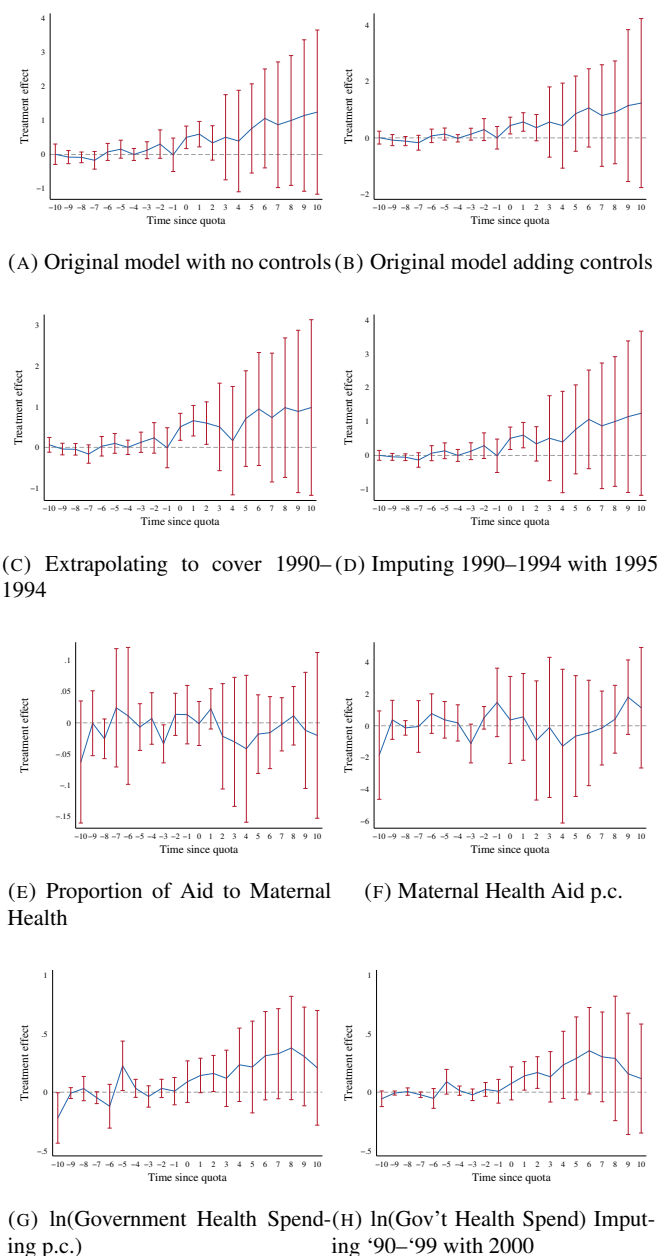


FIGURE A47. Health spending – various  $DID_M$  estimates. Alternative  $DID_M$  estimates are displayed examining the impact of quota reform on health spending. A baseline model is displayed in Figure 6 (replicated in panel (a) here). Health spending as a proportion of GDP is available worldwide from 1995 onwards. Panels (a) and (b) use original data removing 1990–1994 from the sample. Panels (c) and (d) linearly extrapolate to cover 1990–1994, or use values from 1995 to impute for 1990–1994. Panels (e)–(g) use alternative measures of health spending (proportion of all overseas aid receipts for health dedicate to maternal health, maternal health aid per capita, or the log of total government health spending per capita). The log of government health spending per capita in panel (g) is only measured from 2000 onwards, and so is subset to the period of 2000 and later. Panel (h) re-estimates panel (g), however additionally imputing values from 1990–1999 with the value for each country in 2000.

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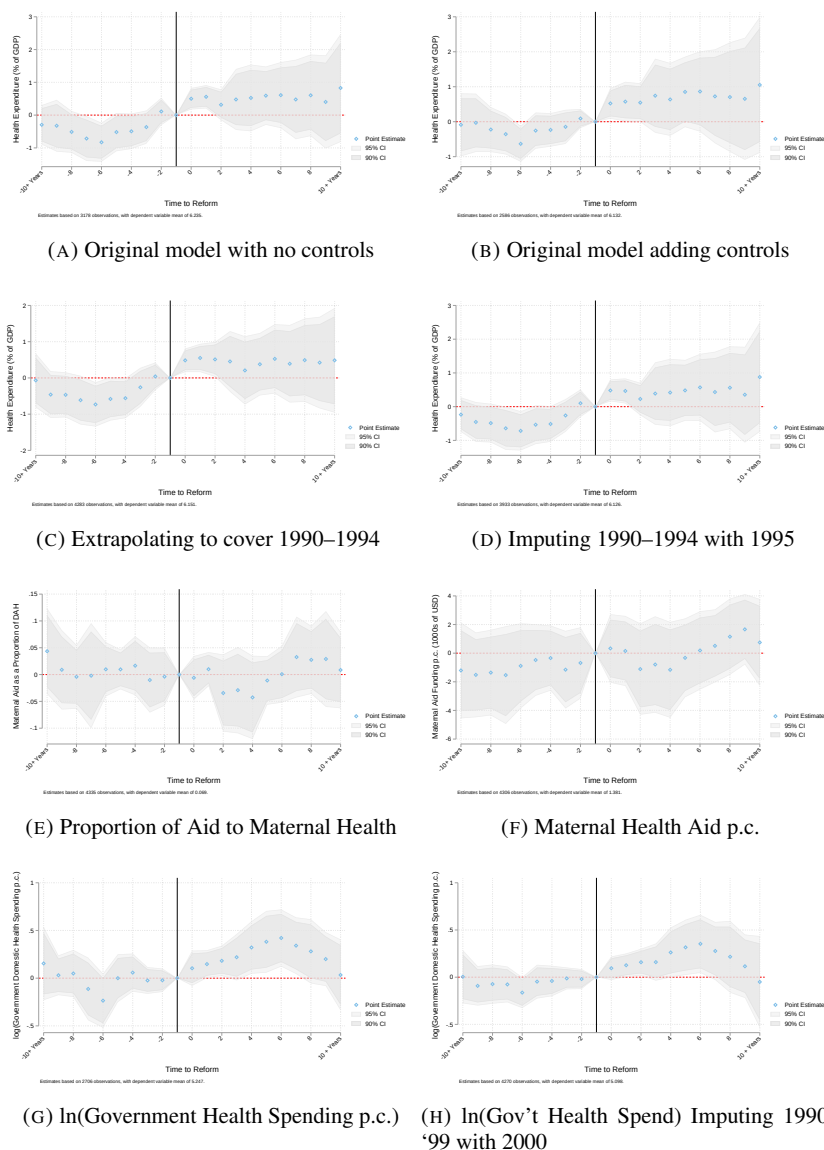
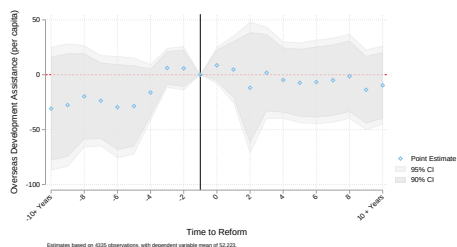
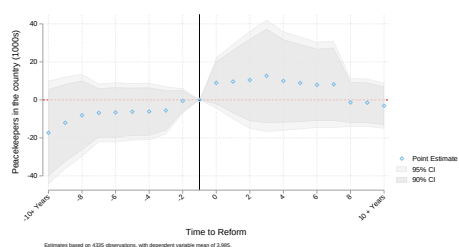


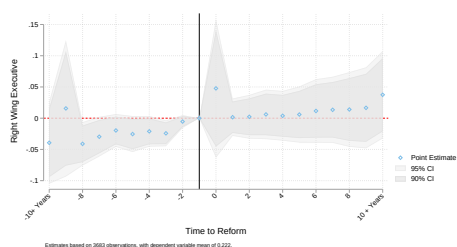
FIGURE A48. Health spending – various event study specifications. Alternative event-study models are displayed examining the impact of quota reform on health spending. A baseline model is displayed in Figure A36 (replicated in panel (a) here), and Honest DiD lags are presented in Figure 9. Health spending as a proportion of GDP is available world-wide from 1995 onwards. Panels (a) and (b) use original data removing 1990–1994 from the sample. Panels (c) and (d) linearly extrapolate to cover 1990–1994, or use values from 1995 to impute for 1990–1994. Panels (e)–(g) use alternative measures of health spending (proportion of all overseas aid receipts for health dedicate to maternal health, maternal health aid per capita, or the log of total government health spending per capita). The log of government health spending per capita in panel (g) is only measured from 2000 onwards, and so is subset to the period of 2000 and later. Panel (h) re-estimates panel (g), however additionally imputing values from 1990–1999 with the value for each country in 2000.



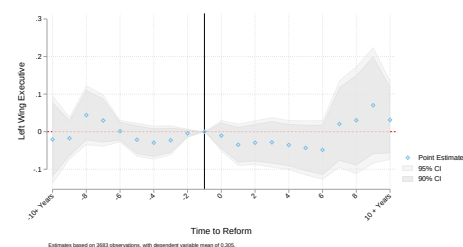
(A) Overseas Development Assistance p.c.



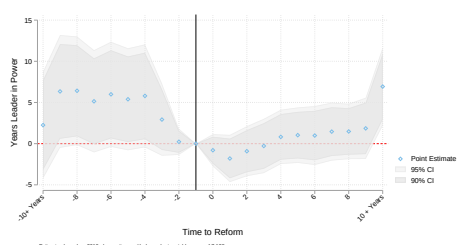
(B) Peace Keeper Presence



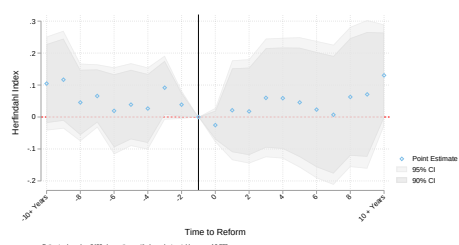
(C) Right Wing Executive



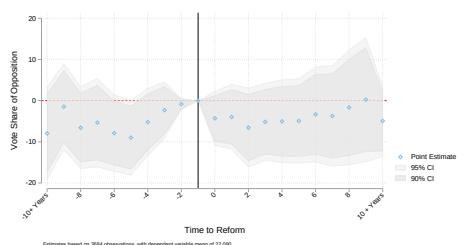
(D) Left Wing Executive



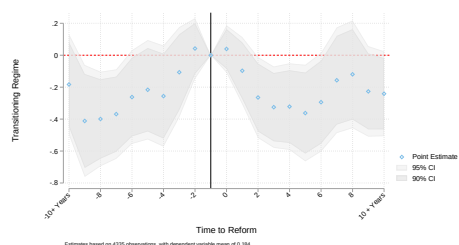
(E) Years in Power



(F) Herfindahl Index



(G) Opposition's Vote Share



(H) Regime in Transition

FIGURE A49. Event studies: reserved seat quotas and predictors from political science literature. Figure replicates models of variation in quota predictors as flagged in the political science literature presented in Figure A24, however now estimating based on standard event studies. Refer to notes to Figure A24 for variable definitions.

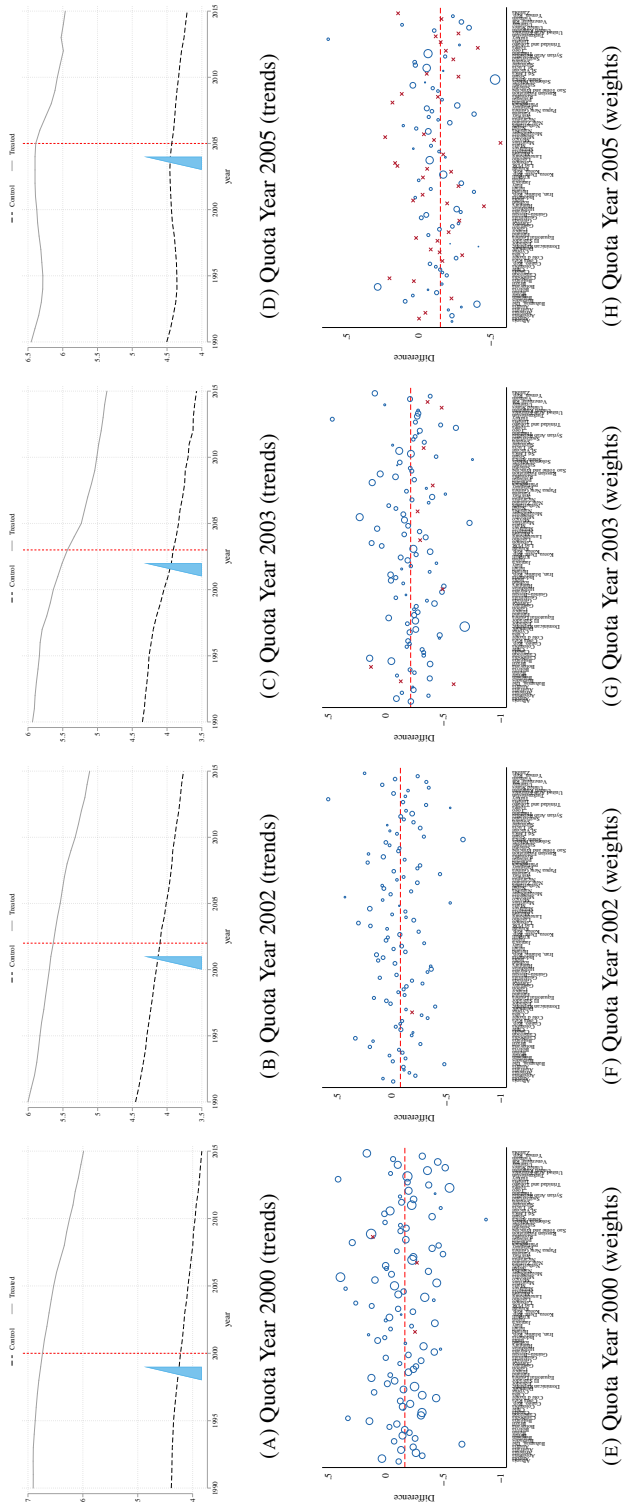


FIGURE A50. Synthetic Difference-in-Differences, Outcome Trends and Synthetic Weights. Adoption-specific synthetic difference-in-differences estimates are displayed following Arkhangelsky et al. (2021). Top panels display average outcomes for maternal mortality in treated and synthetic control units, along with time-specific weights calculated according to Arkhangelsky et al. (2021). Lower panels display weights assigned to each untreated country (size of points), as well as state-by-state observed differences calculated as  $\hat{\delta}_r - \hat{\delta}_i$  following Arkhangelsky et al. (2021), and the vertical dotted line presents the weighted averages of these differences (the estimated effect). Observations with 0 weight are denoted using an x symbol. Full synthetic DID estimates are based on weighted averages of adoption year specific estimates. In the interests of space, here we only present the first four adoption years (adoption years 2010, 2012, and 2013 are not displayed). Implementation follows (Pallanir and Clarke, 2022).

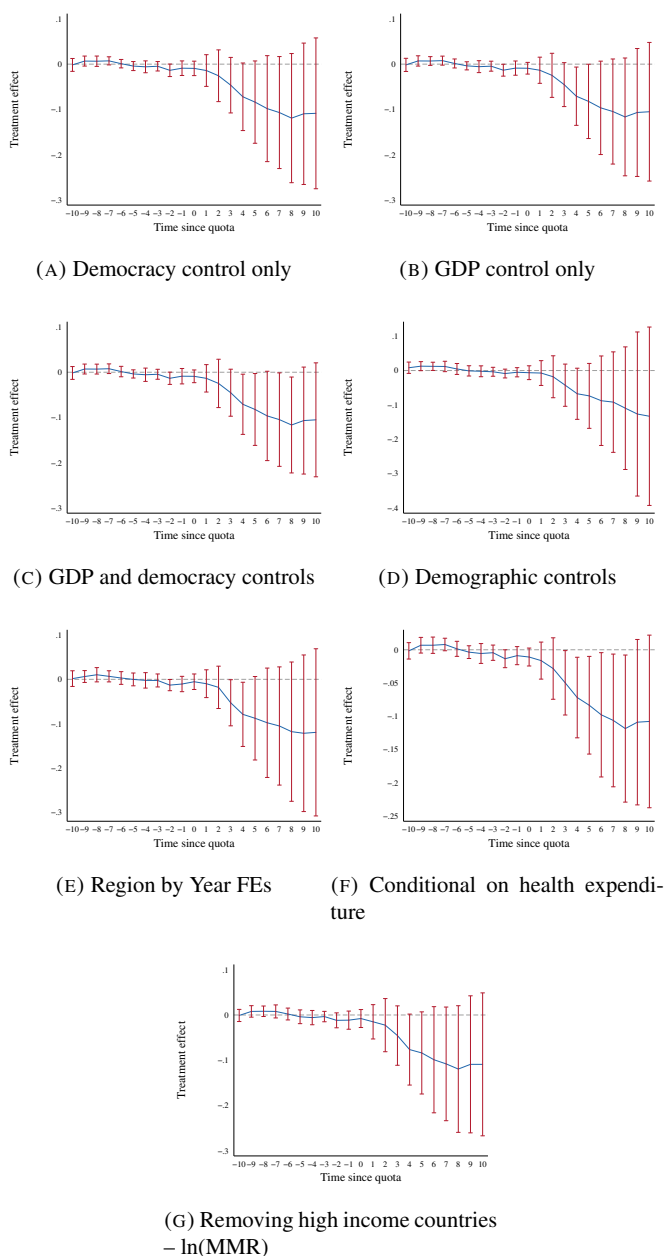


FIGURE A51. Alternative samples and specifications in  $DID_M$  models (maternal mortality). Each panel documents an alternative specification of de Chaisemartin and D'Haultfœuille (2020)'s  $DID_M$  estimates, as displayed in Figure 2. Specifications are shown with alternative controls, estimation samples, or modelling choices. Demographic controls in panel (d) refer to time-varying controls of the education of fertile aged women, the proportion of the population in fertile ages, and the ethnic fractionalization of the population. Region by year FEs include separate year fixed effects for every sub-region based on the United Nations classification. Panel (f) additionally controls for health expenditure as a proportion of GDP, and Development Aid receipts for maternal health. Panel (h) removes high income countries from the control group. A static (2015) measure of high income is used to ensure consistency of the sample across years. Additional notes are provided in Figure 2.

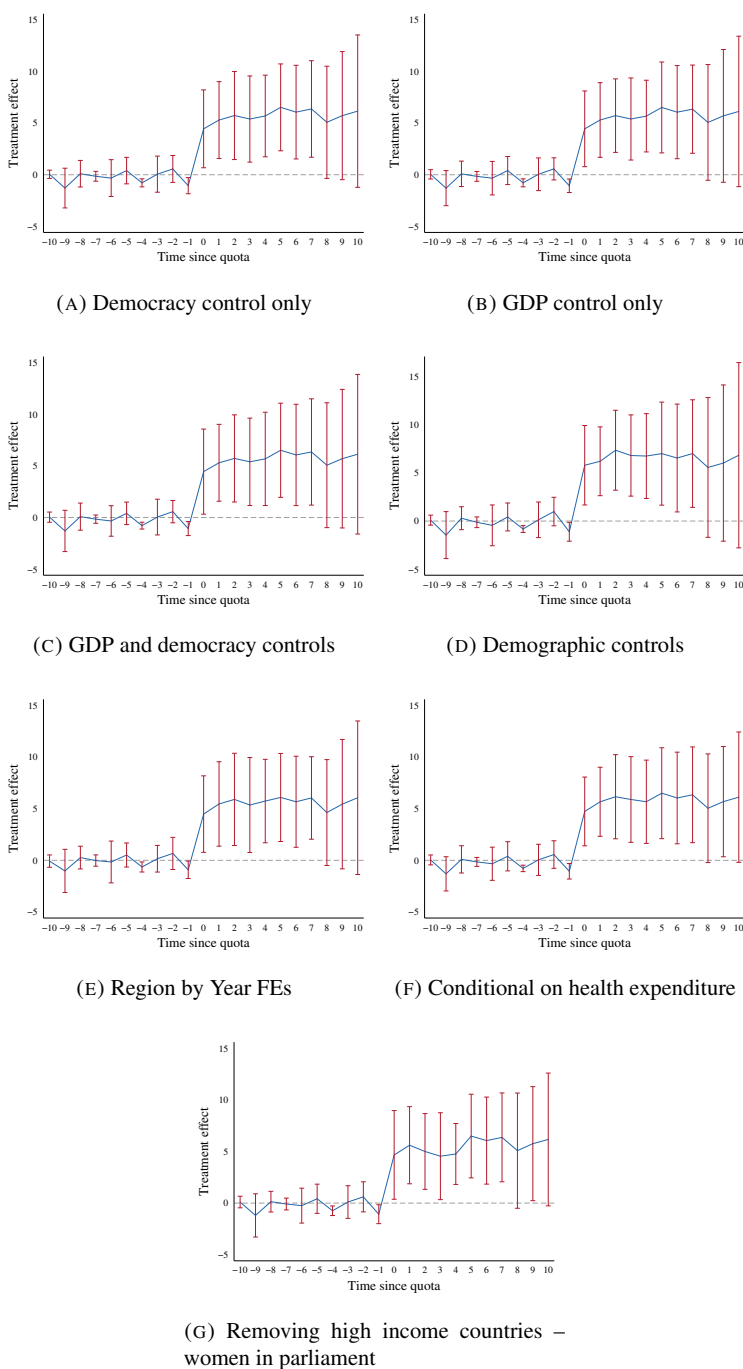


FIGURE A52. Alternative samples and specifications in  $DID_M$  models (women in parliament). Refer to notes to Figure A51. Identical plots or shown where the outcome is women in parliament.

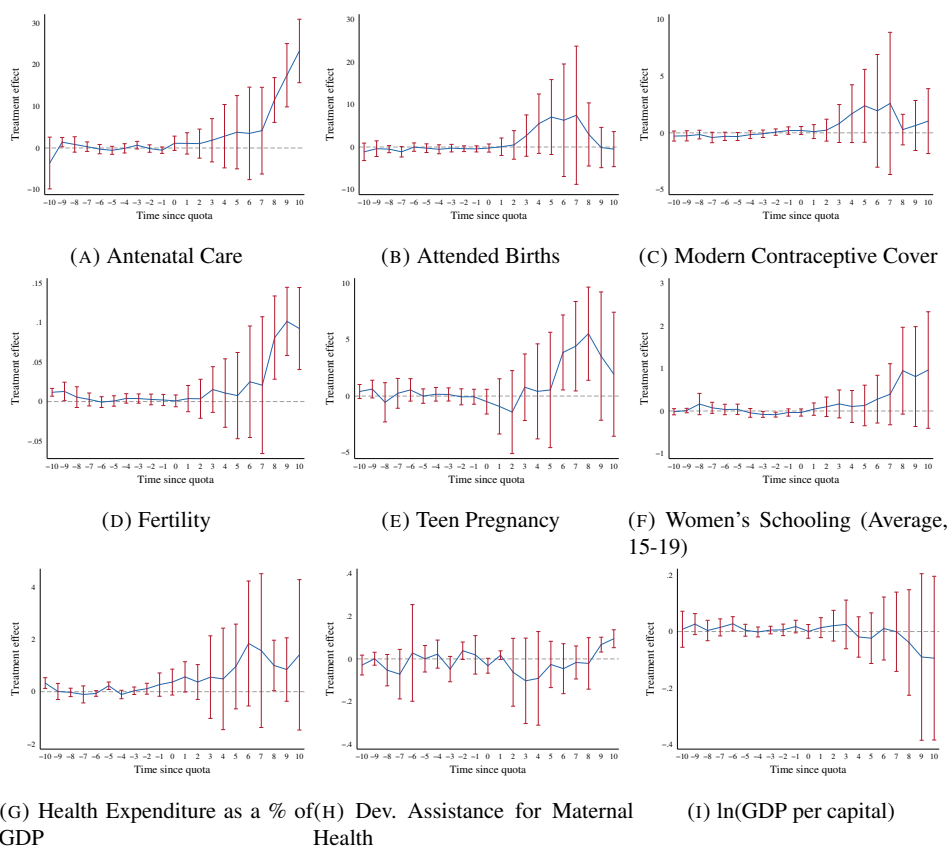


FIGURE A53. Mechanisms:  $DID_M$  estimates for impacts of gender quotas on intermediate outcomes based on a constant sample. de Chaisemartin and D'Haultfœuille (2020)  $DID_M$  estimates of intermediate outcomes replicate those displayed in the paper in Figure 6. However here all models work with a common sample containing observations for each intermediate outcome considered. For additional notes, refer to Figure 6.

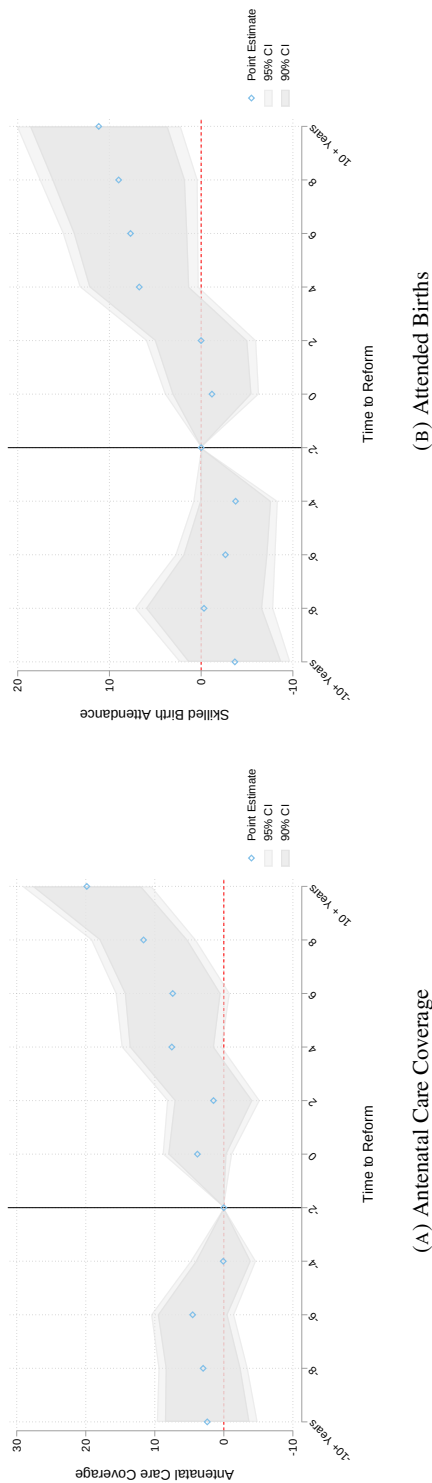


FIGURE A54. Mechanisms: event studies for impacts of quotas on non-interpolated antenatal care and birth attendance. Event studies replicate panels (a) and (b) of Figure A36 using non-interpolated data. Given the unbalanced coverage of antenatal care and attended birth measures by countries and years, we present estimates for these outcomes pooling in 2 yearly bins, rather than yearly bins, to avoid unbalanced coverage in particular lag and lead terms where possible.

**Appendix B: Appendix Tables**

TABLE A1. Summary statistics for reserved seat analysis

|                                                | Obs. | Mean   | Std. Dev. | Min.  | Max.    |
|------------------------------------------------|------|--------|-----------|-------|---------|
| <b>Panel A: Full Sample</b>                    |      |        |           |       |         |
| % Women in Parliament                          | 4186 | 14.06  | 10.45     | 0.00  | 63.80   |
| Maternal Mortality Ratio                       | 4186 | 236.03 | 325.90    | 3.00  | 2890.00 |
| Reserved Seats                                 | 4186 | 0.06   | 0.23      | 0.00  | 1.00    |
| Male Mortality Rate (15-60)                    | 4126 | 240.90 | 120.48    | 58.80 | 753.70  |
| Female Mortality Rate (15-60)                  | 4126 | 168.08 | 116.62    | 34.32 | 685.03  |
| ln(GDP per capita)                             | 4186 | 8.90   | 1.22      | 5.51  | 11.77   |
| Democracy (dichotomous) from BMR               | 4159 | 0.59   | 0.49      | 0.00  | 1.00    |
| Percent of Pregnancies Receiving Prenatal Care | 662  | 84.04  | 17.75     | 15.40 | 100.00  |
| Percent of Births Attended by Skilled Staff    | 1199 | 83.33  | 24.16     | 5.00  | 100.00  |
| Health Expenditure as a % of GDP               | 3124 | 6.24   | 2.39      | 0.72  | 17.10   |
| Female Infant Mortality Rate (DHS subsample)   | 1067 | 0.08   | 0.05      | 0.00  | 0.60    |
| Male Infant Mortality Rate (DHS subsample)     | 1066 | 0.10   | 0.05      | 0.00  | 0.33    |
| Birth rates per 1,000 population               | 4160 | 24.30  | 11.74     | 7.60  | 55.56   |
| <b>Panel B: Reserved Seat Sample</b>           |      |        |           |       |         |
| % Women in Parliament                          | 501  | 14.37  | 11.71     | 0.00  | 63.80   |
| Maternal Mortality Ratio                       | 501  | 447.46 | 293.09    | 12.00 | 1340.00 |
| Reserved Seats                                 | 501  | 0.48   | 0.50      | 0.00  | 1.00    |
| Male Mortality Rate (15-60)                    | 501  | 311.09 | 156.24    | 75.79 | 753.70  |
| Female Mortality Rate (15-60)                  | 501  | 255.54 | 136.63    | 66.03 | 685.03  |
| ln(GDP per capita)                             | 490  | 7.97   | 0.94      | 6.20  | 10.83   |
| Democracy (dichotomous) from BMR               | 496  | 0.16   | 0.37      | 0.00  | 1.00    |
| Percent of Pregnancies Receiving Prenatal Care | 122  | 75.01  | 21.29     | 24.80 | 99.10   |
| Percent of Births Attended by Skilled Staff    | 120  | 58.04  | 30.52     | 7.70  | 99.90   |
| Health Expenditure as a % of GDP               | 354  | 5.51   | 2.20      | 0.81  | 11.59   |
| Female Infant Mortality Rate (DHS subsample)   | 246  | 0.09   | 0.04      | 0.00  | 0.23    |
| Male Infant Mortality Rate (DHS subsample)     | 247  | 0.10   | 0.05      | 0.00  | 0.33    |
| Birth rates per 1,000 population               | 475  | 34.00  | 9.44      | 11.90 | 55.56   |
| <b>Panel C: No Reserved Seat Sample</b>        |      |        |           |       |         |
| % Women in Parliament                          | 3860 | 14.07  | 10.28     | 0.00  | 53.10   |
| Maternal Mortality Ratio                       | 3834 | 205.46 | 316.78    | 3.00  | 2890.00 |
| Reserved Seats                                 | 3860 | 0.00   | 0.03      | 0.00  | 1.00    |
| Male Mortality Rate (15-60)                    | 3748 | 230.66 | 110.60    | 58.80 | 663.36  |
| Female Mortality Rate (15-60)                  | 3748 | 155.26 | 107.16    | 34.32 | 626.09  |
| ln(GDP per capita)                             | 3696 | 9.03   | 1.19      | 5.51  | 11.77   |
| Democracy (dichotomous) from BMR               | 3835 | 0.63   | 0.48      | 0.00  | 1.00    |
| Percent of Pregnancies Receiving Prenatal Care | 556  | 86.23  | 16.17     | 15.40 | 100.00  |
| Percent of Births Attended by Skilled Staff    | 1117 | 86.49  | 21.45     | 5.00  | 100.00  |
| Health Expenditure as a % of GDP               | 2843 | 6.32   | 2.39      | 0.72  | 17.10   |
| Female Infant Mortality Rate (DHS subsample)   | 854  | 0.08   | 0.05      | 0.00  | 0.60    |
| Male Infant Mortality Rate (DHS subsample)     | 852  | 0.09   | 0.05      | 0.00  | 0.26    |
| Birth rates per 1,000 population               | 3805 | 23.07  | 11.40     | 7.60  | 52.75   |

NOTES: Refer to Data Appendix D for a full description of each variable and its source. The Maternal Mortality Ratio is measured as deaths per 100,000 live births. For comparison, the male and female mortality rates for 15–60 year-olds is expressed as per 1,000 male and female adults respectively. Reserved seats is a binary variable taking one for each country and year pair where a quota was implemented, and 0 otherwise.

TABLE A2. Quota countries: quota size, and quota baseline MMR level

| Country      | Quota Size |          | Baseline MMR |          |
|--------------|------------|----------|--------------|----------|
|              | Size       | Category | Value        | Category |
| Afghanistan  | 27.3       | High     | 821          | High     |
| Algeria      | 20         | Medium   | 192          | Low      |
| Bangladesh   | 13         | Low      | 481          | Medium   |
| Burundi      | 30         | High     | 993          | High     |
| China        | 22         | Medium   | 73           | Low      |
| Djibouti     | 10         | Low      | 452          | Medium   |
| Eritrea      | 30         | High     | 931          | High     |
| Haiti        | 3          | Low      | 522          | Medium   |
| Iraq         | 25         | High     | 85           | Low      |
| Jordan       | 11.1       | Low      | 93           | Low      |
| Kenya        | 13.4       | Low      | 708          | High     |
| Morocco      | 15.2       | Medium   | 261          | Low      |
| Niger        | 10         | Low      | 825          | High     |
| Pakistan     | 17.5       | Medium   | 374          | Low      |
| Rwanda       | 30         | High     | 1220         | High     |
| Saudi Arabia | 20         | Medium   | 20           | Low      |
| South Sudan  | 25         | High     | 857          | High     |
| Sudan        | 25         | High     | 626          | Medium   |
| Swaziland    | 5.26       | Low      | 569          | Medium   |
| Tanzania     | 29.1       | High     | 946          | High     |
| Uganda       | 24.4       | Medium   | 673          | High     |
| Zimbabwe     | 22.2       | Medium   | 475          | Medium   |

TABLE A3. Gender Quotas: TWFE impacts on women in parliament and maternal mortality

|                                           | % Women in Parliament |                    |                     | ln(Maternal Mortality Ratio) |                     |                   | Maternal Mortality Ratio |                       |                         |
|-------------------------------------------|-----------------------|--------------------|---------------------|------------------------------|---------------------|-------------------|--------------------------|-----------------------|-------------------------|
|                                           | (1)                   | (2)                | (3)                 | (4)                          | (5)                 | (6)               | (7)                      | (8)                   | (9)                     |
| <b>Panel A: Intensity by Baseline MMR</b> |                       |                    |                     |                              |                     |                   |                          |                       |                         |
| Reserved Seats                            | 5.793***<br>[2.167]   |                    |                     | -0.082<br>[0.051]            |                     |                   | -106.107**<br>[43.036]   |                       |                         |
| Reserved Seats × Baseline MMR             |                       | 1.008**<br>[0.420] |                     |                              | -0.020**<br>[0.010] |                   |                          | -30.209***<br>[6.219] |                         |
| Reserved Seats (Low Baseline MMR)         |                       |                    | 4.727*<br>[2.548]   |                              |                     | -0.077<br>[0.051] |                          |                       | 18.191<br>[21.456]      |
| Reserved Seats (Mid Baseline MMR)         |                       |                    | 2.994*<br>[1.563]   |                              |                     | -0.024<br>[0.061] |                          |                       | -84.875***<br>[17.319]  |
| Reserved Seats (High Baseline MMR)        |                       |                    | 10.067**<br>[4.761] |                              |                     | -0.159<br>[0.120] |                          |                       | -277.155***<br>[93.778] |
| Mean of Dep. Var.                         | 14.110                | 14.167             | 14.110              | 4.357                        | 4.351               | 4.357             | 233.425                  | 224.620               | 233.425                 |
| Observations                              | 4335                  | 4203               | 4335                | 4335                         | 4203                | 4335              | 4335                     | 4203                  | 4335                    |
| Number of Countries                       | 178                   | 167                | 178                 | 178                          | 167                 | 178               | 178                      | 167                   | 178                     |
| R-Squared                                 | 0.465                 | 0.470              | 0.470               | 0.547                        | 0.547               | 0.548             | 0.270                    | 0.361                 | 0.309                   |
| <b>Panel B: Intensity by Quota Size</b>   |                       |                    |                     |                              |                     |                   |                          |                       |                         |
| Reserved Seats                            | 5.793***<br>[2.167]   |                    |                     | -0.082<br>[0.051]            |                     |                   | -106.107**<br>[43.036]   |                       |                         |
| Reserved Seats × Quota Size               |                       | 0.290**<br>[0.115] |                     |                              | -0.005<br>[0.003]   |                   |                          | -6.421***<br>[2.352]  |                         |
| Reserved Seats (0-10)%                    |                       |                    | 2.809**<br>[1.247]  |                              |                     | -0.006<br>[0.048] |                          |                       | -25.035<br>[27.354]     |
| Reserved Seats (10-20)%                   |                       |                    | 7.516***<br>[2.291] |                              |                     | -0.069<br>[0.074] |                          |                       | -60.227**<br>[28.187]   |
| Reserved Seats (20-30)%                   |                       |                    | 6.810*<br>[3.642]   |                              |                     | -0.134<br>[0.082] |                          |                       | -181.188**<br>[76.308]  |
| Mean of Dep. Var.                         | 14.110                | 14.110             | 14.110              | 4.357                        | 4.357               | 4.357             | 233.425                  | 233.425               | 233.425                 |
| Observations                              | 4335                  | 4335               | 4335                | 4335                         | 4335                | 4335              | 4335                     | 4335                  | 4335                    |
| Number of Countries                       | 178                   | 178                | 178                 | 178                          | 178                 | 178               | 178                      | 178                   | 178                     |
| R-Squared                                 | 0.465                 | 0.468              | 0.467               | 0.547                        | 0.547               | 0.548             | 0.270                    | 0.288                 | 0.285                   |

Difference-in-differences (two-way fixed effect) estimates of the impact of reserved seats in parliament on women in parliament (columns 1-3), the log of the maternal mortality ratio (columns 4-6), and MMR in levels (columns 7-9) are displayed. In each case country and year fixed effects are included. Baseline two-way fixed effect models are included in columns (1), (4) and (6), and then models studying heterogeneous impacts are presented there-after. Heterogeneity is examined by baseline maternal mortality levels in panel A, and by the size of the gender quota in panel B. In each case heterogeneity considers simple interactions between the reserved seat dummy and the intensity variable (baseline MMR or quota size respectively), and then separate intensity groups for low, medium and high intensity groups. Standard errors clustered by country are displayed in parentheses. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A4. Two-way fixed effect models: reserved seats and maternal mortality in India

|                          | ln(MMR)            |                    | MMR                     |                         |
|--------------------------|--------------------|--------------------|-------------------------|-------------------------|
|                          | (1)                | (2)                | (3)                     | (4)                     |
| Reserved Seats for Women | -0.142*<br>(0.080) | -0.204*<br>(0.115) | -107.839***<br>(18.042) | -105.096***<br>(22.944) |
| Observations             | 135                | 135                | 135                     | 135                     |
| R-Squared                | 0.95               | 0.92               | 0.91                    | 0.88                    |
| Population Weights       |                    | Y                  |                         | Y                       |

Each column documents coefficients from two-way fixed effect models where the natural logarithm of the maternal mortality ratio (columns 1-2) or the maternal mortality ratio (columns 3-4) is regressed on an indicator for the state's reserved seat status, plus full state and time fixed effects. Data covers the period from 1986 to 2003, from Sample Registration Systems and Ram et al. (2006). Population weights based on census data are included in columns 2 and 4. Standard errors clustered by state are presented in parentheses. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.10$ .

TABLE A5. Weights and Estimates from the Goodman-Bacon (2021) decomposition

|                                     | Weight | Estimate |
|-------------------------------------|--------|----------|
| <b>Panel A: Women in Parliament</b> |        |          |
| Earlier Treated vs. Later Control   | 0.024  | 9.277    |
| Later Treated vs. Earlier Treated   | 0.015  | 6.614    |
| Treated vs. Never Treated           | 0.954  | 5.739    |
| Treated vs. Already Treated         | 0.007  | -0.614   |
| Difference-in-difference Estimate   |        | 5.797    |
| <b>Panel B: ln(MMR)</b>             |        |          |
| Earlier Treated vs. Later Control   | 0.024  | -0.072   |
| Later Treated vs. Earlier Treated   | 0.015  | -0.007   |
| Treated vs. Never Treated           | 0.954  | -0.076   |
| Treated vs. Already Treated         | 0.007  | -0.018   |
| Difference-in-difference Estimate   |        | -0.075   |

Notes: The Goodman-Bacon (2021) decomposition above displays the weights and components making up the global "single coefficient" TWFE model. Decompositions are documented for the percent of women in parliament (panel A) and the natural logarithm of the MMR (panel B). Each components' weight is given along with the point estimate for this comparison. The global estimate is displayed at the foot of each panel.

TABLE A6. Reserved seats as an IV for women in parliament

|                                       | (1)                  | (2)                  | (3)                  |
|---------------------------------------|----------------------|----------------------|----------------------|
|                                       | ln(MMR)              | ln(MMR)              | ln(MMR)              |
| <b>Panel A: LIML Estimates</b>        |                      |                      |                      |
| % Women in Parliament                 | -0.015**<br>[0.007]  | -0.020***<br>[0.007] | -0.015*<br>[0.008]   |
| F-Statistic First Stage               | 7.966                | 4.753                | 7.233                |
| p-value First Stage                   | 0.005                | 0.031                | 0.008                |
| Weak IV-Robust A-R Confidence Set     | [-0.031153, .001431] | [-0.05575, -.006106] | [-0.033524, .002305] |
| 95% CI from Conley et al. (2012)      | [-0.031; 0.002]      | [-0.037; -0.005]     | [-0.032; 0.002]      |
| 90% CI from Conley et al. (2012)      | [-0.029; -0.001]     | [-0.035; -0.007]     | [-0.030; -0.001]     |
| <b>Panel B: First-Stage Estimates</b> |                      |                      |                      |
| Reserved Seat Quota                   | 5.925***<br>[2.099]  | 5.144**<br>[2.360]   | 5.868***<br>[2.182]  |
| Mean of Dep. Var.                     | 4.357                | 4.397                | 4.377                |
| Observations                          | 4335                 | 3212                 | 4241                 |
| Number of Countries                   | 178                  | 156                  | 169                  |
| <b>Controls:</b>                      |                      |                      |                      |
| Democracy & growth                    | N                    | Y                    | N                    |
| Empowerment & predictors              | N                    | N                    | Y                    |

These are instrumental variables regressions in which implementation of gender quotas is used to instrument women in parliament. The first stage regression of women in parliament on reserved seats is displayed in panel B of the table, while F-Statistics of the first stage and the associated p-value are presented below the principal estimates in Panel A. The first-stage F-stats are not consistently larger than standard rules of thumb. To avoid weak instrument problems, we use LIML rather than 2SLS as LIML has improved small sample properties when the IV is weak. Additionally, we present weak IV robust Anderson-Rubin confidence sets, which do not assume identification of coefficients. Power in this setting is graphed in Figure A21. The key take-away is that we can rule out values of zero or, in other words, our finding in the IV setting is robust to weak IV. The displayed coefficients give the effect of an additional percentage of women in parliament on rates of maternal mortality, where women in parliament is instrumented with reserved seats. The 90% and 95% confidence intervals from Conley et al. (2012) are robustness tests, where we allow the instrument to be imperfect in the sense that the exclusion restriction holds approximately but not exactly, allowing quotas to have a direct effect in reducing MMR that is *not* mediated by women in parliament of 0.01 (or 1%). We use Conley et al. (2012)'s Union of Confidence Intervals (UCI) approach, with this process also based on LIML estimation. Each regression includes country and year fixed effects and clusters standard errors by country. Column 1 provides baseline models without controls beyond country and year FE. In column 2 the regressions additionally control for time-varying (and potentially endogenous) GDP and democratization, while column 3 controls for an index of women's empowerment measures at baseline, interacted with year fixed effects. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A7. Test of Trend Break in ln(Maternal Mortality) Around Quota Passage

|                               | Placebo Breaks (Year Pre-Quota Treated as Placebo) |                  |                  |                  |                  |                  |                  |                  |                  |
|-------------------------------|----------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                               | (1)                                                | (2)              | (3)              | (4)              | (5)              | (6)              | (7)              | (8)              | (9)              |
| True Model                    | Adoption                                           | -10              | -9               | -8               | -7               | -6               | -5               | -4               | -3               |
| Pre-Quota Trend               | 0.001<br>[0.006]                                   | 0.005<br>[0.006] | 0.005<br>[0.006] | 0.005<br>[0.006] | 0.005<br>[0.007] | 0.006<br>[0.007] | 0.006<br>[0.008] | 0.007<br>[0.008] | 0.007<br>[0.008] |
| Post-Quota Trend              | -0.012**<br>[0.006]                                | 0.002<br>[0.004] | 0.002<br>[0.005] | 0.003<br>[0.006] | 0.005<br>[0.008] | 0.008<br>[0.011] | 0.013<br>[0.015] | 0.019<br>[0.019] | 0.025<br>[0.024] |
| Observations                  | 4,335                                              | 4,090            | 4,090            | 4,090            | 4,090            | 4,090            | 4,090            | 4,090            | 4,090            |
| R-Squared                     | 0.547                                              | 0.520            | 0.520            | 0.520            | 0.520            | 0.520            | 0.520            | 0.520            | 0.520            |
| Test of Trend Break (p-value) | 0.12                                               | 0.39             | 0.36             | 0.45             | 0.98             | 0.54             | 0.36             | 0.31             | 0.29             |

Each column presents specifications where the log of the maternal mortality ratio is regressed on country and year fixed effects, and separate trends are fit in pre- and post-quota implementation periods. Column 1 presents the true model where trends are fit around quota implementation. Columns 2-9 present similar models using only pre-quota periods, with placebo trend breaks allowed at the number of years pre-quota implementation indicated in column headings. In each case we formally test for equality of trends around the true or placebo reform date, with p-values of this trend presented in the Table footer. Standard errors clustered by country are displayed in parentheses. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A8. Alternative inference procedures for measures of maternal mortality in principal aggregate models

|                                          | de Chaisemartin and D'Haultfoeuille<br><i>DiD<sub>M</sub></i> Estimator |            | Two-way FE Estimator |            | Arkhangelsky et al.'s<br>Synthetic DID Estimator |            |
|------------------------------------------|-------------------------------------------------------------------------|------------|----------------------|------------|--------------------------------------------------|------------|
|                                          | ln(MMR)<br>(1)                                                          | MMR<br>(2) | ln(MMR)<br>(3)       | MMR<br>(4) | ln(MMR)<br>(5)                                   | MMR<br>(6) |
| Reserved Seats (Point Estimate)          | -0.072                                                                  | -86.46     | -0.082               | -106.10    | -0.127                                           | -57.16     |
| p-value Bootstrap                        | 0.115                                                                   | 0.019      | 0.133                | 0.006      | 0.090                                            | 0.155      |
| p-value Triangular Correction            | 0.161                                                                   | 0.027      | 0.260                | 0.047      | 0.209                                            | 0.317      |
| p-value Triangular Correction by Country | 0.124                                                                   | 0.014      | 0.149                | 0.004      | 0.099                                            | 0.163      |
| p-value Normal Correction                | 0.301                                                                   | 0.035      | 0.617                | 0.120      | 0.539                                            | 0.427      |
| p-value Normal Correction by Country     | 0.116                                                                   | 0.031      | 0.131                | 0.009      | 0.088                                            | 0.153      |
| Mean of Dep. Var.                        | 4.357                                                                   | 233.425    | 4.357                | 233.425    | 4.186                                            | 182.757    |
| Observations                             | 4,335                                                                   | 4,335      | 4,335                | 4,335      | 3,068                                            | 3,068      |
| Number of Countries                      | 178                                                                     | 178        | 178                  | 178        | 118                                              | 118        |

Notes: Resample procedures are implemented following Appendix F. These are based on single coefficient estimators from de Chaisemartin and D'Haultfoeuille (2020) (columns 1-2), two way FE estimates (columns 3-4) and Arkhangelsky et al. (2021) (columns 5-6) based on the (required) balanced panel of observations. Point estimates are presented, and below p-values associated with each point estimate, based on different procedures for re-sampling the uncertainty of measures of maternal mortality. In each case, re-samples are taken over country clusters, as treatment is defined at the level of the country.

TABLE A9. Mechanisms: impacts of gender quotas on intermediate outcomes

|                     | Antenatal<br>Care<br>(1) | Attended<br>Births<br>(2) | Contraceptive<br>Usage<br>(3) | Fertility<br>Rate<br>(4) | Teenage<br>Pregnancy<br>(5) | Birth<br>Spacing<br>(6) | Health<br>Expenditure<br>(7) | Development<br>Assistance<br>(8) | GDP<br>per capita<br>(9) |
|---------------------|--------------------------|---------------------------|-------------------------------|--------------------------|-----------------------------|-------------------------|------------------------------|----------------------------------|--------------------------|
| Reserved Seats      | 4.699*<br>[2.771]        | 5.793**<br>[2.434]        | 1.669<br>[1.172]              | -0.061**<br>[0.028]      | -1.609<br>[2.786]           | 1.896<br>[1.818]        | 0.894**<br>[0.371]           | -0.009<br>[0.027]                | -0.005<br>[0.062]        |
| Mean of Dep. Var.   | 84.210                   | 83.726                    | 29.913                        | 1.040                    | 62.366                      | 35.491                  | 6.235                        | 0.089                            | 8.903                    |
| Observations        | 678                      | 1237                      | 4182                          | 4303                     | 4309                        | 1429                    | 3178                         | 3338                             | 4186                     |
| Number of Countries | 155                      | 169                       | 172                           | 177                      | 177                         | 67                      | 176                          | 147                              | 175                      |
| R-Squared           | 0.432                    | 0.306                     | 0.599                         | 0.504                    | 0.541                       | 0.555                   | 0.192                        | 0.098                            | 0.472                    |

Two-way FE models of intermediate outcomes as a function of the passage of gender quotas are displayed. Antenatal care coverage and birth attendance are newly harmonized data available for 1990-2015 and measured as percentage coverage, however only available in a sub-sample of years for each particular country. Contraceptive usage refers to the proportion of all women aged 15-49 using modern contraceptives. Fertility rate is measured in natural logarithms, and teenage pregnancy is measured as births per 1,000 teenage women. Birth spacing is measured in months to subsequent births, generated from full DHS data. Health expenditure refers to spending as a percentage of GDP, and development assistance refers to the proportion of development assistance directed to mothers health. GDP per capita is measured in natural logarithms. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A10. Univariate regressions of  $\ln(\text{MMR})$  on mechanism Variables

| Variable                       | Point Estimate | Standard Error |
|--------------------------------|----------------|----------------|
| Antenatal Care                 | -0.040         | 0.005          |
| Attended Births                | -0.044         | 0.002          |
| Modern Contraceptives          | -0.063         | 0.004          |
| $\log(\text{Fertility Rates})$ | 0.847          | 0.032          |
| Teen Pregnancy                 | 0.028          | 0.001          |
| Women's Schooling              | -0.013         | 0.008          |
| Health Expenditure             | -0.265         | 0.048          |
| DAH Maternal Health            | 1.408          | 0.389          |
| $\log(\text{GDP p.c.})$        | -1.181         | 0.042          |
| Birth Spacing                  | -0.013         | 0.008          |

Each line presents the point estimate and standard error from a projection of  $\ln(\text{MMR})$  on the variable indicated. Standard errors are clustered by country, but no additional controls are included.

TABLE A11. Gender quotas: TWFE impacts on alternative outcomes

|                     | Education                  |                          |                             | Mortality                        |                            |                          | Infant Mortality  |                      |                    |
|---------------------|----------------------------|--------------------------|-----------------------------|----------------------------------|----------------------------|--------------------------|-------------------|----------------------|--------------------|
|                     | Female<br>Schooling<br>(1) | Male<br>Schooling<br>(2) | Female/Male<br>Ratio<br>(3) | Tuberculosis<br>Mortality<br>(4) | Female<br>Mortality<br>(5) | Male<br>Mortality<br>(6) | All<br>IMR<br>(7) | Female<br>IMR<br>(8) | Male<br>IMR<br>(9) |
|                     |                            |                          |                             |                                  |                            |                          |                   |                      |                    |
| Reserved Seats      | 0.470*<br>[0.250]          | 0.144<br>[0.220]         | 0.065**<br>[0.030]          | 0.118<br>[0.110]                 | -0.038<br>[0.052]          | -0.035<br>[0.051]        | -0.091<br>[0.131] | -0.087<br>[0.112]    | -0.105<br>[0.119]  |
| Mean of Dep. Var.   | 7.471                      | 7.565                    | 0.985                       | 2.622                            | 4.906                      | 5.360                    | 4.345             | 4.259                | 4.414              |
| Observations        | 2794                       | 2446                     | 2446                        | 4147                             | 4249                       | 4249                     | 1096              | 1088                 | 1093               |
| Number of Countries | 141                        | 123                      | 123                         | 178                              | 177                        | 177                      | 68                | 68                   | 68                 |
| R-Squared           | 0.333                      | 0.214                    | 0.161                       | 0.356                            | 0.559                      | 0.528                    | 0.396             | 0.398                | 0.361              |

Each column and panel presents estimates from a two-way FE specification following that in Table A3 (columns 1, 4 and 7). We now examine estimates for impacts of gender quotas on alternative outcomes, specifically female and male education, as well as their ratio, and various classes of morbidity or mortality outcomes. Educational data are drawn from Barro and Lee's education database, recording completed years of schooling of 15–19 year-olds in each country and are interpolated between quinquennial time period. Morbidity/mortality outcomes are examined for adults (columns 4–6), and infants (columns 7–9). For adult morbidity/mortality, tuberculosis is measured as incidence per 100,000 people, and mortality is measured as per 1,000 adults of ages 15–60. Since the TB data had the occasional zero, we use the inverse hyperbolic sine transformation rather than the log transformation for this outcome, which is used for female and male mortality. Infant mortality is estimated from all publicly available DHS waves and is expressed as the natural logarithm of infant mortality, for all births, and for males and females only. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A12. A back of the envelope calculation of impacts on total maternal deaths

| Baseline               |           | $\Delta MMR Fertility$         |           |
|------------------------|-----------|--------------------------------|-----------|
| Births = 34,735,750    | MMR=267.5 | Births = 34,735,750            | MMR=244.2 |
| Deaths = 92,928        |           | Deaths = <b>84,843</b>         |           |
| $\Delta Fertility MMR$ |           | $\Delta Fertility, \Delta MMR$ |           |
| Births = 32,616,869    | MMR=267.5 | Births = 32,616,869            | MMR=244.2 |
| Deaths = <b>87,259</b> |           | Deaths = <b>79,668</b>         |           |

The top left quadrant calculates maternal mortality ratios based on actual births and maternal deaths in all quota adopting countries one year prior to the quota. The top right quadrant calculates total maternal deaths if the maternal mortality ratio declines by 8.7%, but births remain fixed. The bottom left quadrant calculates total maternal deaths if the fertility rate falls by 6.1%, but the maternal mortality remains fixed at pre-quota levels. Finally, the bottom right quadrant calculates the total reduction in expected maternal deaths given (a) the fall in fertility and (b) the fall in the maternal mortality ratio.

TABLE A13. Mechanism Variables and Maternal Mortality

|                       | (1)<br>ln(MMR)       | (2)<br>ln(MMR)      | (3)<br>ln(MMR)    | (4)<br>ln(MMR)     | (5)<br>ln(MMR)   | (6)<br>ln(MMR)    | (7)<br>ln(MMR)   | (8)<br>ln(MMR)   | (9)<br>ln(MMR)       | (10)<br>ln(MMR)      |
|-----------------------|----------------------|---------------------|-------------------|--------------------|------------------|-------------------|------------------|------------------|----------------------|----------------------|
| Antenatal Care        | -0.005***<br>[0.002] |                     |                   |                    |                  |                   |                  |                  |                      | -0.005<br>[0.003]    |
| Attended Births       |                      | -0.004**<br>[0.002] |                   |                    |                  |                   |                  |                  |                      | -0.003<br>[0.002]    |
| Modern Contraceptives |                      |                     | -0.004<br>[0.004] |                    |                  |                   |                  |                  |                      | -0.008<br>[0.007]    |
| Fertility Rates       |                      |                     |                   | 0.095**<br>[0.047] |                  |                   |                  |                  |                      | -0.093<br>[0.106]    |
| Teen Pregnancy        |                      |                     |                   |                    | 0.003<br>[0.002] |                   |                  |                  |                      | 0.003<br>[0.004]     |
| Birth Spacing         |                      |                     |                   |                    |                  | -0.007<br>[0.005] |                  |                  |                      | -0.003<br>[0.003]    |
| Health Expenditure    |                      |                     |                   |                    |                  |                   | 0.011<br>[0.010] |                  |                      | -0.018<br>[0.011]    |
| DAH Maternal Health   |                      |                     |                   |                    |                  |                   |                  | 0.086<br>[0.062] |                      | 0.109<br>[0.078]     |
| log(GDP p.c.)         |                      |                     |                   |                    |                  |                   |                  |                  | -0.338***<br>[0.061] | -0.478***<br>[0.144] |
| Observations          | 2,109                | 2,751               | 4,182             | 4,303              | 4,309            | 1,429             | 3,178            | 3,338            | 4,186                | 915                  |
| R-Squared             | 0.989                | 0.987               | 0.987             | 0.987              | 0.987            | 0.968             | 0.991            | 0.978            | 0.989                | 0.986                |

Each column displays a regression of ln(MMR) on country and year FEs and a particular measure considered as a potential explanation of the observed impacts of quotas on maternal mortality. These are regressed column by column in columns 1-9, and jointly in column 10. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A14. Quota Adoption and Women's Inclusion Measures

|                                     | Quota Adoption    |                   | Quota Adoption <sub>(t+1)</sub> |                   | Quota Adoption <sub>(t+2)</sub> |                   |
|-------------------------------------|-------------------|-------------------|---------------------------------|-------------------|---------------------------------|-------------------|
|                                     | (1)               | (2)               | (3)                             | (4)               | (5)                             | (6)               |
| Women civil liberties index         | -0.012<br>[0.057] | 0.023<br>[0.035]  | -0.004<br>[0.060]               | 0.021<br>[0.034]  | 0.025<br>[0.057]                | 0.031<br>[0.034]  |
| Women political participation index | -0.030<br>[0.029] | 0.014<br>[0.017]  | 0.035<br>[0.031]                | -0.001<br>[0.017] | 0.024<br>[0.029]                | -0.012<br>[0.017] |
| Exclusion by Gender index           | -0.051<br>[0.059] | -0.013<br>[0.036] | -0.066<br>[0.063]               | 0.025<br>[0.035]  | -0.082<br>[0.059]               | 0.044<br>[0.035]  |
| Relative Freedom of Movement        | 0.001<br>[0.002]  | -0.001<br>[0.001] | 0.001<br>[0.002]                | 0.000<br>[0.001]  | 0.003*<br>[0.002]               | 0.002<br>[0.001]  |
| Relative Access to Justice          | -0.001<br>[0.003] | -0.001<br>[0.002] | -0.002<br>[0.003]               | -0.001<br>[0.002] | -0.000<br>[0.003]               | -0.001<br>[0.002] |
| Relative Freedom of Discussion      | 0.003<br>[0.002]  | 0.002<br>[0.002]  | -0.002<br>[0.003]               | -0.001<br>[0.002] | -0.001<br>[0.002]               | -0.002<br>[0.002] |
| Power distributed by gender         | 0.008<br>[0.009]  | -0.003<br>[0.005] | -0.010<br>[0.010]               | -0.001<br>[0.005] | -0.009<br>[0.009]               | 0.003<br>[0.005]  |
| Freedom from forced labor for women | 0.015<br>[0.010]  | -0.000<br>[0.006] | -0.001<br>[0.011]               | 0.001<br>[0.006]  | -0.015<br>[0.010]               | 0.000<br>[0.006]  |
| Property rights for women           | -0.001<br>[0.010] | 0.002<br>[0.006]  | 0.003<br>[0.011]                | 0.001<br>[0.006]  | 0.003<br>[0.010]                | -0.001<br>[0.006] |
| Women, Business & Law Index         | 0.000<br>[0.000]  | -0.000<br>[0.000] | -0.001<br>[0.000]               | 0.000<br>[0.000]  | -0.000<br>[0.000]               | -0.000<br>[0.000] |
| CIRI Women's Political Rights       | 0.001<br>[0.006]  |                   | -0.009<br>[0.006]               |                   | -0.008<br>[0.006]               |                   |
| CIRI Women's Economic Rights        | 0.005<br>[0.005]  |                   | -0.008<br>[0.005]               |                   | -0.001<br>[0.005]               |                   |
| CIRI Women's Social Rights          | -0.005<br>[0.005] |                   | 0.004<br>[0.005]                |                   | 0.000<br>[0.005]                |                   |
| Women Ministers                     | -0.000<br>[0.000] |                   | 0.000<br>[0.000]                |                   | 0.000<br>[0.000]                |                   |
| Female Labour Force Participation   | -0.001<br>[0.001] | -0.000<br>[0.000] | -0.000<br>[0.001]               | -0.000<br>[0.000] | 0.000<br>[0.001]                | -0.000<br>[0.000] |
| Abortion (Save Woman's Life)        | 0.004<br>[0.035]  |                   | -0.007<br>[0.037]               |                   | 0.003<br>[0.035]                |                   |
| Abortion (Fetal Impairment)         | -0.011<br>[0.028] |                   | 0.003<br>[0.030]                |                   | -0.000<br>[0.028]               |                   |
| Women's Protest                     | -0.012<br>[0.012] | -0.007<br>[0.008] | -0.006<br>[0.013]               | 0.002<br>[0.008]  | 0.020*<br>[0.012]               | 0.007<br>[0.008]  |
| Observations                        | 1678              | 3700              | 1678                            | 3700              | 1678                            | 3700              |
| Number of Countries                 | 128               | 165               | 128                             | 165               | 128                             | 165               |
| Explanatory Power                   | 0.009             | 0.008             | 0.007                           | 0.007             | 0.011                           | 0.012             |
| Joint test (F statistic)            | 0.772             | 0.767             | 0.590                           | 0.695             | 0.903                           | 1.246             |
| Joint test (p-value)                | 0.735             | 0.836             | 0.909                           | 0.911             | 0.576                           | 0.152             |
| Country and year FEs                | Y                 | Y                 | Y                               | Y                 | Y                               | Y                 |
| Transformed FEs                     |                   | Y                 |                                 | Y                 |                                 | Y                 |

Notes: Each specification regresses an indicator of a reserved seat quota being adopted at a certain time horizon (contemporaneously, or 1 or 2 years into the future) on a series of women's empowerment and political measures. "Transformed FEs" refers to models which separate variables with considerable missingness out into fixed effects, including a separate FE for observations with missing information, so as to allow for greater data coverage. These variables are the CIRI rights measures, proportion of women ministers, and measures of abortion legality. Explanatory power refers to the within variation explained by these variables, while joint tests refers to the test of joint significance of all RHS measures. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A15. Two-way FE, DID<sub>M</sub>, pooled event studies, and synthetic DID estimates with contemporaneous controls

|                                            | (1)                 | (2)                 | (3)                 | (4)                 | (5)                 | (6)                 |
|--------------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Outcome: ln(MMR)                           |                     |                     |                     |                     |                     |                     |
| <b>Method A: Two-way FE Model</b>          |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | -0.082<br>(0.051)   | -0.088*<br>(0.051)  | -0.080<br>(0.051)   | -0.070<br>(0.049)   | -0.071<br>(0.055)   | -0.062<br>(0.054)   |
| <b>Method B: DID<sub>M</sub> Estimates</b> |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | -0.072*<br>(0.043)  | -0.074*<br>(0.043)  | -0.074*<br>(0.044)  | -0.069<br>(0.044)   | -0.080*<br>(0.047)  | -0.083*<br>(0.050)  |
| <b>Method C: Pooled Event Study</b>        |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | -0.079**<br>(0.032) | -0.079**<br>(0.032) | -0.078**<br>(0.038) | -0.076**<br>(0.037) | -0.058<br>(0.036)   | -0.050<br>(0.044)   |
| <b>Method D: Synthetic DID</b>             |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | -0.127**<br>(0.062) | -0.116*<br>(0.065)  | -0.129*<br>(0.074)  | -0.103<br>(0.063)   | -0.128*<br>(0.073)  | -0.099<br>(0.072)   |
| Negative Weights                           | -0.005              | -0.005              | -0.005              | -0.006              | -0.012              | -0.012              |
| Observations                               | 4335                | 4335                | 4305                | 4324                | 4335                | 4294                |
| Outcome: Women in Parliament               |                     |                     |                     |                     |                     |                     |
| <b>Method A: Two-way FE Model</b>          |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | 5.793***<br>(2.167) | 5.628***<br>(2.027) | 5.712**<br>(2.227)  | 5.747***<br>(2.159) | 6.038***<br>(2.145) | 5.660***<br>(2.052) |
| <b>Method B: DID<sub>M</sub> Estimates</b> |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | 5.678**<br>(2.222)  | 5.172**<br>(2.021)  | 5.671**<br>(2.304)  | 5.674**<br>(2.226)  | 5.167**<br>(2.154)  | 4.644**<br>(2.018)  |
| <b>Method C: Pooled Event Study</b>        |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | 6.622***<br>(1.863) | 6.074***<br>(1.712) | 6.546***<br>(1.800) | 6.603***<br>(2.025) | 6.242***<br>(1.858) | 5.596***<br>(1.578) |
| <b>Method D: Synthetic DID</b>             |                     |                     |                     |                     |                     |                     |
| Reserved Seats                             | 8.281***<br>(3.041) | 7.523***<br>(2.745) | 8.361**<br>(3.535)  | 7.950**<br>(3.401)  | 7.661**<br>(3.099)  | 7.014**<br>(2.833)  |
| Negative Weights                           | -0.005              | -0.005              | -0.005              | -0.006              | -0.012              | -0.012              |
| Observations                               | 4335                | 4335                | 4305                | 4324                | 4335                | 4294                |
| <b>Controls (contemporaneous):</b>         |                     |                     |                     |                     |                     |                     |
| Empowerment & Predictors                   |                     | Y                   |                     |                     |                     | Y                   |
| Democracy                                  |                     |                     | Y                   |                     |                     | Y                   |
| Resources                                  |                     |                     |                     | Y                   |                     | Y                   |
| Region×year FE                             |                     |                     |                     |                     | Y                   | Y                   |

Notes: Refer to notes to Table 1. Identical models are estimated, however in this case rather than including baseline×post-quota controls, contemporaneous versions of all control variables are included. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A 16. Women's Rights and Maternal Mortality

|                                        | (1)<br>ln(MMR)   | (2)<br>ln(MMR)   | (3)<br>ln(MMR)    | (4)<br>ln(MMR)    | (5)<br>ln(MMR)   | (6)<br>ln(MMR)     | (7)<br>ln(MMR)    | (8)<br>ln(MMR)    |
|----------------------------------------|------------------|------------------|-------------------|-------------------|------------------|--------------------|-------------------|-------------------|
| World Bank Women, Business & Law Index | 0.000<br>[0.002] |                  |                   |                   |                  |                    |                   | -0.000<br>[0.004] |
| CIRI Women's Economic Rights           |                  | 0.009<br>[0.014] |                   |                   |                  |                    |                   | 0.025<br>[0.033]  |
| CIRI Women's Political Rights          |                  |                  | -0.010<br>[0.020] |                   |                  |                    |                   | 0.039<br>[0.037]  |
| CIRI Women's Social Rights             |                  |                  |                   | -0.002<br>[0.016] |                  |                    |                   | 0.021<br>[0.051]  |
| Female Labour Force Participation      |                  |                  |                   |                   | 0.002<br>[0.005] |                    |                   | 0.004<br>[0.008]  |
| Proportion of Women Ministers          |                  |                  |                   |                   |                  | 0.002**<br>[0.001] |                   | -0.000<br>[0.001] |
| Proportion of Women's Protests         |                  |                  |                   |                   |                  |                    | -0.002<br>[0.025] | 0.060<br>[0.045]  |
| Observations                           | 4,257            | 3,340            | 3,335             | 2,234             | 4,234            | 1,444              | 4,138             | 355               |
| R-Squared                              | 0.987            | 0.990            | 0.990             | 0.993             | 0.987            | 0.989              | 0.987             | 0.997             |

Each column displays a regression of ln(MMR) on country and year FEs and a particular measure of women's rights or women's standing in society. These are regressed column by column in columns 1-6, and jointly in column 7. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A17. Women's Empowerment, Rights and Maternal Mortality

|                                    | (1)<br>ln(MMR)    | (2)<br>ln(MMR)    | (3)<br>ln(MMR)   | (4)<br>ln(MMR)     | (5)<br>ln(MMR)   | (6)<br>ln(MMR)   | (7)<br>ln(MMR)   | (8)<br>ln(MMR)       | (9)<br>ln(MMR)    | (10)<br>ln(MMR)    |
|------------------------------------|-------------------|-------------------|------------------|--------------------|------------------|------------------|------------------|----------------------|-------------------|--------------------|
| Women Civil Liberty Index          | -0.227<br>[0.141] |                   |                  |                    |                  |                  |                  |                      |                   | -0.058<br>[0.225]  |
| Women Political Particip. Index    |                   | -0.064<br>[0.093] |                  |                    |                  |                  |                  |                      |                   | -0.145<br>[0.118]  |
| Exclusion by Gender Index          |                   |                   | 0.266<br>[0.287] |                    |                  |                  |                  |                      |                   | 0.226<br>[0.325]   |
| Relative Freedom of Movement Women |                   |                   |                  | -0.016*<br>[0.009] |                  |                  |                  |                      |                   | -0.016*<br>[0.008] |
| Relative Access to Justice Women   |                   |                   |                  |                    | 0.001<br>[0.009] |                  |                  |                      |                   | 0.000<br>[0.009]   |
| Relative Freedom of Discussion     |                   |                   |                  |                    |                  | 0.007<br>[0.009] |                  |                      |                   | 0.008<br>[0.009]   |
| Power Distributed by Gender        |                   |                   |                  |                    |                  |                  | 0.023<br>[0.033] |                      |                   | 0.068*<br>[0.036]  |
| Freedom from Forced Labour Women   |                   |                   |                  |                    |                  |                  |                  | -0.091***<br>[0.034] |                   | -0.088*<br>[0.049] |
| Property Rights for Women          |                   |                   |                  |                    |                  |                  |                  |                      | -0.009<br>[0.035] | 0.034<br>[0.045]   |
| Observations                       | 4,104             | 4,104             | 4,094            | 4,012              | 4,014            | 3,998            | 4,014            | 4,014                | 4,014             | 3,963              |
| R-Squared                          | 0.988             | 0.988             | 0.988            | 0.988              | 0.988            | 0.988            | 0.988            | 0.988                | 0.988             | 0.988              |

Each column displays a regression of ln(MMR) on country and year FEs and a particular measure of women's empowerment or women's rights. These are regressed column by column in columns 1-9, and jointly in column 10. Standard errors clustered by country are displayed in parentheses. \* p<0.10; \*\* p<0.05; \*\*\* p<0.01.

TABLE A18. Potential Predictors of Quota Adoption and Maternal Mortality

|                             | (1)<br>ln(MMR)    | (2)<br>ln(MMR)   | (3)<br>ln(MMR)    | (4)<br>ln(MMR)   | (5)<br>ln(MMR)    | (6)<br>ln(MMR)    | (7)<br>ln(MMR)      | (8)<br>ln(MMR)   | (9)<br>ln(MMR)     |
|-----------------------------|-------------------|------------------|-------------------|------------------|-------------------|-------------------|---------------------|------------------|--------------------|
| Development Assistance p.c. | -0.000<br>[0.000] |                  |                   |                  |                   |                   |                     |                  | -0.000<br>[0.000]  |
| Peace Keeper Presence       |                   | 0.000<br>[0.000] |                   |                  |                   |                   |                     |                  | 0.000<br>[0.000]   |
| Right Wing Executive        |                   |                  | -0.004<br>[0.022] |                  |                   |                   |                     |                  | 0.027<br>[0.034]   |
| Left Wing Executive         |                   |                  |                   | 0.023<br>[0.020] |                   |                   |                     |                  | 0.043<br>[0.031]   |
| Years Executive in Power    |                   |                  |                   |                  | -0.003<br>[0.002] |                   |                     |                  | -0.003<br>[0.002]  |
| Herfindahl Index (parties)  |                   |                  |                   |                  |                   | -0.043<br>[0.048] |                     |                  | -0.036<br>[0.049]  |
| Opposition Vote Share       |                   |                  |                   |                  |                   |                   | -0.001**<br>[0.000] |                  | -0.001*<br>[0.001] |
| Transitioning Regime        |                   |                  |                   |                  |                   |                   |                     | 0.025<br>[0.018] | 0.005<br>[0.021]   |
| Observations                | 4,335             | 4,335            | 3,683             | 3,683            | 3,619             | 3,432             | 3,684               | 4,335            | 3,420              |
| R-Squared                   | 0.987             | 0.987            | 0.988             | 0.988            | 0.988             | 0.989             | 0.988               | 0.987            | 0.989              |

Each column displays a regression of ln(MMR) on country and year FEs and a particular measure flagged as a predictor of quota adoption in the political science literature. These are regressed column by column in columns 1-8, and jointly in column 9. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A19. Event Study Results with Alternative Time Windows (ln(MMR))

|                             | Lag/Lead Time Period Only |                    |                    | Accumulating Final Periods |                     |                     |
|-----------------------------|---------------------------|--------------------|--------------------|----------------------------|---------------------|---------------------|
|                             | (1)                       | (2)                | (3)                | (4)                        | (5)                 | (6)                 |
| 10 Years Prior to Adoption  | 0.016<br>[0.041]          |                    |                    | -0.010<br>[0.058]          |                     |                     |
| 9 Years Prior to Adoption   | 0.027<br>[0.040]          |                    |                    | 0.032<br>[0.041]           |                     |                     |
| 8 Years Prior to Adoption   | 0.034<br>[0.036]          | 0.035<br>[0.035]   |                    | 0.039<br>[0.037]           | 0.002<br>[0.049]    |                     |
| 7 Years Prior to Adoption   | 0.022<br>[0.031]          | 0.024<br>[0.031]   |                    | 0.023<br>[0.032]           | 0.023<br>[0.032]    |                     |
| 6 Years Prior to Adoption   | 0.020<br>[0.029]          | 0.022<br>[0.029]   |                    | 0.023<br>[0.030]           | 0.023<br>[0.030]    |                     |
| 5 Years Prior to Adoption   | 0.016<br>[0.024]          | 0.018<br>[0.023]   | 0.022<br>[0.023]   | 0.017<br>[0.024]           | 0.017<br>[0.024]    | 0.007<br>[0.039]    |
| 4 Years Prior to Adoption   | 0.011<br>[0.018]          | 0.013<br>[0.017]   | 0.016<br>[0.016]   | 0.011<br>[0.019]           | 0.011<br>[0.019]    | 0.011<br>[0.019]    |
| 3 Years Prior to Adoption   | 0.016<br>[0.014]          | 0.018<br>[0.014]   | 0.020<br>[0.013]   | 0.014<br>[0.016]           | 0.014<br>[0.016]    | 0.014<br>[0.016]    |
| 2 Years Prior to Adoption   | 0.004<br>[0.011]          | 0.005<br>[0.010]   | 0.007<br>[0.009]   | 0.002<br>[0.012]           | 0.002<br>[0.012]    | 0.002<br>[0.012]    |
| Year of Quota Adoption      | -0.011<br>[0.008]         | -0.011<br>[0.008]  | -0.010<br>[0.007]  | -0.013<br>[0.008]          | -0.013<br>[0.008]   | -0.013<br>[0.008]   |
| 1 Year Following Adoption   | -0.021<br>[0.019]         | -0.020<br>[0.018]  | -0.019<br>[0.016]  | -0.027<br>[0.019]          | -0.027<br>[0.019]   | -0.027<br>[0.019]   |
| 2 Years Following Adoption  | -0.030<br>[0.027]         | -0.029<br>[0.025]  | -0.027<br>[0.024]  | -0.036<br>[0.026]          | -0.036<br>[0.025]   | -0.035<br>[0.025]   |
| 3 Years Following Adoption  | -0.040<br>[0.029]         | -0.039<br>[0.028]  | -0.039<br>[0.026]  | -0.049*<br>[0.028]         | -0.049*<br>[0.028]  | -0.048*<br>[0.028]  |
| 4 Years Following Adoption  | -0.058*<br>[0.034]        | -0.056*<br>[0.033] | -0.054*<br>[0.031] | -0.074**<br>[0.033]        | -0.075**<br>[0.033] | -0.075**<br>[0.033] |
| 5 Years Following Adoption  | -0.068*<br>[0.040]        | -0.066*<br>[0.039] | -0.066*<br>[0.037] | -0.085**<br>[0.039]        | -0.085**<br>[0.039] | -0.119**<br>[0.055] |
| 6 Years Following Adoption  | -0.079*<br>[0.047]        | -0.076<br>[0.046]  |                    | -0.103**<br>[0.047]        | -0.104**<br>[0.047] |                     |
| 7 Years Following Adoption  | -0.088*<br>[0.052]        | -0.085*<br>[0.051] |                    | -0.112**<br>[0.052]        | -0.113**<br>[0.052] |                     |
| 8 Years Following Adoption  | -0.095*<br>[0.057]        | -0.094*<br>[0.056] |                    | -0.119**<br>[0.058]        | -0.132**<br>[0.063] |                     |
| 9 Years Following Adoption  | -0.095<br>[0.062]         |                    |                    | -0.116*<br>[0.063]         |                     |                     |
| 10 Years Following Adoption | -0.102<br>[0.068]         |                    |                    | -0.139**<br>[0.067]        |                     |                     |
| Mean of Dep. Var.           | 4.305                     | 4.284              | 4.251              | 4.357                      | 4.357               | 4.357               |
| Observations                | 4187                      | 4126               | 4025               | 4335                       | 4335                | 4335                |
| R-Squared                   | 0.535                     | 0.529              | 0.523              | 0.548                      | 0.548               | 0.548               |

Coefficients and standard errors are displayed for lags and leads to the adoption of quotas. These follow the style of event studies displayed in Figure A6, however varying time periods considered. Columns 1-3 consider only observations within 10/8/5 years of quota adoption for quota countries, while columns 5-6 consider all observations, accumulating so that the final lag and lead refers to greater than or equal to this length from the policy adoption. All other details follow Figure A6. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A20. Event Study Results with Alternative Time Windows (Women in Parliament)

|                             | Lag/Lead Time Period Only |                     |                     | Accumulating Final Periods |                     |                     |
|-----------------------------|---------------------------|---------------------|---------------------|----------------------------|---------------------|---------------------|
|                             | (1)                       | (2)                 | (3)                 | (4)                        | (5)                 | (6)                 |
| 10 Years Prior to Adoption  | 1.535<br>[1.430]          |                     |                     | 2.939**<br>[1.465]         |                     |                     |
| 9 Years Prior to Adoption   | -0.215<br>[1.873]         |                     |                     | -0.423<br>[1.955]          |                     |                     |
| 8 Years Prior to Adoption   | -0.161<br>[1.680]         | -0.133<br>[1.664]   |                     | -0.343<br>[1.764]          | 2.110<br>[1.521]    |                     |
| 7 Years Prior to Adoption   | -0.082<br>[1.568]         | -0.056<br>[1.550]   |                     | -0.209<br>[1.636]          | -0.199<br>[1.633]   |                     |
| 6 Years Prior to Adoption   | -0.220<br>[1.332]         | -0.195<br>[1.323]   |                     | -0.382<br>[1.401]          | -0.377<br>[1.399]   |                     |
| 5 Years Prior to Adoption   | -0.027<br>[1.142]         | -0.004<br>[1.130]   | -0.026<br>[1.110]   | -0.121<br>[1.208]          | -0.117<br>[1.204]   | 1.361<br>[1.446]    |
| 4 Years Prior to Adoption   | -0.783<br>[1.122]         | -0.774<br>[1.105]   | -0.790<br>[1.088]   | -0.880<br>[1.191]          | -0.872<br>[1.187]   | -0.872<br>[1.191]   |
| 3 Years Prior to Adoption   | -0.300<br>[0.711]         | -0.330<br>[0.714]   | -0.391<br>[0.736]   | -0.251<br>[0.697]          | -0.246<br>[0.694]   | -0.248<br>[0.693]   |
| 2 Years Prior to Adoption   | 0.464<br>[0.576]          | 0.470<br>[0.573]    | 0.450<br>[0.589]    | 0.466<br>[0.583]           | 0.466<br>[0.580]    | 0.466<br>[0.581]    |
| Year of Quota Adoption      | 4.768***<br>[1.786]       | 4.763***<br>[1.787] | 4.716***<br>[1.783] | 4.826***<br>[1.798]        | 4.832***<br>[1.800] | 4.836***<br>[1.797] |
| 1 Year Following Adoption   | 5.816***<br>[1.702]       | 5.788***<br>[1.694] | 5.712***<br>[1.683] | 5.812***<br>[1.717]        | 5.811***<br>[1.721] | 5.817***<br>[1.718] |
| 2 Years Following Adoption  | 6.123***<br>[1.839]       | 6.068***<br>[1.835] | 5.993***<br>[1.829] | 6.109***<br>[1.845]        | 6.104***<br>[1.844] | 6.113***<br>[1.839] |
| 3 Years Following Adoption  | 6.393***<br>[1.926]       | 6.307***<br>[1.909] | 6.060***<br>[1.863] | 6.498***<br>[1.964]        | 6.511***<br>[1.966] | 6.547***<br>[1.966] |
| 4 Years Following Adoption  | 6.056***<br>[1.756]       | 6.001***<br>[1.732] | 5.901***<br>[1.698] | 6.165***<br>[1.805]        | 6.210***<br>[1.820] | 6.276***<br>[1.825] |
| 5 Years Following Adoption  | 7.605***<br>[1.880]       | 7.555***<br>[1.845] | 7.446***<br>[1.785] | 7.740***<br>[1.904]        | 7.777***<br>[1.920] | 7.519***<br>[2.259] |
| 6 Years Following Adoption  | 7.313***<br>[1.940]       | 7.270***<br>[1.898] |                     | 7.435***<br>[1.982]        | 7.484***<br>[2.001] |                     |
| 7 Years Following Adoption  | 7.469***<br>[1.946]       | 7.423***<br>[1.905] |                     | 7.596***<br>[1.986]        | 7.643***<br>[2.004] |                     |
| 8 Years Following Adoption  | 6.225***<br>[2.221]       | 6.242***<br>[2.172] |                     | 6.330***<br>[2.271]        | 7.323***<br>[2.540] |                     |
| 9 Years Following Adoption  | 6.425***<br>[2.271]       |                     |                     | 6.619***<br>[2.325]        |                     |                     |
| 10 Years Following Adoption | 6.589**<br>[2.658]        |                     |                     | 7.708***<br>[2.781]        |                     |                     |
| Mean of Dep. Var.           | 14.144                    | 14.149              | 14.153              | 14.110                     | 14.110              | 14.110              |
| Observations                | 4187                      | 4126                | 4025                | 4335                       | 4335                | 4335                |
| R-Squared                   | 0.459                     | 0.453               | 0.445               | 0.470                      | 0.468               | 0.467               |

Refer to notes to Table A19. All details follow this Table, however now with women in parliament as the dependent variable rather than the log of maternal mortality. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A21. Gender Quotas: TWFE impacts on women in parliament and maternal mortality (5 years pre/post adoption)

|                                           | % Women in Parliament |                     |                     | ln(Maternal Mortality Ratio) |                     |                   | Maternal Mortality Ratio |                       |                        |
|-------------------------------------------|-----------------------|---------------------|---------------------|------------------------------|---------------------|-------------------|--------------------------|-----------------------|------------------------|
|                                           | (1)                   | (2)                 | (3)                 | (4)                          | (5)                 | (6)               | (7)                      | (8)                   | (9)                    |
| <b>Panel A: Intensity by Baseline MMR</b> |                       |                     |                     |                              |                     |                   |                          |                       |                        |
| Reserved Seats                            | 6.040***<br>[1.705]   |                     |                     | -0.046*<br>[0.028]           |                     |                   | -56.135**<br>[23.932]    |                       |                        |
| Reserved Seats × Baseline MMR             |                       | 0.688**<br>[0.312]  |                     |                              | -0.012**<br>[0.006] |                   |                          | -16.638***<br>[4.078] |                        |
| Reserved Seats (Low Baseline MMR)         |                       |                     | 6.607**<br>[2.800]  |                              |                     | -0.027<br>[0.034] |                          |                       | 11.814<br>[9.759]      |
| Reserved Seats (Mid Baseline MMR)         |                       |                     | 4.673***<br>[1.378] |                              |                     | -0.030<br>[0.020] |                          |                       | -50.094***<br>[12.318] |
| Reserved Seats (High Baseline MMR)        |                       |                     | 5.920*<br>[3.168]   |                              |                     | -0.079<br>[0.071] |                          |                       | -128.876**<br>[57.497] |
| Mean of Dep. Var.                         | 14.153                | 14.223              | 14.153              | 4.251                        | 4.245               | 4.251             | 218.745                  | 209.709               | 218.745                |
| Observations                              | 4025                  | 3903                | 4025                | 4025                         | 3903                | 4025              | 4025                     | 3903                  | 4025                   |
| Number of Countries                       | 178                   | 167                 | 178                 | 178                          | 167                 | 178               | 178                      | 167                   | 178                    |
| R-Squared                                 | 0.445                 | 0.439               | 0.443               | 0.523                        | 0.522               | 0.523             | 0.219                    | 0.252                 | 0.224                  |
| <b>Panel B: Intensity by Quota Size</b>   |                       |                     |                     |                              |                     |                   |                          |                       |                        |
| Reserved Seats                            | 6.040***<br>[1.705]   |                     |                     | -0.046*<br>[0.028]           |                     |                   | -56.135**<br>[23.932]    |                       |                        |
| Reserved Seats × Quota Size               |                       | 0.246***<br>[0.080] |                     |                              | -0.002<br>[0.002]   |                   |                          | -3.275**<br>[1.288]   |                        |
| Reserved Seats (0-10)%                    |                       |                     | 3.368**<br>[1.506]  |                              |                     | 0.011<br>[0.027]  |                          |                       | -4.617<br>[11.993]     |
| Reserved Seats (10-20)%                   |                       |                     | 9.546***<br>[2.083] |                              |                     | -0.041<br>[0.026] |                          |                       | -31.898<br>[21.018]    |
| Reserved Seats (20-30)%                   |                       |                     | 4.902**<br>[2.385]  |                              |                     | -0.073<br>[0.048] |                          |                       | -94.126**<br>[41.430]  |
| Mean of Dep. Var.                         | 14.153                | 14.153              | 14.153              | 4.251                        | 4.251               | 4.251             | 218.745                  | 218.745               | 218.745                |
| Observations                              | 4025                  | 4025                | 4025                | 4025                         | 4025                | 4025              | 4025                     | 4025                  | 4025                   |
| Number of Countries                       | 178                   | 178                 | 178                 | 178                          | 178                 | 178               | 178                      | 178                   | 178                    |
| R-Squared                                 | 0.445                 | 0.442               | 0.444               | 0.523                        | 0.523               | 0.523             | 0.219                    | 0.222                 | 0.222                  |

Difference-in-differences (two-way fixed effect) estimates of the impact of reserved seats in parliament on women in parliament (columns 1-3), the log of the maternal mortality ratio (columns 4-6), and MMR in levels (columns 7-9) are displayed, following Table A3. However here quota adopting countries are only considered in the 5 years pre and post-quota adoption. All other details follow those in Table A3. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

TABLE A22. Examining Impacts on Maternal Mortality Removing Outliers

|                    | Main                   |                       | Winsorizing            |                        |                         | Removing               |                        |                        |                         |
|--------------------|------------------------|-----------------------|------------------------|------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------|
|                    | (1)                    | (2)                   | (3)                    | (4)                    | (5)                     | (6)                    | (7)                    | (8)                    | (9)                     |
|                    |                        | 500                   | 90%                    | 95%                    | 99%                     | 500                    | 90%                    | 95%                    | 99%                     |
| Reserved Seats     | -106.107**<br>[43.036] | -33.339**<br>[14.065] | -58.942***<br>[17.676] | -83.957***<br>[25.159] | -111.504***<br>[42.685] | -50.364***<br>[16.849] | -57.398***<br>[18.094] | -60.595***<br>[17.587] | -105.547***<br>[42.612] |
| Observations       | 4,335                  | 4,335                 | 4,335                  | 4,335                  | 4,335                   | 3,526                  | 3,901                  | 4,117                  | 4,290                   |
| R-Squared          | 0.27                   | 0.28                  | 0.30                   | 0.32                   | 0.30                    | 0.29                   | 0.29                   | 0.29                   | 0.29                    |
| Mean of Dep. Var.  | 233.4                  | 177.4                 | 206.2                  | 218.2                  | 229.3                   | 103.4                  | 150.5                  | 183.5                  | 218.0                   |
| Baseline Mean      | 448.1                  | 337.9                 | 398.0                  | 424.1                  | 447.9                   | 223.0                  | 323.1                  | 362.5                  | 441.7                   |
| Implied Percentage | -23.7                  | -9.9                  | -14.8                  | -19.8                  | -24.9                   | -22.6                  | -17.8                  | -16.7                  | -23.9                   |

Note: Column 1 estimates a standard two-way FE model regressing MMR in levels on a reserved seat indicator along with country and year fixed effects. Columns 2-5 Winsorize MMR at the level or percentile indicated in column headings, and columns 6-9 remove values for MMR above the level or percentile indicated in column headings, in each case re-estimating the model from column 1. A formal test of equality of coefficients between columns (1) and (2) based on seemingly unrelated regression is rejected with  $p < 0.01$ . Mean of Dep. Var. presents the mean of the transformed dependent variable, Baseline Mean presents the mean of the transformed dependent variable in quota countries prior to quota implementation, and Implied Percentage expresses the estimated reduction in MMR as a percent of the Baseline Mean. Standard errors clustered by country are displayed in parentheses. \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

## Appendix C: Appendix: Robustness Checks

We summarized robustness checks in the main text, here we provide full details.

**Alternative estimators and pre-trends.** The placebo coefficients in the main results shown above are not significantly different from zero. The estimates stand up to including country-specific linear trends and region $\times$ year fixed effects (Figure 3). However, if standard tests of pretrends are underpowered, we might fail to capture the evolution of a relevant unobservable trend. To address this concern, we follow the “Honest DiD” procedure of Rambachan and Roth (2020) and estimate upper and lower bounds on the dynamic effects. For both women in parliament (Figure 4a) and MMR (Figure 4b) these bounds are informative at 95% or, in some cases in later periods, at 90%.<sup>1</sup>

Motivated by the possible concern that countries that do and do not adopt quotas are likely to be quite different, we generate synthetic controls for each treated country so as to achieve a match on pre-treatment levels of maternal mortality, drawing controls from the same geographic region as the treated country, and hence potentially subject to similar regional shocks. We aggregate estimates of treatment leads and lags across all treatment–synthetic control pairs, and implement an inference procedure based on clustered permutation to generate confidence intervals for these estimates. Appendix E details the procedures. The results in Figure 5 show no evidence of differential pre-trends, and a significant post-reform decline in MMR. We further re-estimate the models using the synthetic difference-in-differences procedure of Arkhangelsky et al. (2021) and we observe, if anything, slightly larger effects, see panel D of Table 1. This procedure involves generating quota adoption year specific synthetic controls, placing more weights on countries and years which are more similar to treatment countries and periods. A selection of year-specific treatment units and synthetic controls is presented in Appendix Figure A50, along with details of their construction. These figures reveal gradual declines in MMR in treated units that are larger than in the respective synthetic controls.

Table 1 shows that summary effect sizes from alternative estimators are fairly similar in magnitude. This suggests that, in our setting, the potential bias in the single coefficient two-way FE model discussed in Goodman-Bacon (2021) and de Chaisemartin and D’Haultfœuille (2020) is in fact small. To illuminate this we provide the Goodman-Bacon (2021) decomposition of the identifying variation into its treatment vs. pure control and differential timing components (Table A5). We find that 95.4% of the estimated effect derives from the double-difference comparison of treated with never-treated units. The drop in MMR (of about 7%) is similar when we compare early to late adopters (prior to adoption) to that obtained when comparing aggregate TWFE estimates of treated vs. never treated countries, albeit the weight attached to the

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1. This exercise runs off the TWFE estimator. Below, we discuss that, in our setting, it delivers estimates similar to the preferred estimator.

latter is much greater (panel (b)). The reason that results from two-way FE are close to those from the alternative estimators which more completely isolate the pure treatment versus control comparisons is that the majority of weights in the decomposition are attached to comparing treated to pure control units in a TWFE setting, with the share of units with ‘negative weights’ (de Chaisemartin and D’Haultfœuille, 2020) being small (Table 1). Figure A16 also reveals that the treatment versus pure-control estimates are quite closely clustered around the average effect (indicated by the dashed red line), which suggests that the observed reduction in MMR is observed broadly, rather than being driven by outliers. Indeed, when we present leave-one-out estimates in Figures A17–A20, these are indistinguishable from the main results, establishing that they are not driven by any particular country.

So far we have displayed reduced form estimates. We also estimated LIML regressions of MMR on the share of women in parliament, instrumented with quota implementation. If quotas were proxying an omitted variable the exclusion restriction would fail, but inference can still proceed on the premise of “plausible exogeneity”, which delivers bounds on the IV estimates (Conley et al., 2012). The estimates in Table A6 provide the scaled impact of women’s parliamentary representation among compliers. The IV point estimates indicate that a 1 percentage point increase in women’s share in parliament is associated with a 1.5 to 2.0% decrease in MMR. In estimating bounds, we allow the adoption of quotas to have a direct impact on MMR of up to  $-1\%$  over and above its impact on MMR via women in parliament. The estimated bounds are informative, indicating a 0.01% to 3.7% reduction in maternal mortality for a 1 percentage point increase in the share of women in parliament. We provide weak IV robust Anderson-Rubin confidence sets in Table A6 and plot the implied rejection probabilities for the null across a range of null hypotheses in Figure A21, both of which suggest that the observed relationship between women in parliament and MMR is robust to corrections for weak instruments. These results add to the overall weight of the evidence provided in this section.

**Women’s rights as predictors of gender quota legislation.** The multiple approaches to investigating pre-trends discussed in the preceding section allay the key identification concerns. We nevertheless directly investigate the possibility that our results derive from social preferences evolving gradually to favor gender equality, with gender quota legislation being one manifestation of this. This is plausible in view of historical evidence that laws are often passed once society is ready to comply with them (Doepke and Zilibotti, 2005; Platteau and Wahhaj, 2014). To measure social preferences and gender progressiveness in the policy environment, we pulled together data on 18 indicators of gender progressivity in the political, economic and civil domains including indices of women’s civil liberties, access to justice, economic rights, women’s protests and the passage of abortion law (the full set of indicators is visible in the Figures and defined in the Data Appendix D). To examine the concern that the timing of quota adoption is a response to an upward drift in women’s position, we use the same empirical strategy as for the main analysis, focusing on whether any of these 18 indicators shows an uptick prior to quota adoption. The estimates

are in Figures A22 and A23 (and the equivalent event study estimates are in Figures A37 and A38). The placebo coefficients of the de Chaisemartin and D'Haultfœuille estimates allow us to reject a positive pre-trend for each of the 18 indicators – and thus to reject that quotas were adopted following improvements in other measures of equality for women. We bolster this evidence by regressing quota adoption on the full set of empowerment variables. We provide the F-statistic for joint significance of these variables, showing that it is small (Table A14).

Our findings are plausible. While the progression of gender equality in society is likely to eventually culminate in increased attention to women's reproductive health, this is likely to be a slow process. In contrast, we discover that giving women instrumental power to directly influence policy can effect sharp change. We will pursue evidence of this in the section on mechanisms, where we use the same identification strategy to test for impacts of discontinuous changes in women's political power on a series of intermediate outcomes that (a) can be influenced by policy and (b) are known to bring MMR down. In contrast, as discussed above, few of the 18 indicators of women's equality are associated with MMR decline (Tables A16–A17).

One may be concerned that the findings reflect noisy measurement of the progressivity indicators. This concern is allayed in the specifications that involve putting them together on the right-hand side, or creating an index of them. It is further mitigated by evidence that the measures are meaningful insofar as we see improvements *after* quotas are legislated in indices of women's political rights, political participation, power distribution by gender, and exclusion by gender. We discuss the post-quota (dynamic) coefficients in the Mechanisms section, as any changes that occur after quota adoption potentially reflect mechanisms by which quota adoption leads to MMR decline.

**Political variables as predictors of gender quota legislation.** If not women's rights then what is it that determines adoption of quota legislation? We could find no systematic quantitative analysis of this question, but, case studies in the political science literature indicate the possible relevance of pressure from international organizations (proxied by overseas development assistance), occasions of broader constitutional reform including regime transitions post-conflict reconstruction and the presence of peace-keeping forces (Krook, 2010; Baines and Rubio-Marin, 2005).<sup>2</sup> One might imagine that these same factors may have had direct impacts on MMR decline. To establish whether the estimated impacts of quota adoption might instead reflect political changes, we follow the same approach as for women's rights, scrutinizing pre-trends in seven measures of the political environment, see Figure A24

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2. Rwanda is a case in point. Women make up 62 percent of Rwanda's national legislature, the highest share in the world, and this happened as part of a major constitutional reform in the wake of the genocide. In Nepal there was similarly a major jump in the share of women in parliament in 2008 to 32.8% in the wake of political transformation.

(and see Figure A49 for the standard event studies). There are no significant placebo coefficients. The concern that our results are driven by political variables is further undermined by their bearing no clear association with MMR decline (Table A18).

**Controlling for potential predictors of quota adoption.** As discussed, we find no evidence that the 25 potential predictors, including women's rights and the political variables, predict quota adoption, or that they predict MMR. We nevertheless control in the main analysis for an index of the baseline (pre-quota, 1995) value of the indicators interacted with a dummy for post-quota years.<sup>3</sup> We find that the estimated impact of quotas on MMR is larger and not statistically significantly different from the baseline estimate, see Figure 3, as well as full dynamic estimates with inference in Figures A25 and A26. We also tested a series of placebo trend breaks, three to ten years before the date of quota legislation in each country, and find no evidence of a pre-legislation break in the trend in MMR (Table A7).

**Endogenous changes in the composition of women giving birth.** If gender quotas lead to a shift in the composition of births such that women with lower baseline risks of maternal death are over-represented after quotas, then this could explain our finding of lower MMR. A compositional shift is not implausible given that we find an impact of quotas on fertility (Section 7). We cannot investigate compositional change using aggregate country-year data on fertility, we need information on mother characteristics. To achieve this, we created a pseudo panel of births in the DHS data based on 10,837,442 births for 3,079,298 individual women from 82 countries surveyed in a total of 34 different years.<sup>4</sup> We model quota impacts on birth rates of women of different education and age categories, and on the sex ratio (male/female) of births, a proxy for maternal health (Waldron, 1983; Low, 2000). We find no significant shifts in composition by any of these measures, see Figures A27–A30. Our estimates are robust to controlling for time-varying measures of the age and educational composition of mothers, see Figure 3 and Figure A34 panel d).

**Measurement of maternal mortality.** Since MMR varies considerably across countries, proportional changes implied by using logarithms will exaggerate achievements in countries with lower baseline rates (Deaton, 2006), and we showed that treatment effects exhibit heterogeneity by baseline rates. We estimated an alternative model replacing the logarithm with the level of the MMR ratio, and the

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3. We use standardized versions of the underlying variables. We create separate indices, one for women's rights, one for the political variables and one for resources, which includes GDP, health expenditure per capita, and overseas development assistance for maternal health. We show that the results are not sensitive to whether we use these pre-quota indices times post-quota, or if instead we just include contemporaneous measures of the variables, see Table A15.

4. The DHS are available for 14 of 22 reforming countries and 59 of 156 non-reforming countries. Construction of the pseudo-panel on fertility is described in the supplementary data section, and total fertility rate (TFR) is constructed as a weighted average of age-specific fertility rates.

results hold (see Table A3).<sup>5</sup> A second issue is that the MMR data we use derive from vital statistics and demographic survey data, with gaps filled using modelled predictions (Alkema et al., 2017, 2016; World Health Organization, 2015; Wilmoth et al., 2012). About 76% of the country-year observations are original survey data points, the remaining 24% being imputed. The data come with uncertainty intervals. We examine sensitivity of our estimates to this using three approaches. First, Figure 3 shows that removing countries for which all observations are imputed has no substantive impact on the findings. Second, we directly account for this uncertainty, using a double-bootstrap procedure re-sampling over the uncertainty intervals to calculate the standard errors. The results are in Table A8. Allowing for correlation within country reduces the estimated uncertainty. For the preferred de Chaisemartin and D'Haultfœuille (2020) DID<sub>M</sub> estimator and the synthetic DID, with a triangular resampling procedure, the estimates tend to uphold the main results. Third, we use an alternative measure of MMR which we derive from survey-based reports of sister deaths of DHS respondents, following the procedure detailed in Bhalotra and Clarke (2019). The DHS maternal mortality module was implemented for 44 countries, of which 11 implemented quotas, and it covers the analysis period, 1990–2015. Using these data, we find a similar pattern of results (Figures A31 and A32). While less precisely estimated, the effects are larger, consistent with the DHS countries having higher MMR on average.

Another possible concern is that the availability and quality of MMR data is endogenous. If women parliamentarians, motivated by a concern to reduce MMR, improve surveillance and tracking of MMR (“we measure what we treasure”), this will render our estimates conservative. For instance, if women parliamentarians act to expand surveillance coverage by counting maternal deaths in remote under-developed areas then, other things equal, measured MMR will tend to increase. However, in principle this could go the other way if women politicians face more scrutiny of MMR and they react by pulling back on counting maternal deaths. Alternatively, if women politicians act to reduce the variance of (mean zero) measurement error in MMR, this could make finding significant effects more likely. We acknowledge this problem without directly addressing it, but the fact that we identify mechanisms consistent with actual reductions in MMR suggests that our findings are less likely to be driven by changes in MMR measurement.

**Sensitivity to sample and clustering.** We explained earlier that including never-treated countries in the estimation sample aids identification of dynamic effects. We nevertheless assessed sensitivity to dropping the 51 high income countries and found that this yields essentially identical estimates (Figures A34, A35, A51, and A52),

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5. The estimated impact is larger on account of outliers. If we winsorize MMR at 500 deaths per 100,000 live births, top-coding 806 observations with values above 500, the effect sizes in the levels model broadly agree with effect sizes in logs, see Table A22 (where we additionally document other cutoffs, as well as dropping rather than winsorizing at the top end).

consistent with the MMR profile of these countries being relatively flat.<sup>6</sup> When we further restrict the sample only to countries in Africa, we again find results consistent with those in the full sample (Figure 3), consistent with the majority of countries adopting quotas being African. To assess sensitivity to changes in the composition of countries in the panel, we dropped the 7 countries that passed quotas after 2005 to create a balanced sample with the baseline window of 10 years pre and post-quota. The estimates are again unchanged (Figure 3). Estimates based on shorter time-horizons of 5 and 8 years pre- and post-quota adoption also agree with the baseline results using a 10 year window (Tables A19, A20 and A21).

In Section 7 we will analyse mechanisms. For some mechanisms variables, the data are sparser than for the main results. We therefore re-estimate the main results on the common sample, see Figure A33 (and Figure A53 for corresponding  $DID_M$  plot). The results are less precise in this smaller sample but the broad patterns remain. Inference in our main specifications treats the data as independent across countries, but not within countries. To address the potential concern that quota implementation was temporally correlated, we estimate event studies with two-way clustering (Cameron et al., 2011) of standard errors by both country and by year, see Figures A34–A35. While the confidence intervals are now wider, we still observe statistically significant effects.

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6. The sum of negative weights increases by 50% when we remove high income countries, but it remains small.

## Appendix D: Data Appendix

The following table provides an exhaustive list of the variables used in the paper along with the original sources.

| Variable (Source)                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Maternal Mortality, Cross Country</i> (MMEIG – modelled estimates) | We used recently released estimates of the maternal mortality ratio (MMR) per 100,000 live births produced by the Maternal Mortality Estimation Inter-Agency Group (MMEIG) and published in the World Bank World Development Indicators (WDI, indicator SH.STA.MMRT). These data were made available for the first time in the year 2016 and before that there were no reliable annual cross-country data on MMR. These estimates were available for 183 countries annually for the period 1990–2015. Maternal mortality is identified using ICD-10 codes O00–O99 (Pregnancy, childbirth and puerperium); the official definition is “the number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births.” These are widely considered the best MMR measures to date, as they address known measurement difficulties in survey and vital statistics data on maternal mortality using Bayesian methods applied to multiple, complementary data sources including vital statistics, special inquiries, surveillance sites, population-based household surveys and census files (Alkema et al., 2016, 2017). The world distribution of average MMR for the period of 1990–2015 is in Figure A3. |
| <i>Maternal Mortality, Indian states</i> (SRS)                        | State-level estimates of maternal mortality in India are gleaned from the Office of the Registrar General & Census Commissioners Sample Registration System (SRS) Bulletins (RGI, 2006). These data are available for the 15 large states – Andhra Pradesh, Assam, Bihar (including Jharkhand), Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh (including Chattisgarh), Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (including Uttarakhand), and West Bengal – for the period of 1997–2003. These are complemented by an aggregate (state-level) estimate from 1986, reported in Ram et al. (2006) covering the same large states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Ethnic Composition</i> (HIEF)                                      | Ethnic composition is measured by Ethnic Fractionalization (EF Index), which is the probability that two individuals who are chosen at random from a country belong to two different ethnic groups. Time-varying data on EF come from Historical Index of Ethnic Fractionalization Dataset (HIEF) V 2.0 (Dražanová, 2020), downloaded from the Harvard Dataverse ( <a href="https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/4JQRCL">https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/4JQRCL</a> ). The dataset is available for the years 1945–2013.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>Political Gender Quota Data, Cross-Country</i> (IDEA)              | We collated measures for each country of whether the country has a legislated and binding reserved seat quota for women, its year of implementation, and the size of the quota measured as number of seats divided by all seats in the uni- or bi-cameral chamber. To create the database, we started with measures provided by Dahlerup (2005) and completed the most recent years from Global Database of Quotas for Women database which is a repository developed and maintained by the International Institute for Democracy and Electoral Assistance (IDEA), the Inter-Parliamentary Union, and Stockholm University.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>Political Gender Quota Data, India</i> (Iyer et al. (2012))        | State-level data on the reservation of seats for women in local councils come from Iyer et al. (2012) who provide a time-varying state-level indicator for when women were given political representation. “[T]he indicator equals one in the years following the first local government election that implemented the not less than one-third reservation scheme for women representatives” (Iyer et al., 2012).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

(continued on next page)

| Variable (Source)                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Women in Parliament Data</i> (WDI, MDG, (Paxton et al., 2008)) | We used three distinct annual-level measures of women in parliament to construct a comprehensive panel of the percentage of women occupying seats in the national parliament. These were the WDI indicator SG.GEN.PARL.ZS (“Proportion of seats held by women in national parliaments (%)”), The UN Millennium Development Goals (MDG) Indicators (“Seats held by women in national parliament, percentage”), and the Inter university Consortium for Political and Social Research (ICPSR) dataset compiled by (Paxton et al., 2008) (“Women in Parliament, 1945–2003: Cross-National Dataset”). The first two of these datasets had partially-complete coverage for the years 1990, and then 1997–2015, while the latter had partially-complete yearly coverage for each year starting in 1945, and ending in 2003. In order to construct as comprehensive a series as possible, we began with the WDI data, and then imputed missing years where available from the MDG indicators, and Paxton et al. (2008) data. When a missing WDI year was available in both the MDG and the ICPSR dataset, we favored the MDG measure, which was estimated using the same sample and year. Figures A7b and A7a present the distribution of the proportion of women in parliament pre- and post-quota implementation in quota countries, as well as the full distribution of the proportion of women in parliament over the period under study. |
| <i>Health Expenditure</i> (WHO)                                   | Health expenditure at the country-year level was taken from the World Health Organization the National Health Accounts (NHA) data series. These provide a measure of total health expenditure as a percent of GDP, and are available for the years 1995–2013.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <i>Development assistance for health</i> (IHME)                   | Development assistance for health (DAH) data are based on the Institute for Health Metrics and Evaluation (IHME) Development Assistance for Health Database (1990–2017). These data are available at the source country $\times$ receiver country $\times$ year level. We compute the proportion Development Assistance for Health to Maternal Health as: $\frac{\text{Development Assistance for Health to Maternal Health}}{\text{Development Assistance for Health}} \times 100$ . Development Assistance for Health disbursed from all channels (constant 2017 US dollars)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Women's Protests</i> (Bell et al., 2019)                       | We compute the proportion of women's protests using country-level panel data on women's protests and total protests from Bell et al. (2019). (We are grateful to Sam Bell for sharing the data with us.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>Contraception Prevalence</i> (UN – modelled estimates)         | This variable measures the percentage of Women of reproductive age (15–49 years) who are currently using any modern method of contraception. The annual data are from the “ESTIMATES AND PROJECTIONS OF FAMILY PLANNING INDICATORS 2020” dataset generated by the UN Department of Economics and Social Affairs, Population Division. Downloaded from <a href="https://www.un.org/development/desa/pd/data/family-planning-indicators">https://www.un.org/development/desa/pd/data/family-planning-indicators</a> on 03/02/2021.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>Adult Male &amp; Female Mortality</i> (World Bank)             | Data on male/female mortality for adults are available in the World Bank Data Bank (indicators SP.DYN.AMRT.MA and SP.DYN.AMRT.FE), based on measures from the United Nations Population Division, World Population Prospect and University of California, Berkeley, and Max Planck Institute for Demographic Research. This is measured as mortality between the ages of 15–60, per 1,000 male adults, and captures the likelihood that a male/female of age 15 dies by the age of 60.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <i>Tuberculosis Mortality</i> (WHO)                               | This is measured as the number of deaths due to Tuberculosis among HIV negative people, and is measured per 100,000 population. The data are from the WHO and were downloaded from: <a href="http://apps.who.int/gho/data/view.main.57020ALL?lang=en">http://apps.who.int/gho/data/view.main.57020ALL?lang=en</a> , accessed on 17/03/2016. Further details on estimation are provided here: <a href="https://www.who.int/data/gho/indicator-metadata-registry/imr-details/1425">https://www.who.int/data/gho/indicator-metadata-registry/imr-details/1425</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <i>Women's Rights</i> (CIRI)                                      | Measures of women's political, economic, and social rights data are based on the Cingranelli et al. (2013) data set available from <a href="http://www.humanrightsdata.com/">http://www.humanrightsdata.com/</a> . We use the three following variables:<br>- <i>Womens Political Rights</i> : takes into account women's rights to vote, to run for political office, to hold elected and appointed government positions, to join political parties, and to petition government officials. This variable takes discrete values between 0 and 3, with 3 representing high rights and 0 representing low rights. This variable is available for the period of 1981–2011 for approximately 139 (in 1990) to 195 (in 2011) countries.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| Variable (Source)     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| Women's Rights (VDEM) | <p>- <i>Womens Economic Rights</i>: takes into account women's rights to equal pay for equal work, free choice of profession or employment without the need to obtain a husband or male relative's consent, the right to gainful employment without the need to obtain a husband or male relative's consent, equality in hiring and promotion practices, job security (maternity leave, unemployment benefits, no arbitrary firing or layoffs, etc.), non-discrimination by employers, be free from sexual harassment in the workplace, to work at night, to work in occupations classified as dangerous, to work in the military and the police force. This variable is available for the period of 1981–2011 for approximately 139 (in 1990) to 195 (in 2011) countries.</p> <p>- <i>Women's Social Rights</i>: takes into account women's rights to equal inheritance; enter into marriage on a basis of equality with men; travel abroad; obtain a passport; confer citizenship to children or a husband; initiate a divorce; own, acquire, manage, and retain property brought into marriage; participate in social, cultural, and community activities; education; and freedoms to choose a residence/domicile, and from female genital mutilation of children and of adults without their consent, and from forced sterilization. This variable is available for the period of 1981–2007 for approximately 139 (in 1990) to 193 (in 2007) countries.</p> <p>Measures of women's rights and measures of relative social standing are based on data collected in the Variety of Democracy dataset Version 10 (Coppedge et al., 2020b; Pemstein et al., 2020) – VDEM-10 – downloaded from <a href="https://www.v-dem.net/en/data/data/v-dem-dataset/">https://www.v-dem.net/en/data/data/v-dem-dataset/</a> on the 27/10/2020. When generating ratios of women to male outcomes these are Winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles to avoid outliers in cases where the denominator is very small. We follow suggested practices in removing a small number of observations which are coded by 3 or fewer country experts (Coppedge et al., 2020b) in "C" type variables from the VDEM data which are based on the opinions of country experts. We specifically use the following variables:</p> <p>- <i>Womens Civil Liberties Index</i> (v2x_gencl – modelled estimates): "The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for freedom of domestic movement for women (v2cldmovew), freedom from forced labor for women (v2clslavef), property rights for women (v2clprptyw), and access to justice for women (v2clacjstw)" (Coppedge et al., 2020a).</p> <p>- <i>Womens Political Participation Index</i> (v2x_genpp): "The index is formed by taking the average of the indicators for lower chamber female legislators (v2lgfemleg, standardized) and power distributed by gender (v2pepwrgen)" (Coppedge et al., 2020a).</p> <p>- <i>Exclusion by Gender Index</i> (v2xpe_extgender – modelled estimates): "The index is formed by taking the point estimates from a Bayesian factor analysis model of the indicators power distributed by gender (v2pepwrgen), equality in respect for civil liberties by gender (v2clgencl), access to public services by gender (v2peapsgen), access to state jobs by gender (v2peasjgen), and access to state business opportunities by gender (v2peasbgen)" (Coppedge et al., 2020a).</p> <p>- <i>Relative Freedom of Movement for Women</i>: Ratio of freedom of domestic movement for women (v2cldmovew) / freedom of domestic movement for men (v2cldmovem). The indicators specify "the extent to which all women / men are able to move freely, in daytime and nighttime, in public thoroughfares, across regions within a country, and to establish permanent residency where they wish" (Coppedge et al., 2020a).</p> <p>- <i>Relative Access to Justice for Women</i>: Ratio of Access to justice for women (v2clacjstw) / Access to justice for men (v2clacjstm). Access to justice "specifies the extent to which women/men can bring cases before the courts without risk to their personal safety, trials are fair, and women have effective ability to seek redress if public authorities violate their rights, including the rights to counsel, defense, and appeal" (Coppedge et al., 2020a).</p> |
|                       | (continued on next page)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Variable (Source)                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Women, Business and the Law Index<br>(World Bank) | - <i>Relative Freedom of Discussion for Women</i> : Ratio of Freedom of discussion for women (v2cldiscw) · Freedom of discussion for men (C) (v2cldiscm) · “specifies the extent to which [women/men are able to engage in private discussions, particularly on political issues, in private homes and public spaces (restaurants, public transportation, sports events, work etc.) without fear of harassment by other members of the polity or the public authorities. We are interested in restrictions by the government and its agents but also cultural restrictions or customary laws that are enforced by other members of the polity, sometimes in informal ways” (Coppedge et al., 2020a). |
|                                                   | - <i>Power distributed by gender</i> (v2pepwrgen): Measures if political power distributed according to gender. Lower values indicate men have near-monopoly on political power, while higher values indicate more equality in power between women and men.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                   | - <i>Freedom from forced labor for women</i> (v2clslavef): measures whether adult women free from servitude and other kinds of forced labor. “Involuntary servitude occurs when an adult is unable to quit a job s/he desires to leave not by reason of economic necessity but rather by reason of employers coercion. This includes labor camps but not work or service which forms part of normal civic obligations such as conscription or employment in command economies” (Coppedge et al., 2020a).                                                                                                                                                                                             |
|                                                   | - <i>Property rights for women</i> (v2clprptyw): measures whether women enjoy the right to private property. “Private property includes the right to acquire, possess, inherit, and sell private property, including land. Limits on property rights may come from the state (which may legally limit rights or fail to enforce them); customary laws and practices; or religious or social norms. This question concerns the right to private property, not actual ownership of property.” (Coppedge et al., 2020a).                                                                                                                                                                                |
|                                                   | The WBL index is a recently released index covering 170 countries between 1970–2020, providing a measures of women’s equality in development outcomes, labor force participation, vulnerable employment and political participation where scores are based on the average of each economy’s scores for 8 distinct topics listed below. A higher score indicates more gender equal laws.                                                                                                                                                                                                                                                                                                              |
|                                                   | Mobility – Incorporates answers to the following questions – Can a woman apply for a passport in the same way as a man? Can a woman travel outside the country in the same way as a man? Can a woman travel outside her home in the same way as a man? Can a woman choose where to live in the same way as a man?                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                   | Workplace – Incorporates answers to the following questions – Can a woman get a job in the same way as a man? Does the law prohibit discrimination in employment based on gender? Is there legislation on sexual harassment in employment? Are there criminal penalties or civil remedies for sexual harassment in employment?                                                                                                                                                                                                                                                                                                                                                                       |
|                                                   | Pay – Incorporates answers to the following questions – Does the law mandate equal remuneration for work of equal value? Can a woman work at night in the same way as a man? Can a woman work in a job deemed dangerous in the same way as a man? Can a woman work in an industrial job in the same way as a man?                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                   | Marriage – Incorporates answers to the following questions – Is there no legal provision that requires a married woman to obey her husband? Can a woman be head of household in the same way as a man? Is there legislation specifically addressing domestic violence? Can a woman obtain a judgment of divorce in the same way as a man? Does a woman have the same rights to remarry as a man?                                                                                                                                                                                                                                                                                                     |
|                                                   | Parenthood – Incorporates answers to the following questions – Is paid leave of at least 14 weeks available to mothers? Length of paid maternity leave? Does the government administer 100% of maternity leave benefits? Is there paid leave available to fathers? Length of paid paternity leave? Is there paid parental leave? Shared days? Days for the mother? Days for the father? Is dismissal of pregnant workers prohibited?                                                                                                                                                                                                                                                                 |

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| Variable (Source)                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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|                                                                            | <p>Entrepreneurship – Incorporates answers to the following questions – Can a woman sign a contract in the same way as a man? Can a woman register a business in the same way as a man? Can a woman open a bank account in the same way as a man? Does the law prohibit discrimination in access to credit based on gender?</p> <p>Assets – Incorporates answers to the following questions – Do men and women have equal ownership rights to immovable property? Do sons and daughters have equal rights to inherit assets from their parents? Do male and female surviving spouses have equal rights to inherit assets? Does the law grant spouses equal administrative authority over assets during marriage? Does the law provide for the valuation of non-monetary contributions?</p> <p>Pension – Incorporates answers to the following questions – Is the age at which men and women can retire with full pension benefits the same? Is the age at which men and women can retire with partial pension benefits the same? Is the mandatory retirement age for men and women the same? Are periods of absence due to childcare accounted for in pension benefits?</p> |
| <i>Women's Rights</i> (additional data)                                    | <p>We gleaned Womens rights data from several additional sources:</p> <ul style="list-style-type: none"> <li>- <i>Women Ministers</i>: Women Minister data is drawn from the Inter Parliamentary Union (IPU). These were compiled based on country year aggregates for 1994, 1998, 2000, 2005, 2008, 2010, 2012, 2014 and 2015.</li> <li>- <i>Female Labor Force Participation – modelled estimates</i>: This is modelled by the International Labour Organization (provided in the ILOSTAT database) as the percent of women aged 15 and above who are economically active. It is available from 1990 to 2015.</li> <li>- <i>Abortion (Save Mother's Life)</i>: Measures of abortion availability, and in which circumstances abortion is legal is drawn from the data of Elías et al. (2017).</li> <li>- <i>Abortion (Fetal Impairment)</i>: As above.</li> </ul>                                                                                                                                                                                                                                                                                                         |
| <sup>‡</sup> <i>Maternal Care Inputs</i> (World Bank)                      | <p>Recent data from the World Bank Data Bank allow us to examine the state of maternal health care in a subset of countries and years. These data are constructed and released by the World Bank using comparable measures from each country: specifically data from UNICEF, the State of the Worlds Children, Child Info, and the Demographic and Health Surveys (DHS). As such, these measures are only available in years and countries for which surveys were conducted, resulting in fewer observations than the yearly measures of maternal mortality. In our analysis we use the full set of data released in the World Bank Data Bank. We use the following two policy relevant indicators:</p> <ul style="list-style-type: none"> <li>- <i>Antenatal Care</i>: The percent of pregnant women receiving prenatal care (indicator SH.STA.ANVC.ZS).</li> <li>- <i>Skilled Birth Attendance</i>: the percent of all births attended by skilled health staff (indicator SH.STA.BRTC.ZS).</li> </ul>                                                                                                                                                                     |
| <i>Fertility</i> (World Bank)                                              | <p>Total fertility rates are expressed as the number of children expected to be born per woman based on current fertility rates, and are available as World Bank indicator SP.DYN.TFRT.IN.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <sup>‡</sup> <i>Women's Schooling, Average 15–19</i> (Barro and Lee, 2013) | <p>Womens schooling measures are taken from the Barro-Lee dataset (Barro and Lee, 2013) which gives average years of schooling for women aged 15–19 years. Barro-Lee is only available quin-quennially from 1950 to 2015. We use the sample from 19902015, and linearly interpolate by country between 5 year periods.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <sup>‡</sup> <i>Men's Schooling, Average 15–19</i> (Barro and Lee, 2013)   | <p>As above.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>Teen Pregnancy</i> (World Bank)                                         | <p>The adolescent fertility rate expressed as the number of births per 1,000 women aged 15–19 is provided by the World Bank, WDI database, indicator SP.ADO.TFRT.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <i>GDP</i> (World Bank)                                                    | <p>The log of GDP per capita is PPP adjusted and measured in 2011 international dollars. This is taken from the World Bank WDI database, indicator NY.GDP.PCAP.PP.KD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <i>Infant Mortality Rates</i> (DHS)                                        | <p>We use male and female infant mortality rates based on the DHS data. Infant mortality is defined as the death of a child before reaching the age one.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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| Variable (Source)                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <i>Quota Predictors</i> (IPI, World Bank, Beck et al. (2001)) | <p>We examined quota predictors as laid out in Krook (2010):</p> <ul style="list-style-type: none"> <li>- <i>Peacekeepers</i>: the number of peacekeepers in a country from The International Peace Institute, IPI Peacekeeping Database.</li> <li>- <i>Net Overseas Development Assistance</i>: World Bank Indicator DT.ODA.ODAT.CD</li> <li>- <i>Political Competition</i>: a series of measures of political competition and landscape from (Beck et al., 2001)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>Democracy</i> (Boix et al., 2013)                          | Our dichotomous measure of democracy was gleaned from the Boix et al. (2013) database (updated in 2018). This database provides a binary index of democracy, measured annually, for all sovereign countries (222 distinct countries), between 1800 and 2015. They classify a country at a given time as a democracy if it meets two criteria: high political contestation (the decisions to govern the state are taken through voting procedures that are free and fair), and high participation (a minimal level of suffrage).                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <i>Population</i> (UN)                                        | We collect population covering the entire population, and just the population of women aged 15–64 years which are available by country and year over an extended period of time. These are drawn from the United Nations Population Division's World Population Prospects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>Maternal Mortality</i> (DHS)                               | We construct country by year measures of maternal mortality based on microdata collected in the DHS. The DHS employs the sisterhood method, asking each woman to list all her sisters, whether they are surviving, and if not, the year of their death and whether this was related to maternal causes. The DHS maternal mortality module which employs this procedure is implemented in only a sub-sample of countries. We collect all DHS survey waves which have implemented the maternal mortality module, and use these to construct retrospective panels of all sisters listed by women, converted into pseudo-panels such that each sister has an observation for each year in which she is aged between 15–49 and is surviving. For each sister×year observation we infer whether she dies for reasons related to childbirth based on the sisterhood surveys. Based on this pseudo-panel, we calculate a country by year observation for rates of maternal mortality.             |
| <i>Fertility, birth spacing and birth composition</i> (DHS)   | Country by year measures of age-specific fertility rates, total fertility, birth spacing and characteristics of mothers giving birth are calculated from DHS microdata based on retrospective fertility panels. Each surveyed woman is asked to report her full fertility history including months and years of all births. From these fertility histories we generate a pseudo-panel covering all women with a single observation for each of their ages between 15–49 (or up to their age at the time of the survey). In each year, we infer whether the woman gave birth, and if so, the birth spacing between that and the following birth, as well as the child's sex. Based on these pseudo-panels we aggregate data to country×year cells calculating fertility rates in each quinquennial age group (15–19, 20–24, ..., 40–44), as well as the average birth spacing for all births, the sex ratio of births, and the mean education and literacy status of mothers giving birth. |
| <i>Infant Mortality by sex</i> (DHS)                          | We calculate (total) infant mortality as well as infant mortality by sex from DHS microdata. To do so, we generate a panel of all children born reported by mothers in the DHS, their year of birth, their gender, and their survival status. If they are recorded as not surviving, we record their age at death. From these micro-level observations, we calculate the infant mortality rate as the total number of infant deaths in the country and year cell, divided by the total number of births. A similar calculation is conducted for male and female infant mortality rates (with the denominator of male and female births respectively).                                                                                                                                                                                                                                                                                                                                     |

Notes. <sup>‡</sup> For indicated time-varying variables, missing values are linearly interpolated. Where relevant, tests using original (non-interpolated) values are provided as part of the online appendix.

## Appendix E: Matched Controls using a Pooled Synthetic Control Procedure

In the main event study specification identification is drawn by comparing changes in countries which adopt quotas to all other countries which did not adopt quotas. Thus, ‘control’ units consist of all non-quota countries, with prevailing differences (in the pre-reform period) captured by country fixed effects. An alternative model consists of explicitly matching each treated country with a single aggregate or synthetic matched control country, and observing how outcomes evolve in the treated and synthetic control, inferring treatment effects based on differences in each case.

We conduct such a procedure, generating a synthetic control for each quota country. We then generate a full dynamic set of treatment effects by pooling lags across each post-quota period as laid out below. Consider country  $c$  which adopted quotas in year  $t$ . For this country, the pool of countries which can potentially generate a synthetic control consists of all 156 countries which never adopted a reserved seat quota. For country  $c$  generate the synthetic control following Abadie et al. (2010) by finding the vector of weights  $\mathbf{W}^*$  which minimize:  $\|\mathbf{X}_1 - \mathbf{W}\mathbf{X}_0\|$  where  $\mathbf{X}_1$  and  $\mathbf{X}_0$  consist of a matrix of (identically defined) matching variables between the quota country and the pool of non-quota countries. In this particular implementation, the matching variables consist of rates of the outcome of interest (women in parliament or maternal mortality) in each of the pre-quota periods  $t - 10, t - 9, \dots, t - 3$ , as well as binary indicators for the country’s sub-region based on UN sub-region classifications. Note that there are three particular features of this method that should be highlighted. The first is that countries will be explicitly matched based on pre-treatment outcomes such that pre-trends in country  $c$  and its synthetic control should be equal in levels (this is a test of the quality of the synthetic control). Second is that periods  $t - 2$  and  $t - 1$  are not mechanically matched in the synthetic control procedure, and thus can act as placebo periods such that impacts should not be observed prior to the reform’s passage. And finally, note that the inclusion of sub-region binary indicators is a device which favors choosing matched units from within the same geographic areas (and potentially exposed to similar shocks), but that units from outside of these areas can be included if the difference in binary variables owing to sub-region variations is offset by the weighted quadratic difference in other matching variables.<sup>7</sup>

We conduct this procedure for each quota country which is amenable to generation of a synthetic control in this way. Note that of the 22 quota countries, only 15 can be adequately matched in synthetic control methods. Uganda adopts quotas prior to 1990 and so has no pre-adoption periods to match on. South Sudan is a new country, and so has insufficient periods to match on. Afghanistan, Burundi, Iraq, Djibouti and Saudi Arabia each have multiple missing measures for MMR in the years prior to quota

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7. In other words, countries from outside of the sub-region can be included in the synthetic control if they are considerably better matches than countries within the same sub-region and can pay the penalty based on different sub-region indicators in the matching process.

adoption and as such have missing entries in the  $\mathbf{X}_1$  matrix. Once each country has its own synthetic control generated, we estimate full dynamic treatment effects by averaging the difference between each post-treatment period and the synthetic control over all treatment-synthetic control pairs. Thus, the estimated treatment effect on the first lag is the mean of the difference between each country and its synthetic control in the first post-quota lag, with similar procedures conducted for each lead and lag term.

Finally, to conduct inference in this setting we implement a permutation method, which consists of randomly permuting the actual distribution of quota years across alternative countries. Thus, each permutation maintains the precise structure of the data, simply permuting treatment units. We conduct 500 permutations, and generate 95% confidence intervals for *each* lag and lead as the end points of percentile 2.5 and 97.5 of each permuted treatment effect.

## Appendix F: Description of Resampling Procedure for MMR Uncertainty

Publicly available MMR data published by the MMEIG consist of a point estimate and the upper and lower points of the 80% uncertainty interval. In describing the modeling procedure, the authors note “We computed 80% uncertainty intervals (UIs) for the MMR and all related outcomes using the 10th and 90th percentiles of the posterior distributions. ... We report 80% UIs rather than 95% UIs because of the substantial uncertainty inherent in maternal mortality outcomes: intervals based on higher uncertainty levels quickly lose their ability to present meaningful summaries of a range of likely outcomes.” (Alkema et al., 2016, p. 1250). In order to estimate standard errors and p-values based on these data, we undertake the following procedure:

### Resample Algorithm

1. Take a clustered bootstrap resample from the original data  $b = 1, \dots, B$ , with  $B = 50$
2. Generate a random vector of size  $N$  (where  $N$  is the sample in the regression) where each element is either a) a draw of a normal variable where 80% of the probability mass falls between -1 and 1 (a draw from  $\mathcal{N}(0, 0.7803)$ ), or b) a draw from a triangular distribution in the interval  $[-1, 1]$ . Below this is  $\epsilon$ , and in each case, these integrate to 1.
3. Generate a resampled value of maternal mortality as:  $MMR_t^{b*} = MMR_{ct} + \epsilon \frac{MMR_{ct}^{UB} - MMR_{ct}^{LB}}{2}$ , where  $MMR_{ct}^{LB}$  is the lower bound estimate and  $MMR_{ct}^{UB}$  is the upper bound estimate; ie take the original measure, and draw a value from the uncertainty interval centred around this measure.
4. Estimate the original regression using the resampled data, with the re-resampled MMR measure. This results in an estimate of interest  $\hat{\beta}^{b*}$
5. if  $b < 50$  return to step 1. Else go to step 6
6. Calculate the standard error of  $\hat{\beta}$  as the standard deviation of  $\{\hat{\beta}^{1*}, \hat{\beta}^{2*}, \dots, \hat{\beta}^{50*}\}$ . This replaces the original naive standard error, and similarly a p-value can be calculated associated with the null hypothesis of a null impact, analogous to the p-value calculated based on a standard regression coefficient.

This procedure is only necessary when estimating impacts of quotas on maternal mortality, and not for women in parliament as we are only adjusting for uncertainty in the dependent variable in cases where maternal mortality is used. Note that in the above we are re-sampling maternal mortality to provide full coverage of the 80% uncertainty interval, or indeed, to provide greater than full coverage in the case of the normal draw, for each country year pair. In each case, the normal or triangular distribution places more weight on the likelihood of observing a value of maternal mortality close to the stated estimate, and less weight on the likelihood of observing a value in the tails of the distribution.

The above resampling procedure assumes that uncertainty in maternal mortality is independent between countries and years. It may also be the case that uncertainty is correlated across years within a country. When undertaking inference robust to uncertainty we thus present p-values associated with a range of cases as presented in Table A8. These are:

1. Bootstrap: The bootstrap analogue of the original p-value (ie no uncertainty in MMR)
2. Triangular Correction: Resamples from the MMR uncertainty range from the WHO data (80% coverage) with a triangular distribution whose minimum and maximum are at the end points of the uncertainty range, and whose center is at the estimate
3. Triangular Correction by Country: Resamples as above, however now instead of taking uncertainty draws by country and year, takes uncertainty draws only at the level of the country. This implies that uncertainty with regards to MMR is perfectly correlated within a country over time. It is the limit case of assuming correlation within a country in uncertainty in MMR measurement.
4. Normal Correction: Resamples from the MMR uncertainty range assuming a normal distribution, where draws are taken so that the 10<sup>th</sup>/90<sup>th</sup> quintile of the normal are at the upper and lower end points of the uncertainty range presented in the WHO data in each case. This allows for us to sample outside the 80% confidence bounds presented in the original data, and will be the most demanding of all corrections.
5. Normal Correction by Country: Resamples as above, however now instead of taking uncertainty draws by country and year, takes uncertainty draws only at the level of the country.

In results documented in Table A8 we first provide p-values associated with a standard clustered bootstrap prior to taking into account uncertainty in MMR measurements. Next we provide two sets of bootstrapped p-values computed assuming either a triangular distribution or a normal distribution for MMR uncertainty intervals. While the end points of the triangular distribution are at the ends of the uncertainty interval, the normal distribution provides coverage outside of the 80% UI. In each of the two types of distributions we allow for the possibility of either assuming full correlation in uncertainty by country or not. The corrections by country assume full correlation in uncertainty within a country over time. Where not by country, the estimator assumes no correlation within a country over time. The triangular corrections re-sample from MMR so that coverage respects the full 80% uncertainty interval suggested by the MMEIG. The normal corrections re-sample so that 80% of re-samples fall within the 80% uncertainty interval reported by the MMEIG. Both of these inference procedures are implemented assuming no correlation by country, and then assuming full correlation in uncertainty by country.

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