Maternal Mortality and the Status of Women

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The Long Shadow of Historical Institutions and Gender

Historical institutions cast long shadows which explain heterogeneities in contemporary socio-economic outcomes (Acemoglu et al., 2001; Nunn and Wantchekon, 2011).

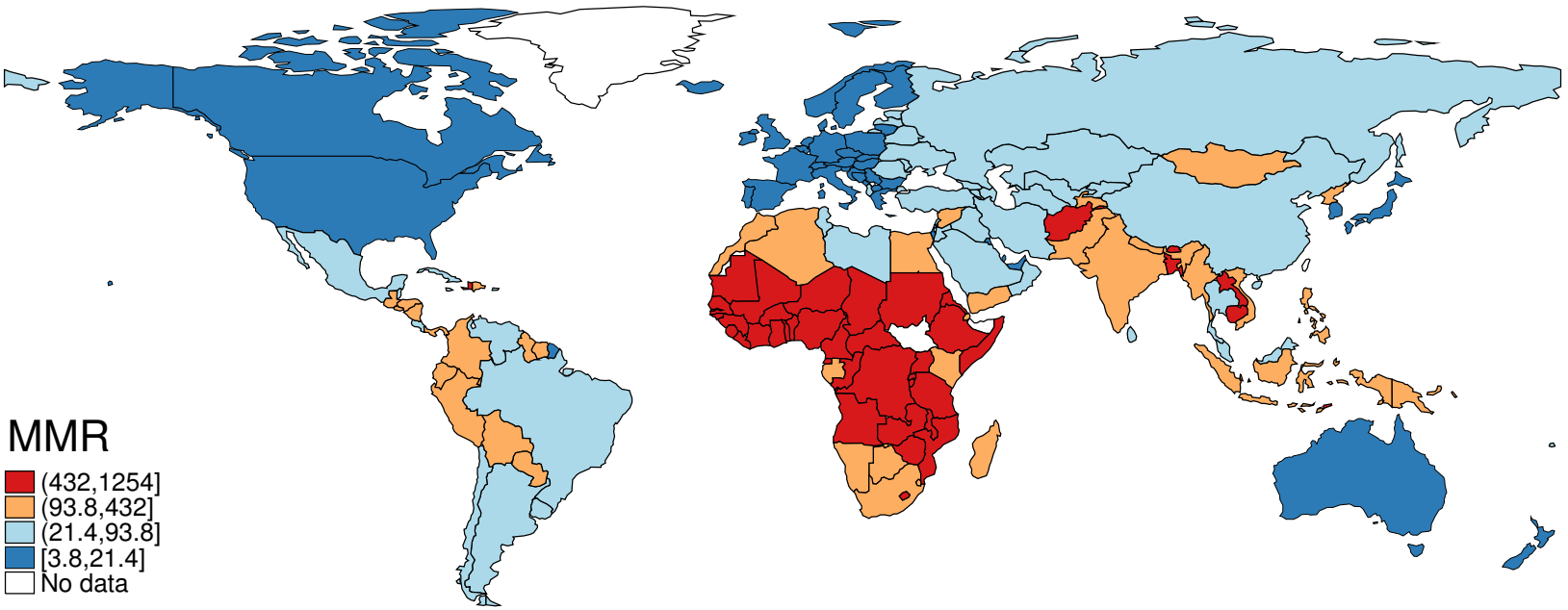
- History also plays a role in explaining how gender related preferences are formed, with important links to women's contemporary well-being.
  - Alesina et al. (2013): Plough use and the origins of gender roles
  - Gay et al. (2013): Origins of gender roles embedded in language
  - Nunn (2012): Role of missionaries in female literacy in Africa
- Here we argue (and document) that in many societies women are a low public policy priority and show that this has **lethal implications**

The Long Shadow of Historical Institutions and Gender

In this paper we focus particularly on (female-specific) health outcomes: rates of maternal mortality. We ask:

1. Can the heterogeneity in current-day outcomes be traced back to deep-seated institutional structures?
2. To what extent can this be addressed by pushing *present-day* policy levers?

Average Maternal Mortality Ratio (1990-2015)



- Public health emergency: 830 deaths *per day*
- 99% of these deaths occur in the developing world
- MDGs were not met. "Doubling down" with the SDGs suggests importance of finding new ways to reduce rates of maternal death

Women-Specific Health is a Low Public Policy Priority

Declines in the maternal mortality ratio (MMR) have been slower than other infectious diseases.

- Infant mortality decline started much earlier and progressed more rapidly than maternal mortality decline.
- Infant mortality decline has benefited from massive improvements in control of infectious disease.
- Historically, the same improvements led to maternal mortality declines, consistent with 40-50% of maternal deaths being the result of post-partum puerperal sepsis (an infection).
- Our hypothesis: the sluggishness of MMR decline is a function of gender prejudice, (in Med/Public Health: The Yentl Syndrome).

Key Questions

Does giving women voice/decision making capacity in public policy/politics change things?

- Historical reforms – (suffrage, sulfonamides) and state-varying MMR reductions.
- Contemporary reforms – Quotas and women's representation in parliament.

Related Literature

Amartya Sen, The New York Review of Books (1990) **"More Than 100 Million Women Are Missing"** (Also 1981, 2003)

- Anderson and Ray (2010, 2012) highlight missing women across the disease and age distribution.
- These references are agnostic about prejudice in health care driving excess mortality amongst women.
- This has huge impacts on multitude social and economic outcomes. MMR declines raise:
  - women's labour force participation (Alabanesi & Olivetti 2009)
  - women's education (Alabanesi & Olivetti (2014), Jayachandran & Lleras-Muney 2008).
  - Economic growth (Lagerlof 2003, Amiri and Gerdtham 2013, Kirigia et al 2006).
  - MMR decline tends to raise fertility, although concurrent IMR decline tends to lower fertility (Bhalotra & Venkataramani 2014).

Empirical Challenge: Exogenous Variation in Prejudice?

- In previous work, Bhalotra and Clarke (2013) show that exogenous increases in women's education created by program interventions are associated with large declines in MMR.
- We exploit variation in contemporary institutions giving women more voice and decision making power:
  - The implementation of women's suffrage across the US states in the early 20th century (Miller 2008).
  - Implementation of election quotas across countries since the 1990s (`www.quotaproject.org`).
- And historical given institutions/preferences:
  - In language at birth on premise that gender differentiation embedded in language structure proxies deep-set (centuries old) gender attitudes (Gay et al. 2013).
  - In elicited son preference in fertility
  - In institutionalized political, economic and social rights of women.
  - Historical intra-country and cross-country gender prejudice determinants.

Methods and Results

Identification with Gender Bias

Gender prejudice in societies has strong (lethal) implications on women-specific health outcomes. We test this in a number of ways:

1. Historical and contemporaneous reforms which exogenously vary representation
2. Time series and cross-sectional variation in gender inequality and female health world-wide
3. Historical intra-country and cross-country gender prejudice determinants
4. Examining placebo (gender-neutral) diseases using the same specifications

(1) Historical Reforms: Sulfa and Suffrage

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We estimate the following DiD model:

$$\begin{aligned} log(MMR)_{st} &= \alpha + \beta Post1937_t + \gamma(EarlySuf_s \times t) + \delta_1(EarlySuf \times Post1937_t) \\ &\quad + \delta_2(EarlySuf \times Post1937_t \times t) + \phi_t + \mu_s + \upsilon_{st}. \end{aligned}$$

- δ_1 and δ_2 test whether there are larger level and trend breaks in MMR in early suffrage states.
- Suffrage was mandated in 1920. More gender progressive states legislated earlier (Miller, 2008)
- We estimate the same equation for pneumonia which was most prevalent among infants and especially boys, and was treatable with sulfa. So good falsification test.
- Data for 1925-1943; sulfa drugs introduced in 1937. Dummy for early vs late suffrage adoption.

Suffrage in 20^{th} Century US

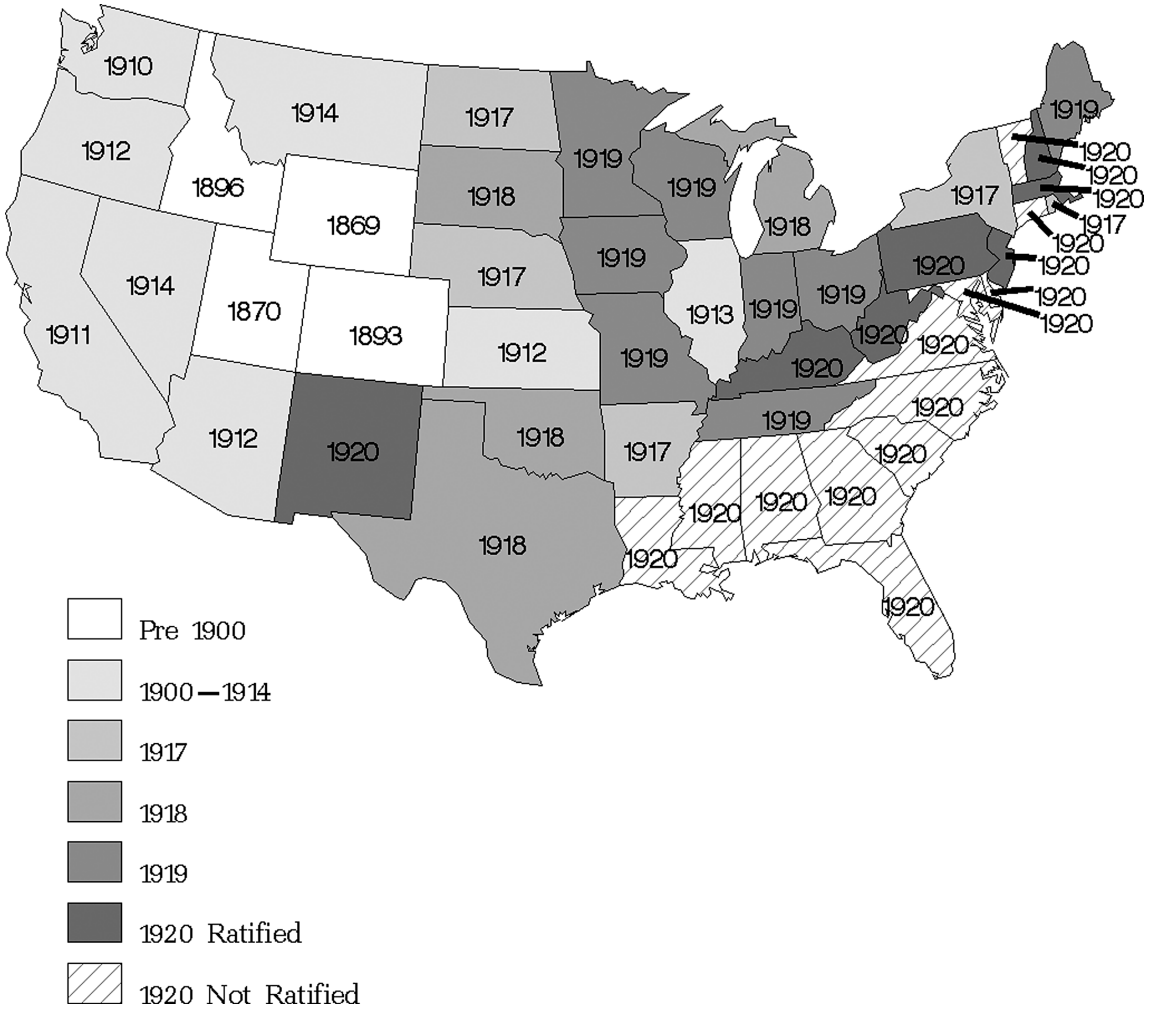


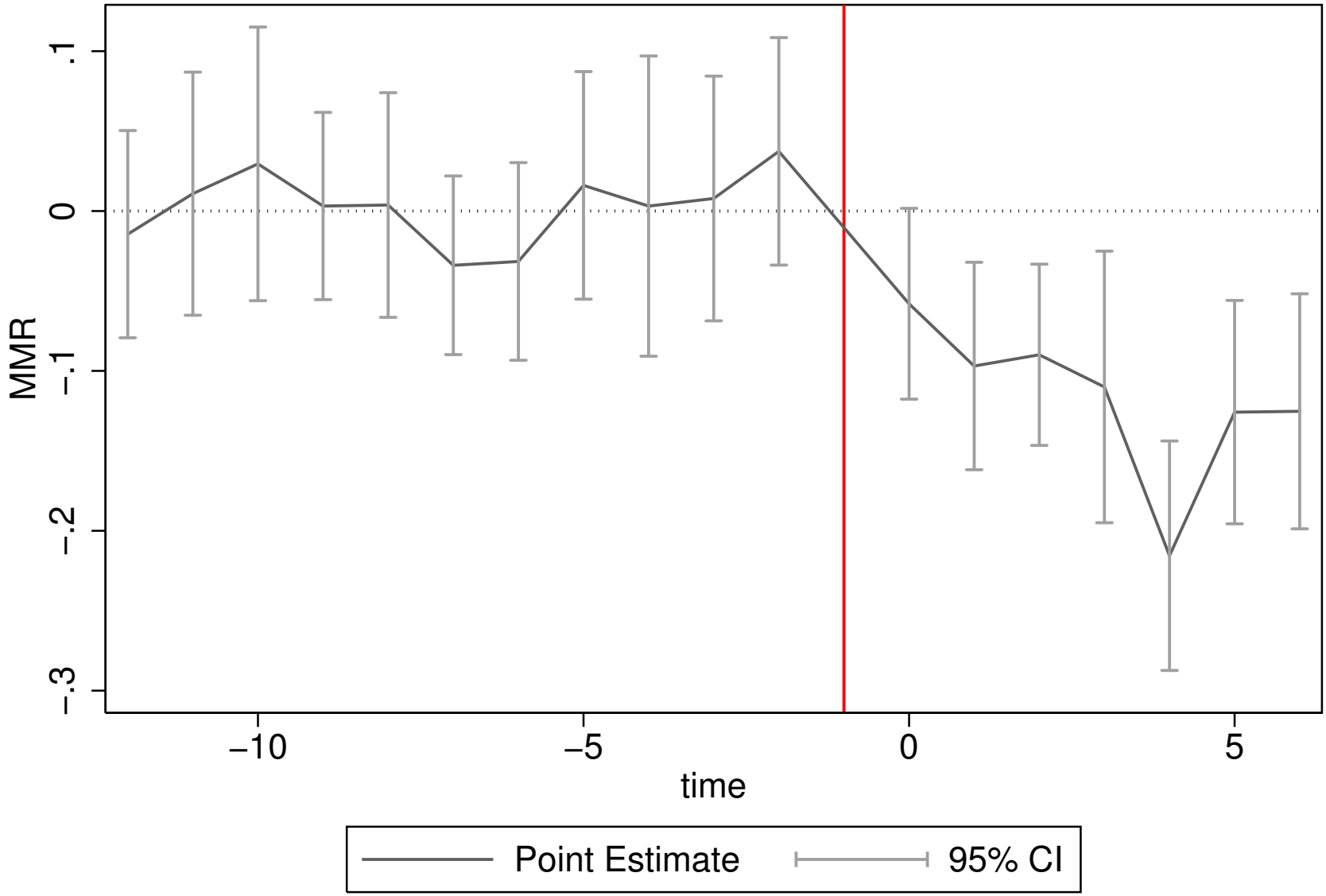
Figure 1: Early vs. Late Suffrage (Miller, 2008)

Sulfa and Suffrage: Estimation and Results

We estimate the above specification, as well as full event studies for both (next slides)

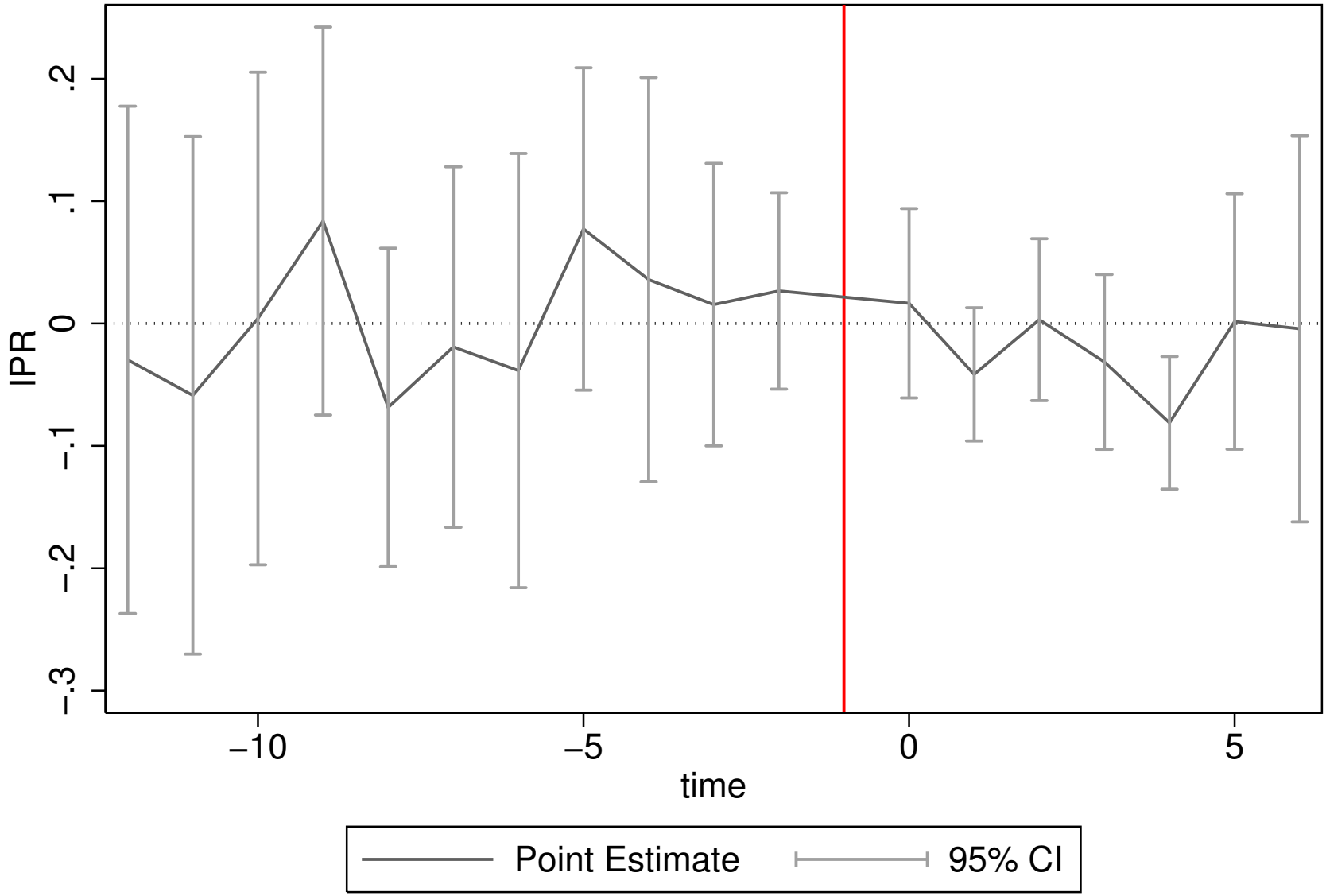
- We find that the MMR gap between early and late suffrage adopters widened after the arrival for sulfa drugs, but this was not the case for pneumonia mortality
- Suggests that preferences correlated with female suffrage may have influenced the adoption of medical technology for woman-specific MMR.
- Parallel trends, and regression-based estimates

Figure 2: Maternal Mortality Event Study Plot



Year −1 is omitted as the base case.

Figure 3: Pneumonia (Placebo) Event Study Plot



Year −1 is omitted as the base case.

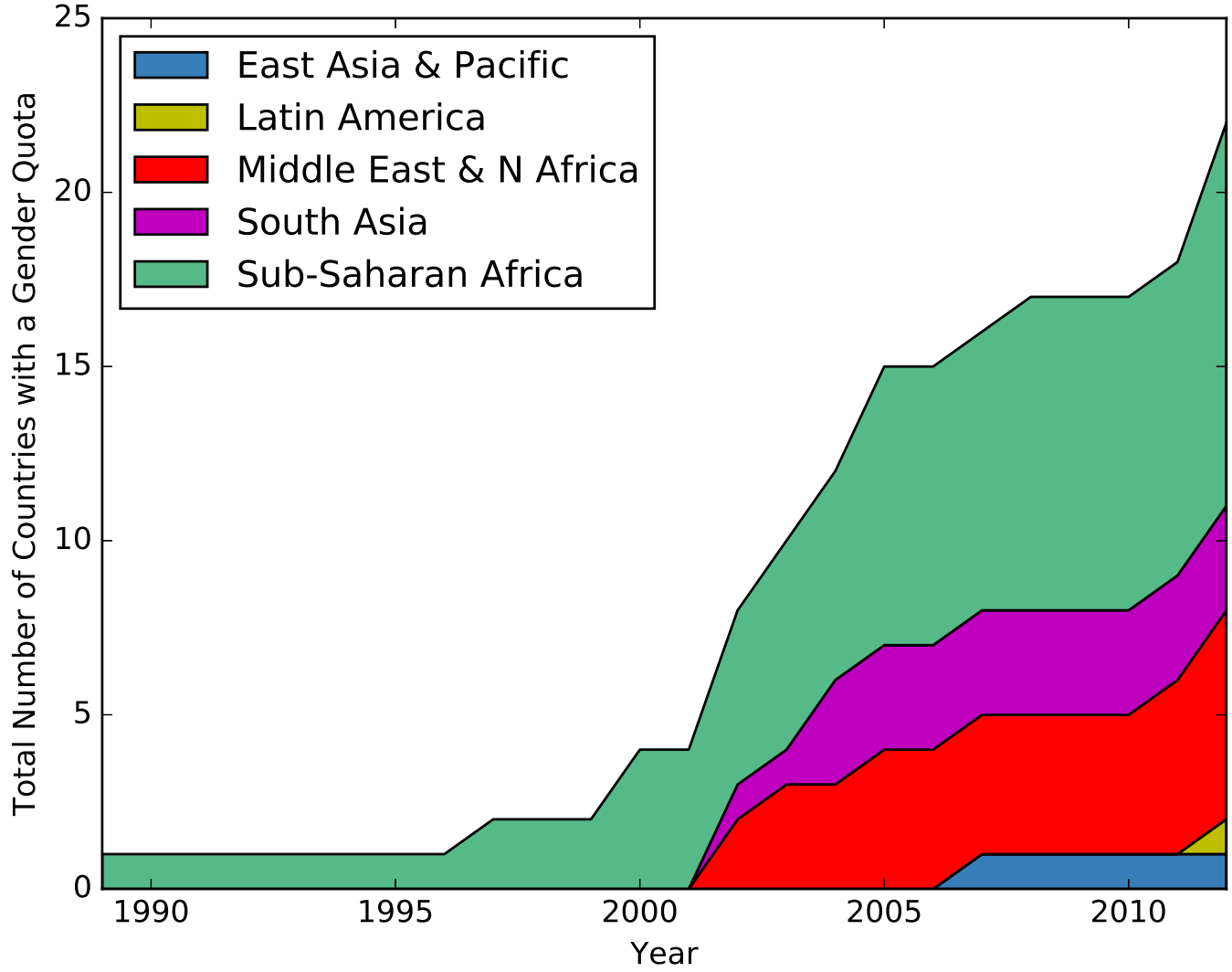
(2) Current Reforms: Quotas and Women in Parliament

(2) Quotas and Women in Parliament

The site `www.quotaproject.org` provides the most definitive source of gender quotas in parliament at a national and sub-national level.

- We compiled data for each country recording whether or not reserved seats are legislated for women leaders
- If so, we record the date the legislation was adopted
- We also record the size of the quota (eg the percent of seats reserved for women)
- The results here do *not* include quotas at a sub-national level.

Figure 4: Implementation of Reserved Seats for Women Leaders



Quotas: Estimation and results

We begin by estimating a diff-in-diff model of quota implementation:

$$\log(MMR)_{ct} = \alpha_0 + \alpha_1 Quota_{c,t-1} + \mu_c + \lambda_t + \varepsilon_{ct} \tag{1}$$

- Baseline specification includes country and year fixed effects
- Standard errors clustered at level of country
- Also include time-varying controls such as $\log(GDPpc)$
- The direct effect of reserved seats on women in parliament is important
  - Some countries are particularly noteworthy (Algeria, Burundi,...)
  - Examine formally by estimating (1) with % of women in parliament as outcome variable

Quotas: Estimation and results

We then estimate a full event-study surrouding implementation:

$$\begin{aligned}\log(MMR)_{ct} &= \alpha_0 + \sum_{j=1}^{J} \tau_{-j} \cdot Quota_{c,t-j} + \sum_{k=1}^{K} \tau_{+k} \cdot Quota_{c,t+k} \\ &\quad + \mu_c + \lambda_t + \varepsilon_{ct}\end{aligned}$$

- We interact quota implementation with a full set of leads and lags
- In the spirit of Granger (1969) casuality, we should observe that if any effects from (1) are truly due to quotas, these should emerge only after the reform, and not in the pre-reform coefficients τ_{-j}.

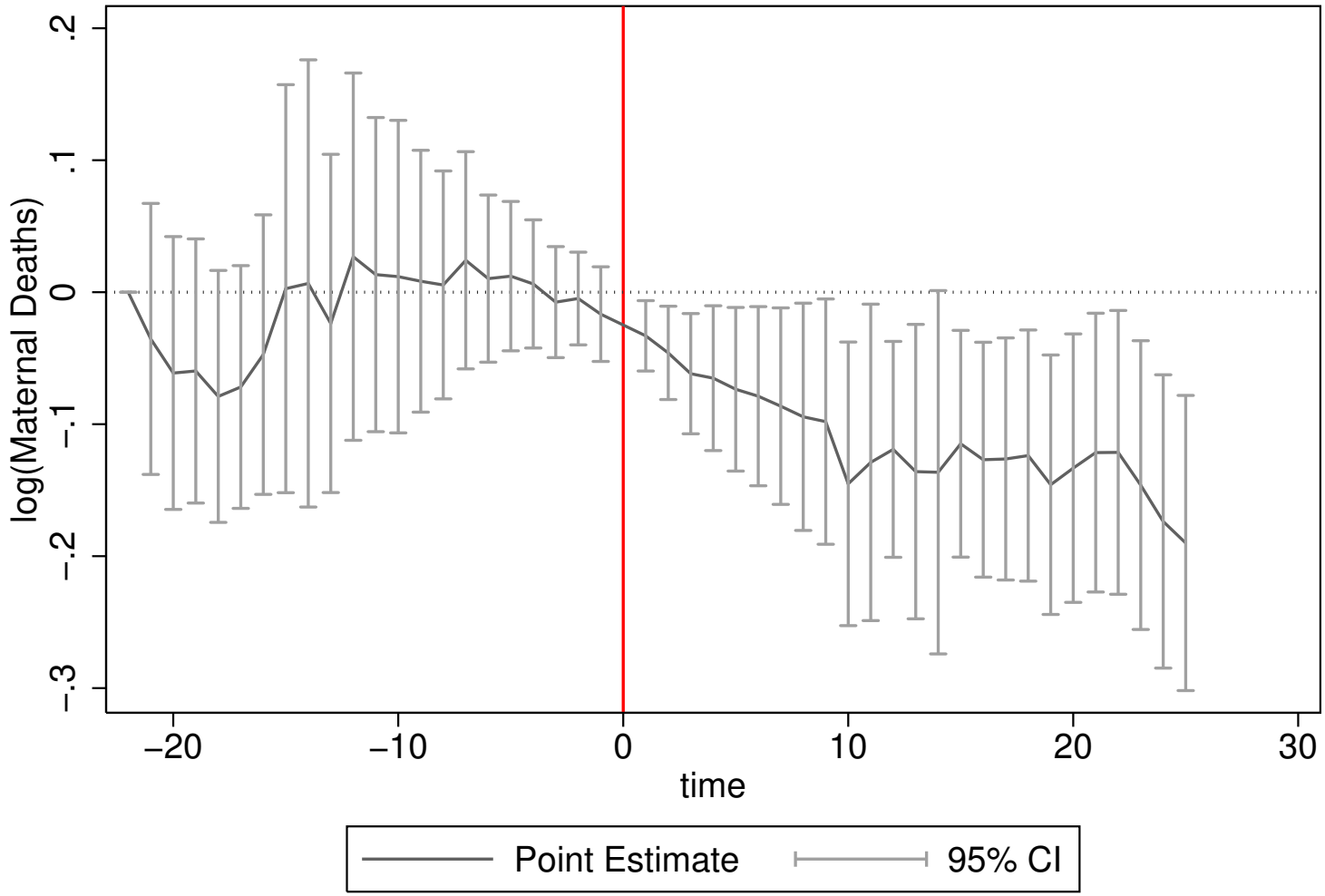
Reserved Seats, Women in Parliament and Maternal Mortality

Table 1: Difference-in-differences estimates of effect of reserved seats

	Has Reserved Seats		Proportion of Reserved Seats	
	(1) % Women	(2) ln(MMR)	(3) % Women	(4) ln(MMR)
Quota (reserved)	5.320** (1.21,9.43) [p=0.011]	-0.083* (-0.18,0.01) [p=0.092]		
Quota (reserved, %)			0.192 (-0.06,0.45) [p=0.140]	-0.006** (-0.01,-0.00) [p=0.047]
Constant	5.600 (-16.12,27.32) [p=0.611]	7.093*** (6.19,8.00) [p=0.000]	23.620 (-22.09,69.33) [p=0.306]	7.582*** (6.10,9.07) [p=0.000]
R-Squared	0.454	0.586	0.594	0.666
Observations	3846	3846	1384	1384
Country and Year FE	Y	Y	Y	Y

Quota data is coded from the quotaproject.org, recording whether each country has seats reserved for women, and if so the year of implementation of the the quota law. The proportion of countries with reserved seats is 0.047. The average proportion of reserved seats in these countries is 2.634. Full summary statistics are in table 1. Reserved Seats refers only to those countries where a fixed proportion of representation is guaranteed for women with binding sanctions in place. Standard errors are clustered at the level of the country. 95% confidence intervals are reported in round brackets, and p-values associated with each coefficient are in square brackets. ***p-value<0.01, **p-value<0.05, *p-value<0.01.

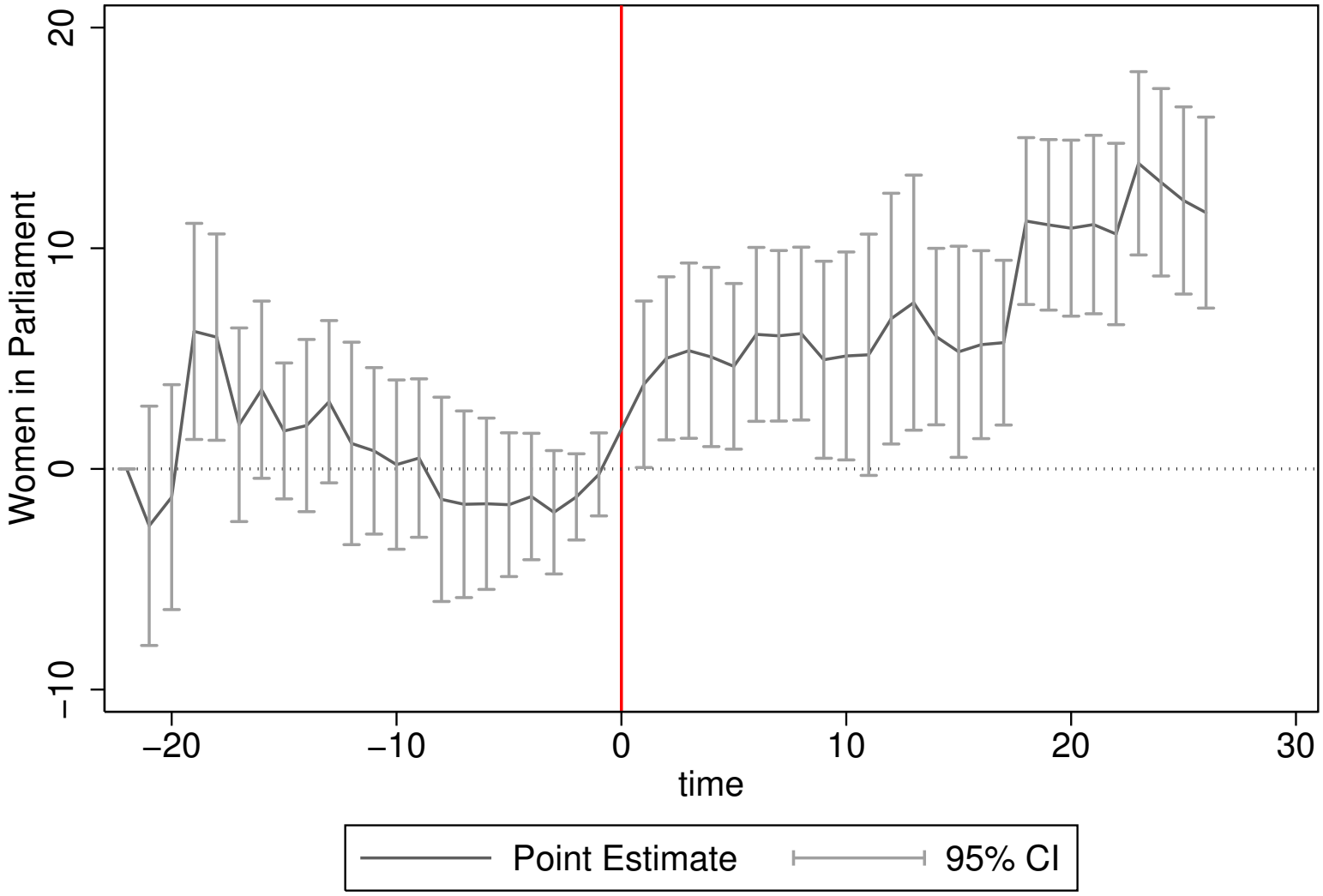
Figure 5: Event Study: Reserved Seats and ln(Maternal Mortality Ratio)



Year 0 is omitted as the base case.

Identical findings for Maternal Mortality Ratio

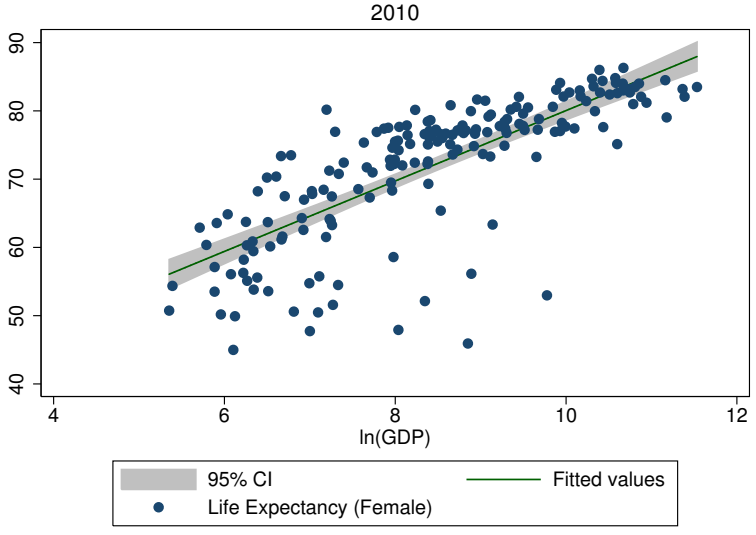
Figure 6: Event Study: Reserved Seats and Women in Parliament



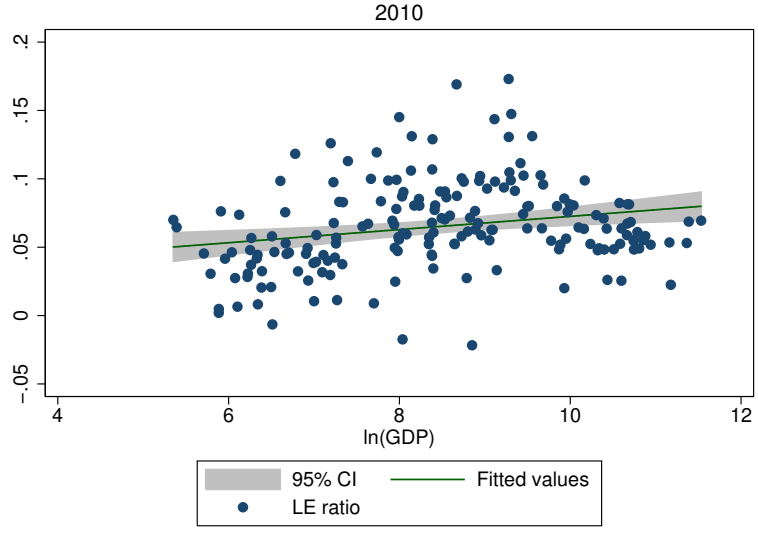
Year 0 is omitted as the base case.

(3) Cross-Country Evidence

(3) Cross-Country Evidence: Descriptive Figures



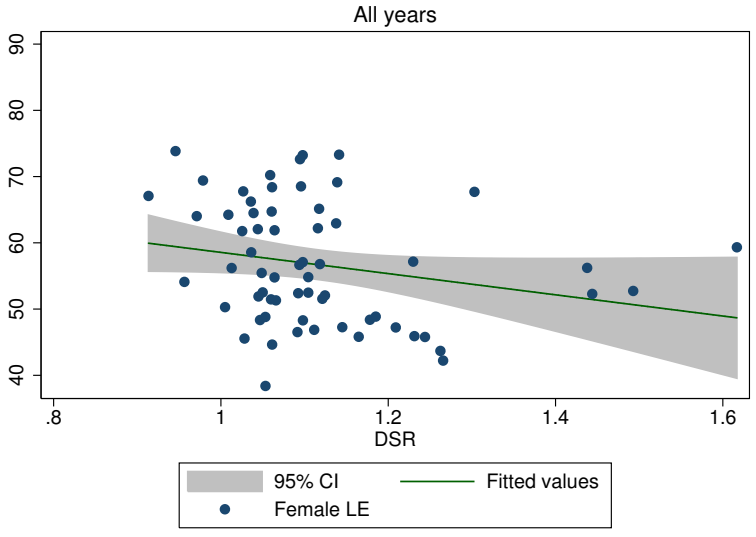
(a) Female LE and ln(GDP)



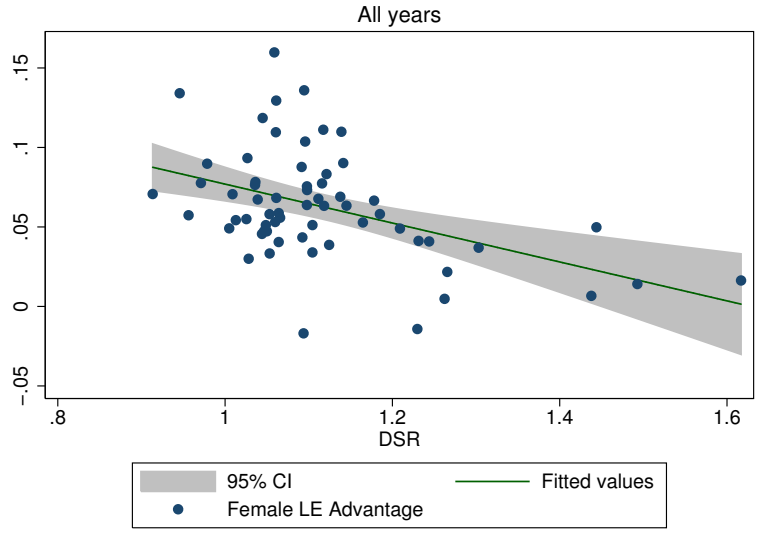
(b) Female LE advantage and lGDP

- Simple trends suggest a strong relationship between life expectancy (of women and men) and GDP
- However, this is not the case for life expectancy *ratio*
- In other words, increasing income levels alone does not improve gender equality

(3) Cross-Country Evidence: Descriptive Figures



(a) Female LE and DSR



(b) Female LE advantage and DSR

- The LE ratio is much more strongly related to gender bias
- Here gender bias is proxied by the desired sex ratio (desired number of boys to girls) reported by parents
- In other words, decreasing observable measures of gender bias *does* improve gender equality in health outcomes

Conditional Analysis

We estimate the following regression using panel data:

$$MMR_{it} = \alpha + \beta GenderBias_{it} + \gamma_i + \delta_t + (\phi_i \times t) + \theta X_{it} + \varepsilon_{it}. \quad (2)$$

- MMR is later replaced with the log ratio of female-male life expectancy.
- $GenderBias_{it}$ is measured as desired sex ratio of births, women's rights and women's share of parliamentary seats.
- γ, δ, $(\phi_i \times t)$ - country and year specific FE, country specific trends.
- X_{it} includes ln(GDP), interactions
- Standard errors are always clustered at the country level.
- We construct/collect data from various sources: WB, WHO, DHS

Gender Bias Proxied by Desired Sex Ratio

- We construct time profiles of the desired sex ratio of births at the individual level using the DHS
- The DSR in, say, 1990, is the DSR reported by all women who were 15-25 years of age in 1990, irrespective of when their responses are elicited. See map
  - Low Son Preference countries: Dominican Republic (0.92); Haiti, Ukraine (0.94); Nicaragua (0.96), Colombia (0.99)
  - Medium: Zimbabwe (1.08), Ghana (1.108), Tanzania (1.07)
  - High: India (1.33), Nepal (1.42), Pakistan (1.59)
- We observe that DSR is strongly linked to excess girl infant mortality
- Similar results hold when we use the life expectancy differential instead of MMR

Gender Bias Proxied by Desired Sex Ratio

Table 2: MMR and Desired Sex Ratio (boys/girls)

	(1) MMR	(2) MMR	(3) MMR	(4) MMR	(5) MMR
Desired Sex Ratio	824.7**	655.0**	667.0**	923.9***	2627.7***
	[329.4]	[299.3]	[286.5]	[252.9]	[617.9]
ln(GDP)			40.9	12.4	318.5***
			[48.5]	[49.8]	[119.6]
Desired Sex Ratio× ln(GDP)					-285.3***
					[100.7]
Constant	-476.0	-405.1	-712.6	-1514.3***	-3371.0***
	[358.9]	[325.8]	[494.2]	[483.9]	[734.5]
R-squared	0.09	0.92	0.92	0.93	0.93
Observations	310	310	307	307	307
Country FE		Y	Y	Y	Y
Year FE		Y	Y	Y	Y
Desired Fertility				Y	Y

Gender Inequality II: Women's Rights

Cingranelli et al. (2013) collect direct measures of women's rights in society. They compile a dataset (with variation over time) capturing:

- **Political Rights** - e.g. rights to vote, run for political office.
- **Economic Rights** - e.g. equal pay for equal work, free choice of profession without the need to obtain a husband or male relative's consent.
- **Social Rights** - e.g. equal inheritance, enter into marriage on a basis of equality with men.
- **Women's Composite Rights 1** - First principal component of political, economic and social rights.
- **Women's Composite Rights 2** - First principal component of political and economic social rights.

Gender Bias Measured by Women's Rights

Table 3: MMR and Women's Rights

	(1) MMR	(2) MMR	(3) MMR	(4) MMR	(5) MMR	(6) MMR
Panel A: Political Rights						
Political Rights	-44.19**	-1.79	-2.47	-367.13***	-346.89***	-256.74***
	[18.54]	[17.54]	[17.30]	[74.73]	[77.60]	[80.30]
R-squared	0.93	0.93	0.93	0.94	0.94	0.94
Observations	757	757	757	757	757	757
Panel B: Economic Rights						
Economic Rights	11.11	10.79	6.62	-165.37*	-164.61*	-103.71
	[23.50]	[22.39]	[22.24]	[97.86]	[97.27]	[87.01]
R-squared	0.92	0.93	0.93	0.93	0.94	0.94
Observations	755	755	755	755	755	755
Year FE		Y	Y	Y	Y	Y
Democracy controls			Y		Y	Y
Rights× GDP				Y	Y	Y
Democracy× GDP						Y

Similar findings for composite measures

Gender Bias has Large Effects on Women's Health

- A 1 s.d. increase in son preference results in:
  - 48 additional maternal deaths per 100,000 live births which is 10% of the MMR mean and 11% of the s.d.
  - A 62% reduction in a girl child's survival advantage.
  - A 1 s.d.increase in women's political rights leads to 9 fewer maternal deaths per 100k live births which is 3.42% of the mean and 2.48% of the s.d. in an average GDP country
- Comparing reductions in MMR in early- and late-suffrage states following the arrival of sulfanide drugs in the USA:
  - Early suffrage states in the USA reduced MMR by nearly 10 percentage points more than late suffrage states
  - In comparative terms, this is approximately *double* the effect seen in late-suffrage states
- A 1 s.d. increase in quotas leads to
  - an increase of 8.4% of the mean and 11.33% of the s.d. of % of women in parliament.
  - a fall of 33.6% of the mean and 8% of the s.d. of log of MMR.

Gender Bias and Grammatical Gender

The in-built structures of language have been demonstrated to have effects on present-day gender equality measures. We estimate:

$$MMR_{it} = \beta_0 + \beta_1 GII_i + \beta_2 PercentLang_i + X_{it} + X_i + \nu_{it} \quad (3)$$

- GII is highly pre-determined but it does not vary over time. So we include continent FE rather than country FE.
- The idea is that grammatical gender reflects gender attitudes in society
  - Maternity leave policy differences (Givati & Troiano, 2012).
  - Female labour force and political participation (Gay et al. 2013).

Gender Bias and Grammatical Gender

The literature has proposed a number of measures of gender intensity of language. We follow recent papers in defining the following (summary statistics here):

1. Sex-Based Intensity Index (sbii)
2. Number Gender Intensity Index (ngii)
3. Gender Assignment Intensity Index (gaii)
4. Gender Pronouns Intensity Index (gpii)
5. gii0 = ngii + sbii + gaii + gpii
6. gii1 = ngii + sbii + gaii
7. gii2 = ngii + sbii + gpii
8. gtroiano = number of cases of gender differentiated pronouns.

MMR and Gender Intensity of Language Measures

Table 4: MMR and Gender Intensity of Language Measures

Dep Var: MMR	(1) NGII	(2) SBII	(3) GPII	(4) GAII	(5) GII0	(6) GII1	(7) GII2	(8) GTroiano
Panel A: No Interaction								
Gender Intensity Index	49.46**	74.83**	88.22***	59.25	28.71**	36.36***	26.87**	-3.505
	(21.84)	(33.97)	(29.38)	(38.07)	(11.96)	(13.33)	(13.10)	(8.525)
ln(GDP)	-70.70***	-71.43***	-78.61***	-71.20***	-75.02***	-72.07***	-68.95***	-71.37***
	(16.55)	(16.53)	(23.98)	(17.49)	(24.74)	(23.70)	(17.35)	(19.09)
R-squared	0.740	0.744	0.758	0.746	0.745	0.757	0.733	0.620
Observations	2914	2914	2103	2849	2012	2103	2745	1928
Panel B: GDP Interaction								
Gender Intensity Index	447.1***	297.1*	740.5***	501.2**	227.7***	274.1***	193.4***	140.5**
	(130.4)	(150.1)	(128.8)	(195.2)	(45.35)	(57.27)	(63.21)	(67.04)
GII × ln(GDP)	-45.10***	-26.15*	-77.00***	-51.44**	-24.35***	-29.44***	-20.00***	-15.63**
	(13.28)	(15.41)	(14.57)	(19.88)	(5.163)	(6.833)	(6.796)	(7.032)
ln(GDP)	-45.81**	-50.68**	-31.48	-55.07***	-7.283	-10.97	-33.48	-33.09
	(17.64)	(22.39)	(21.96)	(18.45)	(24.13)	(23.21)	(20.61)	(23.29)
R-squared	0.756	0.748	0.788	0.756	0.768	0.779	0.745	0.639
Observations	2914	2914	2103	2849	2012	2103	2745	1928

(4) Sub-national Variation in Gender Bias

(4) Sub-national Variation in Gender Bias

Cross-country evidence above provides suggestive evidence, but concerns given that language is fixed by country, and due to the potential for unobservables in panel results

- We use time and regional variation in MMR to examine whether historically more biased regions progress less towards improvements in female health outcomes
- Examine protestant missions (Nunn, 2012)
- We observe local (sub-national) variation in these variables, so can control for country-specific factors (FEs)
- This requires us to create our own new measures of MMR at a sub-country level from the full set of DHS surveys

Missions as an Indicator of Gender Equality

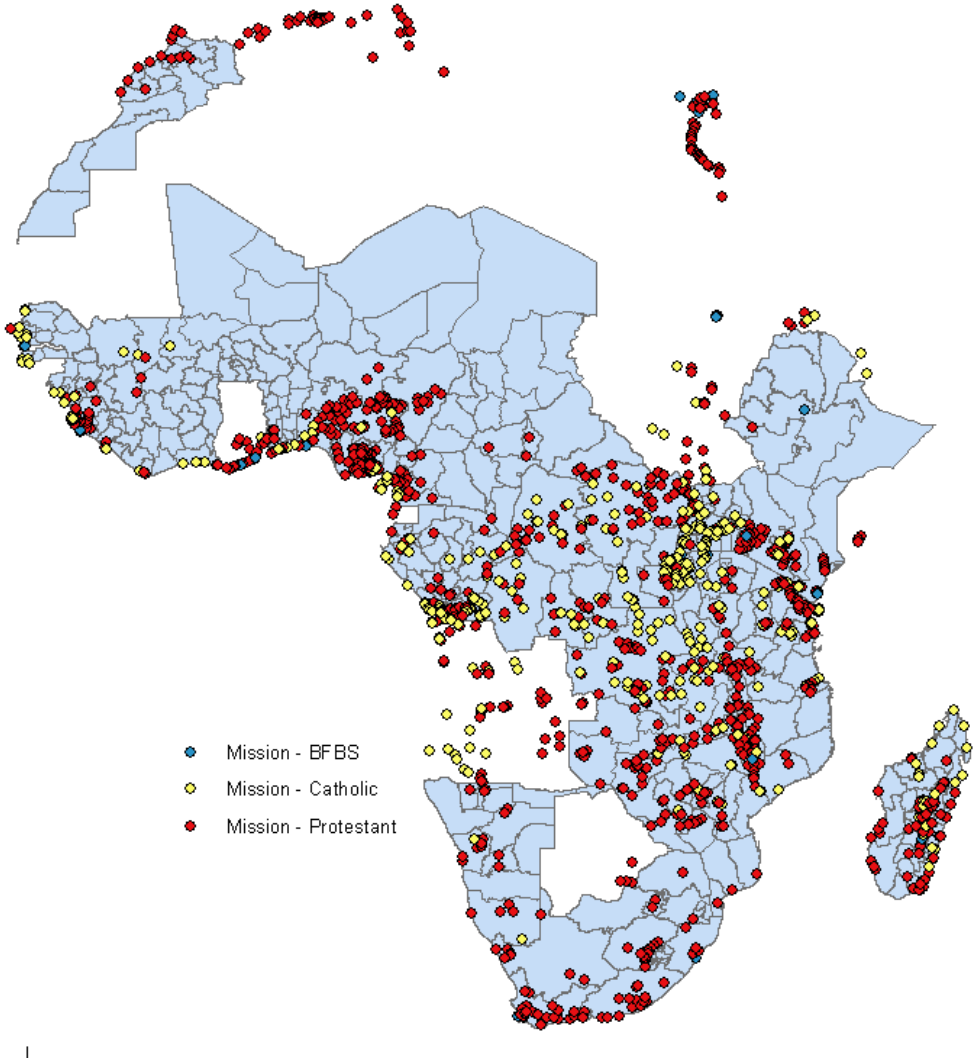


Figure 9: Missionaries in Africa

(4) Sub-national Variation in Gender Bias

Effect of Protestant missions: evidence suggesting that Protestant missions historically were open to women's education (Nunn, 2013)

- We follow controls from Nunn's specification however now use MMR as the outcome variable
- We find that in both the Nunn (Afrobarometer) sample and the full Africa DHS sample (Missionary locations):
  - Areas with more Protestant missions have lower MMR today
  - Areas with more Protestant missions have higher women's education today

Missions as an Indicator of Gender Equality

Table 5: Effect of Missionary Settlement on MMR

	Afrobarometer Sample		All of Africa (DHS)	
	MMR	Women's Educ	MMR	Women's Educ
Protestant	-61.37**	0.473**	-49.56*	0.492**
	(29.54)	(0.228)	(27.08)	(0.232)
Catholic	-64.62	0.278	-9.624	0.0637
	(43.43)	(0.248)	(39.40)	(0.270)
N	1844	1844	2125	2125
R-squared	0.336	0.884	0.315	0.885

NOTES TO TABLE: Standard errors in parentheses are clustered at the level of the DHS cluster. Controls include crop sustainability, elevation, explorer routes, proportion urban, availability of fresh water, historical slave trading, historical railways, and country and year FEs. MMR is constructed at the level of the DHS region in quinquennial periods from 1980-2010.

(5) Gender Neutral Placebo Tests

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- Tuberculosis is a "gender neutral" infectious disease
- Frequently occurring (around 9 million cases in 2013). Incidence ranges from less than 10 cases per 100,000 people, to greater than 1,000 per 100,000 (ie a range very similar to MMR)
- We estimate the same set of specifications with the same measures of gender bias, replacing MMR with TB.
- Same tests replacing MMR with TB largely lead to null results:
  - Desired Sex Ratio
  - Women's Rights as gender inequality proxy
  - Gender inequality embedded in language

Discussion and Conclusions

We document evidence from various sources and identification strategies showing that MMR is higher and slower to fall in areas which are more gender biased

- These biases are embedded in deep historical institutions
- *However*, institutional changes during the 20th and 21st century favouring women have had important impacts on rates of maternal mortality
- Preventable maternal mortality is still very high in many developing countries, even after falling by almost 50% since 1990
- Considerable work to be done in further reducing MMR for SDGs
- Increasing women's voice and representation is a way to reduce shockingly high rates of death

Thank you

Appendices

The Yentl Syndrome

From the New England Journal of Medicine:

Yentl, the 19th-century heroine of Isaac Bashevis Singer's short story, had to disguise herself as a man to attend school and study the Talmud. Being "just like a man" has historically been a price women have had to pay for equality. Being different from men has meant being second-class and less than equal for most of recorded time and throughout most of the world. It may therefore be sad, but not surprising, that women have all too often been treated less than equally in social relations, political endeavors, business, education, research, and health care.

Table A1: Early Suffrage Adopters and Disease Burden

	(1) log(MMR)	(2) log(Pneumonia)
Post-1937	-0.0917***	0.00870
	(0.0298)	(0.0215)
Post×Year	-0.0891***	-0.0611***
	(0.00490)	(0.0108)
Year	-0.0230***	-0.0293***
	(0.00246)	(0.00647)
Early Suffrage × Post	-0.0849**	-0.0459
	(0.0365)	(0.0279)
Early Suffrage × Post × Year	-0.0146**	-0.00674
	(0.00642)	(0.0128)
Early Suffrage × Year	0.001000	0.00470
	(0.00335)	(0.00760)
Constant	1.689***	-0.0461***
	(0.0120)	(0.0148)
Observations	868	868
R-squared	0.951	0.780

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Figure A1: Trends in ln(MMR)

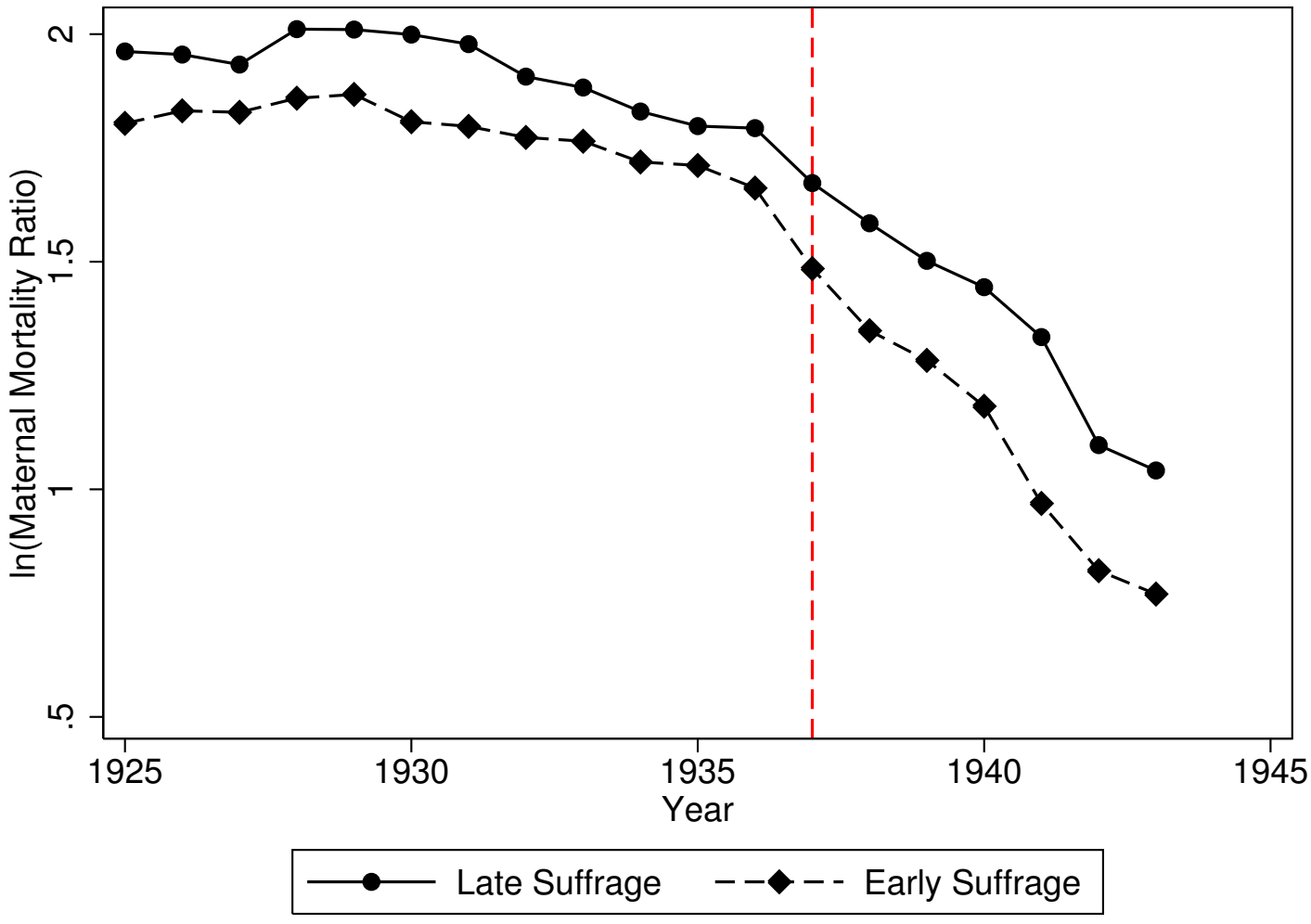

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Figure A2: Trends in ln(IPR)

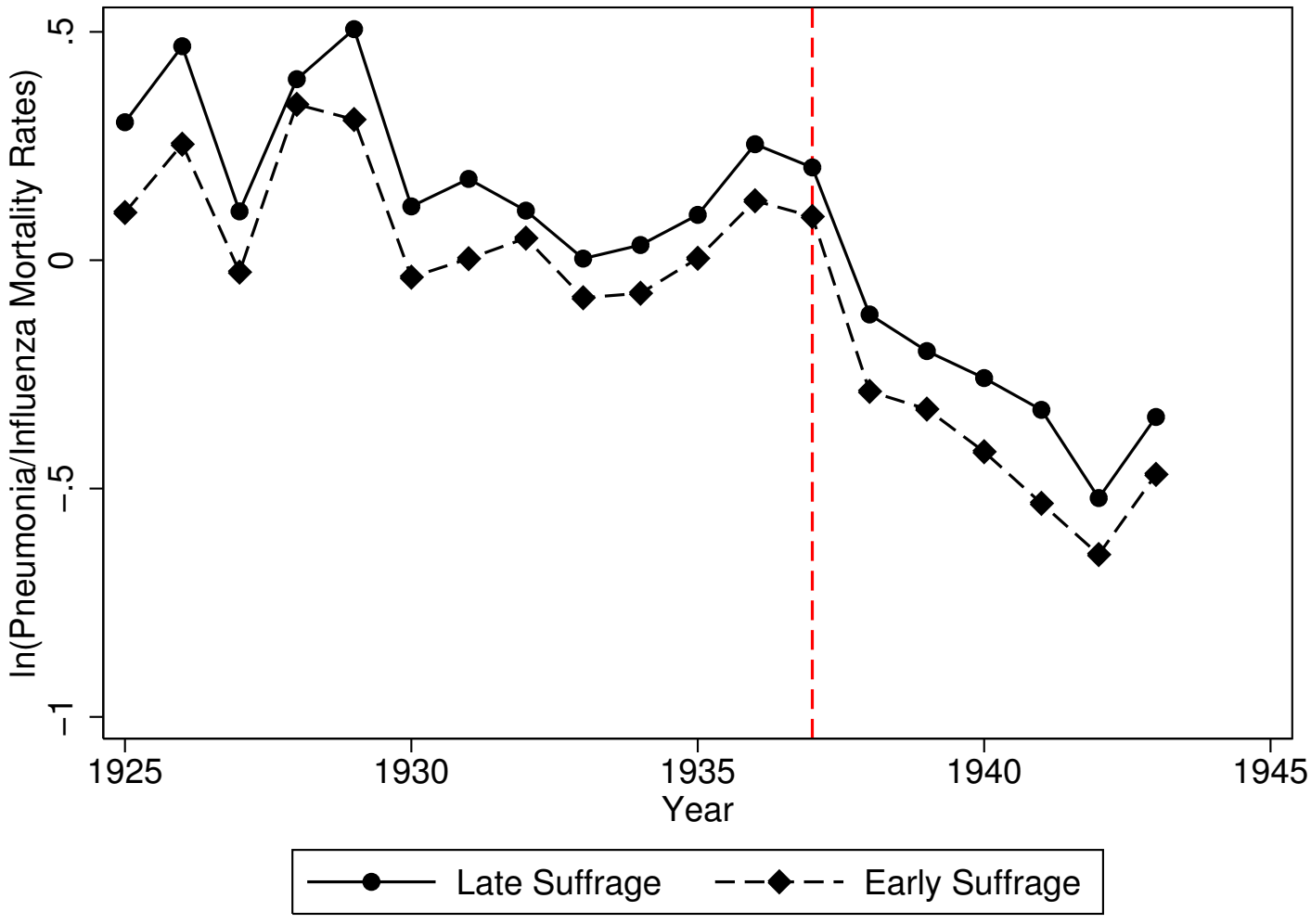

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Figure A3: Countries with Reserved Seats and Women's Representation

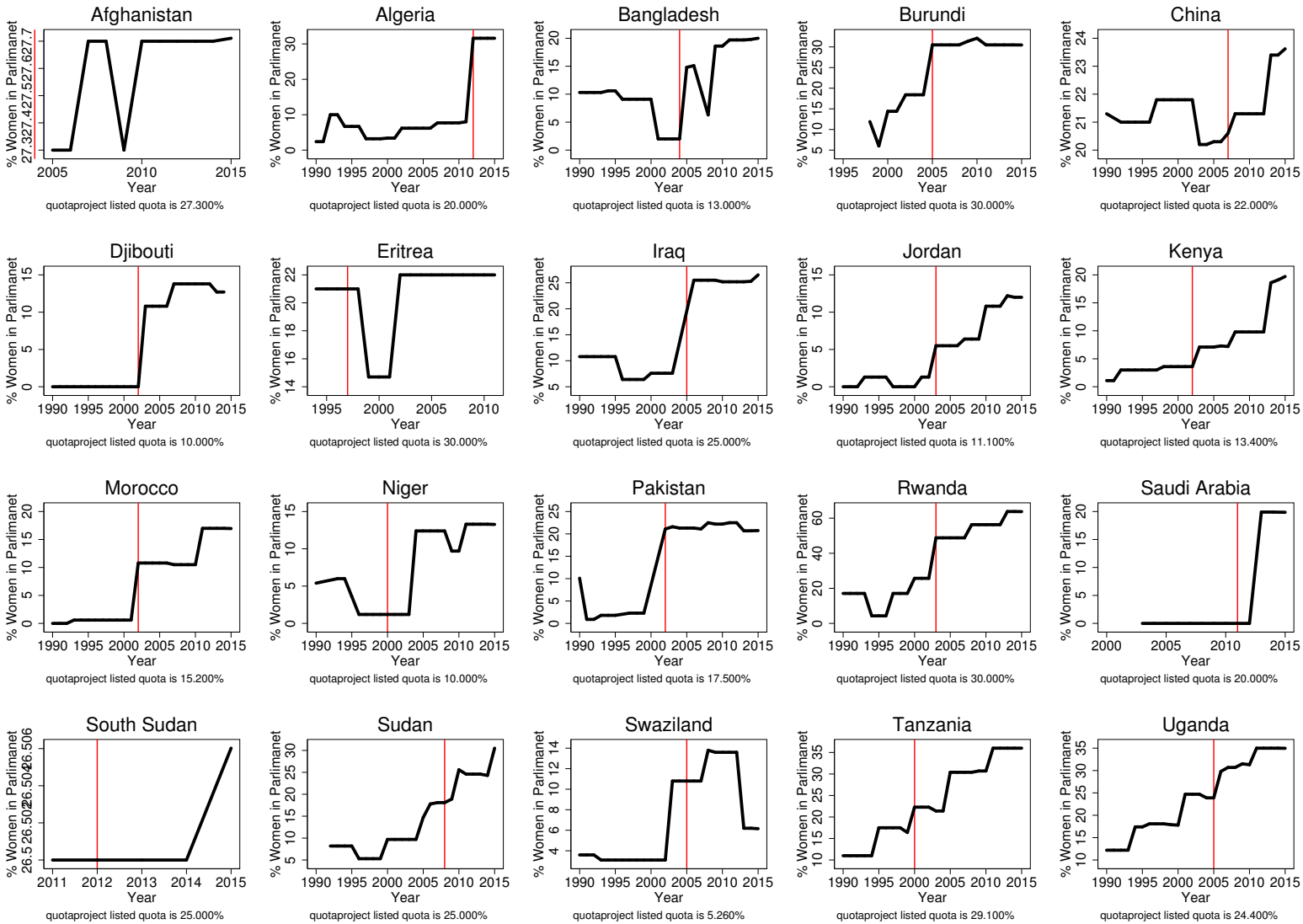

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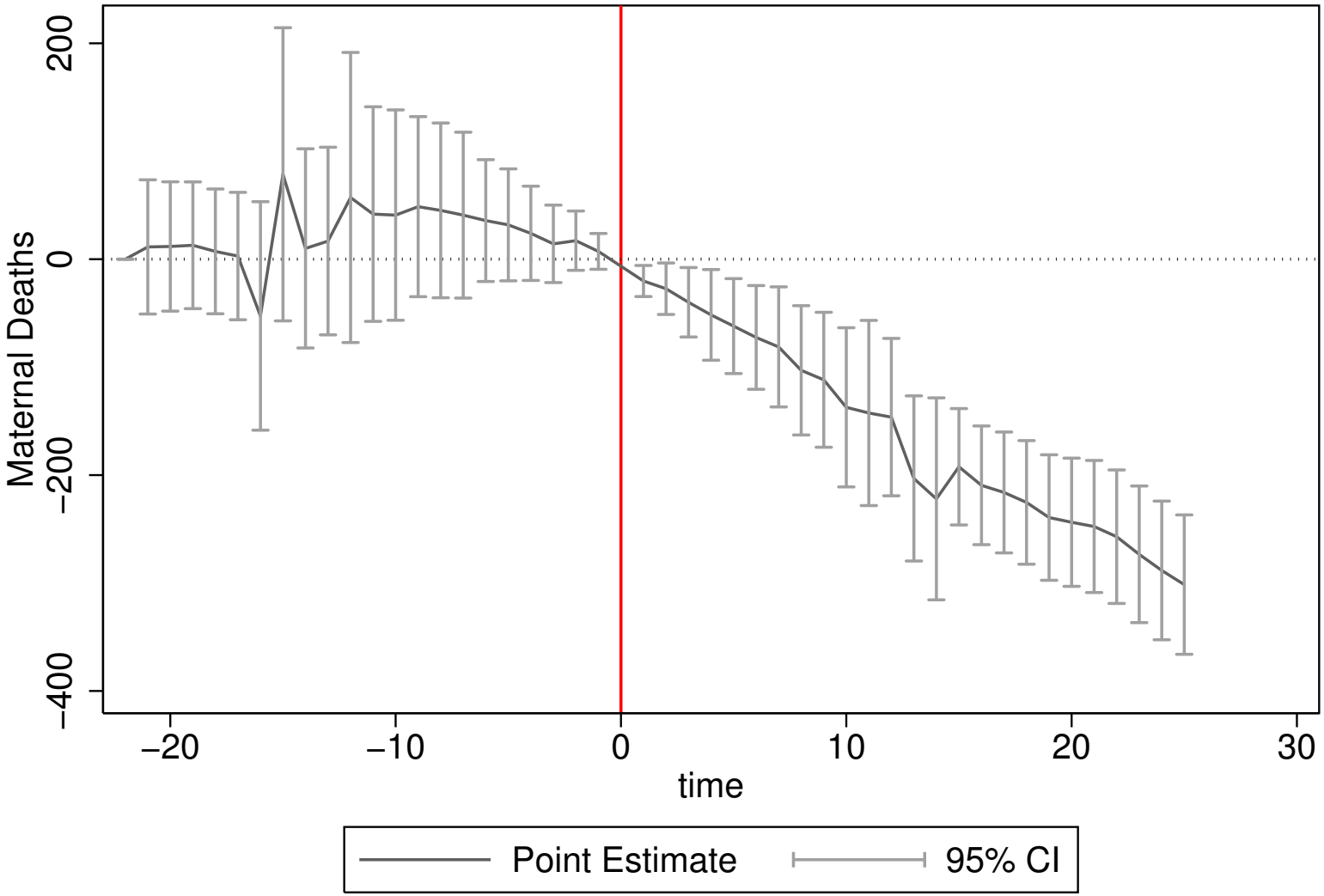
Figure A4: Event Study: Reserved Seats and Maternal Mortality Ratio



Year 0 is omitted as the base case.

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Cross country data sources

Table A2: Annual data (with gaps)

Variable	Source	N Countries	Years
MMR (Deaths per 100,000 live births)	WDI	183	1990- 2015
Subnational MMR calculated from microdata	DHS	45	1970-2010
Life Expectancy (Male)	WDI	200	1960-2014
Life Expectancy (Female)	WDI	200	1960-2015
Life Expectancy Ratio (F/M)	WDI	200	1960-2016
GDP	WDI	190	1960-2015
Tuberculosis Mortality Rate	WDI	191	1990-2015
Desired Sex Ratio (M/F)	DHS	63	1960-2012
Women's Political Rights	Cingareli	190	1981-2011
Women's Economic Rights	Cingareli	190	1981-2011
Women's Social Rights	Cingareli	190	1981-2004

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Table A3: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Life Expectancy (Female)	65.709	12.176	22.394	86.900	10629
Life Expectancy (Male)	61.106	10.925	16.286	81.600	10629
LE ratio (F/M)	1.074	0.036	0.963	1.375	10629
MMR	251.57	357.733	3	2900	4758
Log GDP	8.201	1.509	4.749	11.886	8342
Desired Sex Ratio (M/F)	1.116	0.142	0.433	3	2997
Tuberculosis Mortality Rate	21.559	32.145	0	283	4712
Women's Political Rights	1.786	0.647	0	3	4830
Women's Economic Rights	1.323	0.697	0	3	4779
Women's Social Rights	1.235	0.84	0	3	3395
Women's Composite Rights 1	0	1.436	-3.435	3.882	3352
Women's Composite Rights 2	0	1.16	-3.286	3.022	4766

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Gender Bias Measured by Women's Composite Rights

Table A4: Maternal Mortality and Women's Composite Rights

	(1)	(2)	(3)	(4)	(5)	(6)
Political,Economic,	-4.276	-3.094	-4.187	-122.3***	-126.0***	-115.4***
Social Rights	(4.518)	(4.662)	(4.827)	(32.68)	(33.64)	(31.59)
log GDP	-101.7***	-37.54	-42.46	-32.60	-36.96	-70.65*
	(20.04)	(36.27)	(36.59)	(35.10)	(35.10)	(39.69)
Rights*log GDP				14.84***	15.14***	13.80***
				(3.694)	(3.796)	(3.540)
N	2111	2111	1972	2111	1972	1972
r2		0.215	0.215	0.265	0.269	0.299
Political &	-3.590	-2.147	-3.371	-184.8***	-183.0***	-160.6***
Economic Rights	(5.952)	(6.161)	(6.956)	(43.70)	(47.74)	(43.13)
log GDP	-96.69***	-37.17	-27.16	-22.23	-12.95	-63.28*
	(17.87)	(33.78)	(34.56)	(31.40)	(32.30)	(35.64)
			(4.274)		(3.914)	(25.41)
Rights*log GDP				22.28***	21.98***	19.29***
				(4.843)	(5.237)	(4.693)
N	3400	3400	3113	3400	3113	3113
r2		0.245	0.263	0.313	0.327	0.369
Country FE		Y	Y	Y	Y	Y
Year FE		Y	Y	Y	Y	Y
Democracy			Y		Y	Y
Democracy*log GDP						Y

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Summary Statistics (Gender Intensity of Language)

Table A5: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Number Gender Intensity Index	0.46	0.498	0	1	6944
Sex-Based Intensity Index	0.694	0.461	0	1	6944
Gender Assignment Intensity Index	0.692	0.462	0	1	5096
Gender Pronouns Intensity Index	0.341	0.474	0	1	6888
gtroiano	2.524	1.5	0	4	4592
gii0	2.453	1.661	0	4	4816
gii1	1.978	1.222	0	3	5096
gii2	1.517	1.235	0	3	6496

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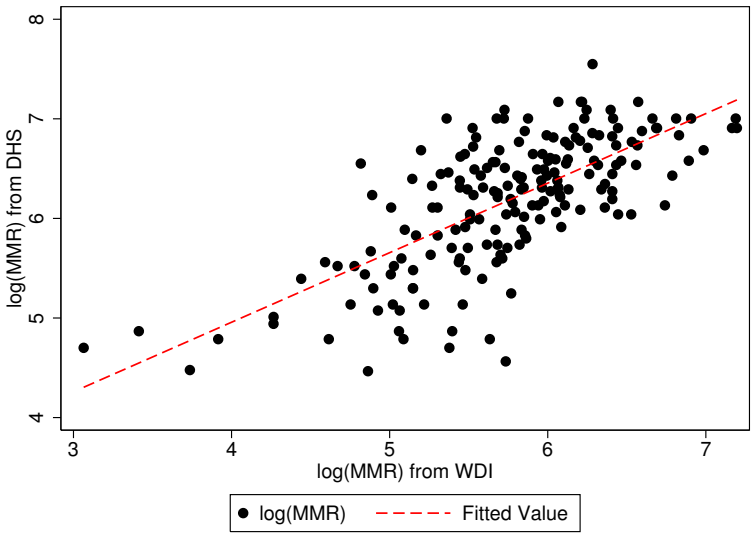
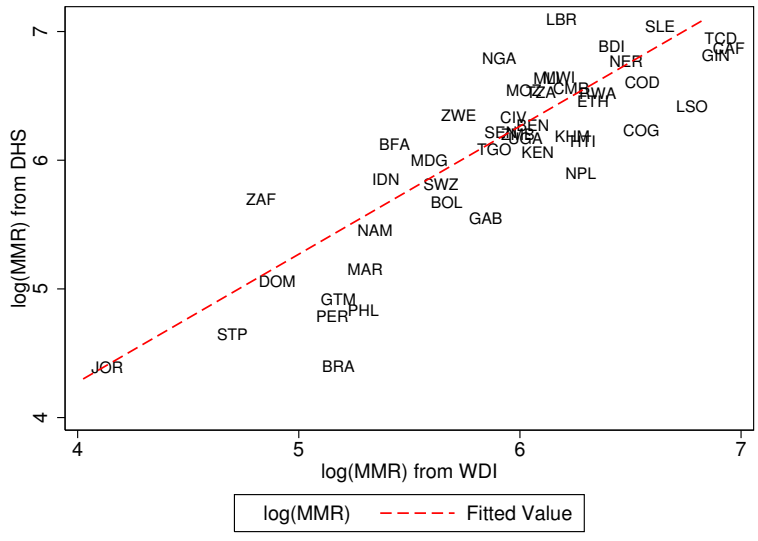
Figure A5: Comparison of MMR values from WDI-generated and author-generated DHS microdata



(a) Estimates by Country and Year



(b) Estimates by Country

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Table A6: Dependent Variable: TB mortality rate and Women's rights

	(1)	(2)	(3)	(4)	(5)	(6)
Political rights	-0.912	-0.813	-1.063	-25.19***	-25.54***	-22.91**
	(1.017)	(1.030)	(1.155)	(7.838)	(9.015)	(9.070)
log GDP	-9.891***	-7.312	-8.710	-12.17*	-13.66*	-16.30**
	(2.761)	(6.777)	(7.127)	(6.838)	(7.251)	(8.203)
democ			-0.274		-0.128	-4.907*
			(0.380)		(0.384)	(2.710)
Rights * LGDP				3.011***	3.041***	2.746***
				(0.893)	(1.033)	(1.042)
democracy * LGDP						0.656*
						(0.345)
N	3504	3504	3135	3504	3135	3135
r2		0.123	0.127	0.149	0.152	0.160
Economic rights	0.240	0.277	-0.282	-3.527	-5.154	-4.511
	(1.411)	(1.517)	(1.695)	(8.038)	(8.653)	(8.381)
log GDP	-9.722***	-6.860	-8.100	-7.213	-8.576	-12.39
	(2.673)	(6.715)	(7.006)	(7.119)	(7.470)	(8.638)
democ			-0.250		-0.248	-6.099**
			(0.384)		(0.386)	(2.783)
Rights* log GDP				0.454	0.583	0.489
				(0.795)	(0.851)	(0.816)
democracy * LGDP						0.807**
						(0.357)
N	3492	3492	3124	3492	3124	3124
r2		0.125	0.128	0.125	0.129	0.143

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Table A7: TB mortality rate and Stated Son Preference

	(1)	(2)	(3)	(4)	(5)
Desired Sex Ratio	26.32	-35.95	-43.32	-25.23	-52.34
	(72.30)	(45.99)	(42.58)	(39.33)	(193.8)
Log GDP			-3.352	-3.734	-8.376
			(7.483)	(7.286)	(34.96)
Desired Sex Ratio* Log GDP					4.310
					(30.28)
N	1407	1407	1375	1375	1375
r2		0.222	0.219	0.247	0.247
Country FE		Y	Y	Y	Y
Year FE		Y	Y	Y	Y
Desired Fertility				Y	Y

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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Table A8: TB and Gender Intensity of Language Measures

Dep Var: TB Incidence	(1) NGII	(2) SBII	(3) GPII	(4) GAII	(5) GII0	(6) GII1	(7) GII2	(8) GTroiano
Panel A: No Interaction								
Gender Intensity Index	1.723	6.055	2.365	2.011	1.957	2.702	1.512	-0.458
	(2.953)	(4.127)	(4.964)	(4.428)	(1.373)	(1.669)	(1.661)	(0.633)
ln(GDP)	-10.64***	-10.58***	-8.783***	-10.81***	-6.964**	-8.104***	-9.337***	-5.574***
	(2.855)	(2.843)	(2.939)	(2.907)	(2.878)	(2.987)	(2.710)	(1.234)
Observations	2782	2782	2003	2719	1915	2003	2619	1834
R-squared	0.552	0.556	0.546	0.484	0.508	0.551	0.510	0.511
Panel B: Interaction								
Gender Intensity Index	7.037	0.496	-26.65	10.87	10.02	3.697	4.947	0.287
	(20.77)	(26.50)	(41.95)	(27.72)	(7.563)	(11.02)	(11.09)	(4.255)
GII × ln(GDP)	-0.604	0.655	3.428	-1.032	-0.988	-0.123	-0.413	-0.0809
	(2.173)	(2.912)	(4.561)	(2.918)	(0.855)	(1.282)	(1.252)	(0.451)
ln(GDP)	-10.30***	-11.10**	-10.89***	-10.48***	-4.202	-7.847*	-8.604*	-5.377***
	(3.555)	(4.527)	(3.784)	(3.371)	(3.779)	(4.137)	(4.347)	(1.549)
Observations	2782	2782	2003	2719	1915	2003	2619	1834
R-squared	0.552	0.557	0.551	0.485	0.512	0.551	0.510	0.511

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Desired Sex Ratio and Infant Mortality

Table A9: Infant mortality and DSR (boys/girls)

	(1) OLS	(2) Probit	(3) OLS	(4) Probit	(5) OLS	(6) Probit
Female	-1.153***	-0.0801***	-2.716***	-0.194***	-2.729***	-0.195***
	(0.0928)	(0.00614)	(0.163)	(0.00894)	(0.163)	(0.00900)
Desired Sex Ratio	0.0125	0.00167	-0.551***	-0.0389***	-0.571***	-0.0400***
	(0.103)	(0.00668)	(0.0997)	(0.00660)	(0.0971)	(0.00647)
Desired Sex Ratio*Female			1.362***	0.0976***	1.369***	0.0981***
			(0.121)	(0.00704)	(0.121)	(0.00707)
Desired Fertility	No	No	No	No	Yes	Yes
N	4524542	4524521	4524542	4524521	4524542	4524521
R^2 / pseudo R^2	0.0216	0.040	0.0218	0.041	0.0220	0.041

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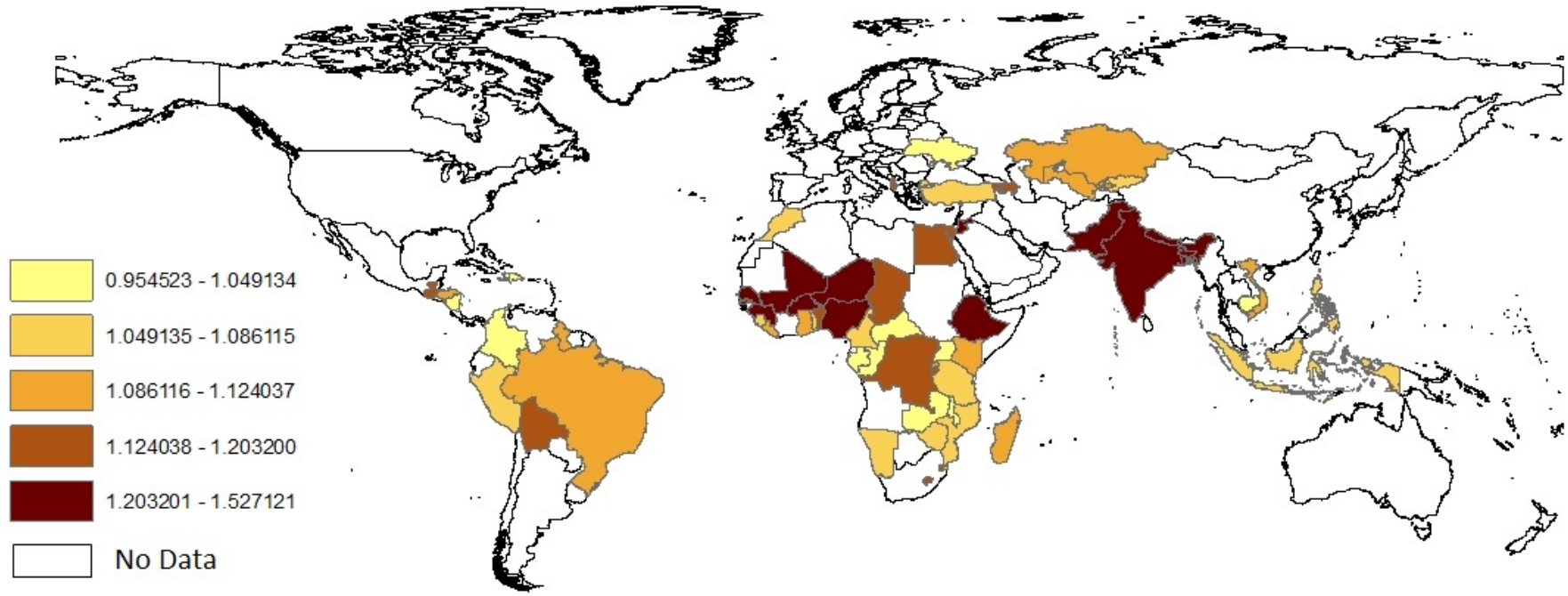

Figure A7: Desired Sex ratio (Stated Son Preference) in the 63 DHS countries average for 1969-2012

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Why differences in Suffrage across states?

"The most obvious pattern is geographic – all else equal, women in western states could vote before women elsewhere in America. Some historians suggest that frontier conditions were amenable to women's suffrage because women supported restrictions on common western vices (drunkenness, gambling, and prostitution) or because the harsh realities of frontier life made it impossible to maintain traditional gender roles (Brown 1958; Grimes 1967). Many others argue that idiosyncratic circumstances in each state resulted in the vote for women (Larson 1971; Beeton 1986), citing rich historical evidence in support of this view. Quantitative studies yield strikingly inconclusive results (Cornwall, Dahlin, King, and Schiffman 2004). ***The single robust correlate of suffrage law enactment emerging from these studies is the share of women working in non-agricultural occupations*** *(King, Cornwall, and Dahlin 2005). Although this presumably reflects changing social norms about the role of women, it evolved very gradually over time (Smith and Ward 1985; Goldin 1990) and can be distinguished econometrically from abrupt year-to-year legislative changes governing women's right to vote."*
Miller (2008)