

# Juggling Work and Childcare: Female Employment Opportunities and Child Health in Bangladesh

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# Introduction

- ▶ More women are working outside their home than ever before in developing countries.
- ▶ Greater employment opportunities may improve the status of women in terms of their education, marriage, fertility choices, health, decision making abilities, etc.
- ▶ Low skill, export-oriented manufacturing jobs, often emanating from removing international trade barriers, is a key driver in absorbing female workers in developing countries.
- ▶ We exploit the sudden increase in exports of readymade garments from Bangladesh post the annulment of the Agreement on Textile and Clothing in 2005 as a source of exogeneous variation in female employment opportunity

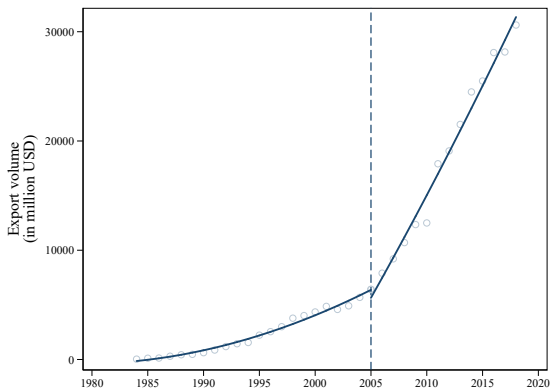
## Context

- ▶ The Multi Fibre Arrangement governed the world trade in textiles and garments from 1974 through 1994, imposing quotas on the amount developing countries could export to developed countries.
- ▶ The ATC, that is the WTO Agreement on Textile and Clothing, replaced MFA and laid down the regulation governing trade in textile and clothing.
- ▶ The WTO Agreement on Textiles and Clothing (ATC) ended on January 1, 2005.
- ▶ Quota restrictions for textiles and clothing ended and all WTO members had unrestricted access to the US, EU, and Canadian markets.

# Context

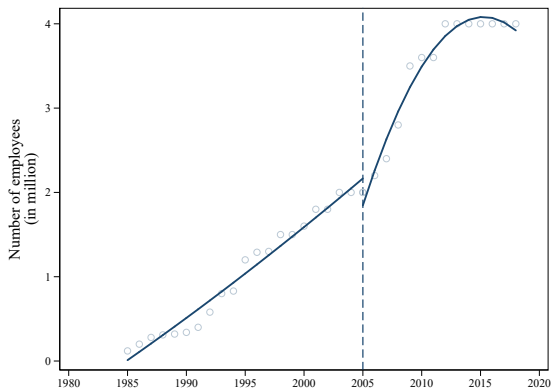
- ▶ The Bangladesh garment industry experienced massive growth in number of factories and employees, mainly due its comparative advantage in labor costs
- ▶ Due to the high female to male sex ratio of employees in garment factories, the rise of the garment industry in Bangladesh represents a structural shift in the labor market for Bangladeshi women
- ▶ The source of comparative advantage for Bangladesh was mainly its low cost labor
- ▶ There were uncertainties about the future of the industry as the end of the preferential quota era drew nearer.
- ▶ Between 2005-2010 the number of garment factories in Bangladesh increased by 15 percent, and the number of women employed in the Bangladesh garment industry increased by 63 percent (BGMEA)

# RMG Exports by Year



Note: Data used from BGMEA database. We perform a Wald test of the null hypotheses that there are no structural breaks in the year 2005 for export volume. The null hypotheses are rejected at the one percent level of significance

# RMG Employment by Year



Note: Data used from BGMEA database. We perform a Wald test of the null hypotheses that there are no structural breaks in the year 2005 for employment. The null hypotheses are rejected at the one percent level of significance

## Related Literature

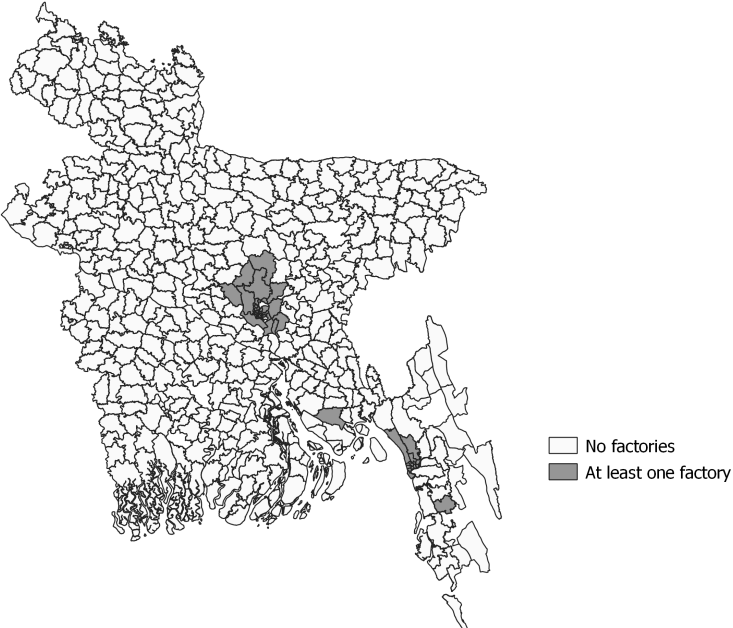
- ▶ Heath and Mobarak (2015) study the effects of greater employment opportunity for Bangladeshi women in ready-made garments industry on their marriage, fertility, education, and most importantly employment decisions
- ▶ Jensen (2012) finds if young women are provided with recruiting services to get jobs in the BPO industry they are likely to delay their marriage, and either enter labor market or spend more time to acquire more human capital
- ▶

# Data Description

- ▶ We use two data sources –
  - ▶ Five rounds of Bangladesh Demographic Household Surveys (DHS) conducted between 1999-2014
  - ▶ Bangladesh Garment Manufacturers and Exporters Association (BGMEA) members list
- ▶ DHS interviews married women aged 10 to 49 about their marital history, employment status, and health of their children
- ▶ BGMEA has information on the location and year of establishment of garment factories in Bangladesh
- ▶ About – percent of garment manufacturing units are members of BGMEA



# Distribution of RMG Factories



# Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample		Subdistrict has no RMG		Subdistrict has RMG		Difference
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Woman employed	0.22	0.41	0.21	0.41	0.29	0.45	0.08***
Woman employed in factory work	0.04	0.18	0.03	0.17	0.10	0.30	0.07***
Husband employed in factory work	0.11	0.31	0.10	0.30	0.14	0.35	0.04***
Age at marriage	14.99	2.74	14.93	2.70	15.62	3.02	0.69***
Age at first birth	17.46	3.10	17.42	3.07	17.90	3.34	0.48***
Number of antenatal visits	17.46	3.10	1.60	2.40	3.04	3.25	1.44***
Institutional delivery	17.46	3.10	0.11	0.31	0.24	0.43	0.13***
Cesarean delivery	17.46	3.10	0.04	0.20	0.10	0.30	0.06***
Months of breastfeeding	17.46	3.10	21.06	12.29	20.30	11.87	-0.76**
Child fed baby formula	17.46	3.10	0.06	0.24	0.16	0.37	0.10***
Child fed milk	17.46	3.10	0.39	0.49	0.40	0.49	0.01
Child fed meat	17.46	3.10	0.64	0.48	0.69	0.46	0.05***
Child fed vegetables	17.46	3.10	0.59	0.49	0.59	0.49	-0.00

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Summary Statistics (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample		Subdistrict has no RMG		Subdistrict has RMG		Difference
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Height-for-age z-score	17.46	3.10	-2.13	1.45	-1.99	1.36	0.13***
Weight-for-age z-score	17.46	3.10	-1.74	1.26	-1.54	1.28	0.20***
Had diarrhea in the last two weeks	17.46	3.10	0.07	0.26	0.08	0.27	0.01
Had fever in the last two weeks	17.46	3.10	0.38	0.49	0.39	0.49	0.01
Had cough in the last two weeks	17.46	3.10	0.41	0.49	0.42	0.49	0.01
Received BCG vaccine	17.46	3.10	0.89	0.31	0.93	0.26	0.04***
Received DPT-1 vaccine	17.46	3.10	0.88	0.33	0.92	0.27	0.05***
Received OPV-1 vaccine	17.46	3.10	0.91	0.29	0.94	0.24	0.03***
Received DPT-2 vaccine	17.46	3.10	0.81	0.39	0.88	0.33	0.07***
Received OPV-2 vaccine	17.46	3.10	0.82	0.38	0.89	0.32	0.06***
Received DPT-3 vaccine	17.46	3.10	0.73	0.44	0.81	0.39	0.08***
Received OPV-3 vaccine	17.46	3.10	0.74	0.44	0.82	0.39	0.08***
Received Measles vaccine	17.46	3.10	0.69	0.46	0.74	0.44	0.05***

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Summary Statistics (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample		Subdistrict has no RMG		Subdistrict has RMG		Difference
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Household size	6.24	3.15	6.27	3.16	5.95	2.96	-0.32***
Place of residence is rural	0.68	0.47	0.74	0.44	0.11	0.31	-0.63***
Religion is Muslim	0.88	0.33	0.87	0.33	0.92	0.27	0.05***
Woman's age	29.89	9.39	29.88	9.44	30.05	8.97	0.17
Woman's education	3.55	3.89	3.44	3.82	4.59	4.40	1.14***
Husband's age	39.03	11.09	39.03	11.15	38.93	10.49	-0.10
Husband's education	4.68	4.75	4.53	4.68	6.13	5.11	1.60***
Child is female	0.49	0.50	0.49	0.50	0.48	0.50	-0.01
Child's age	2.16	1.36	2.15	1.36	2.21	1.33	0.06

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BGMEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

# Empirical Strategy

- ▶ Difference-in-difference strategy
- ▶ Temporal variation before and after the end of ATC (2005)
- ▶ Spatial variation in terms of whether a subdistrict had at least one RMG factory before the end of ATC

# Specification

$$y_{icsdt} = \beta_0 + \beta_1 RMG_s + \beta_2 RMG_s \times Post_t + \gamma_t + \kappa_d + X_{icsdt} + e_{icsdt} \quad (1)$$

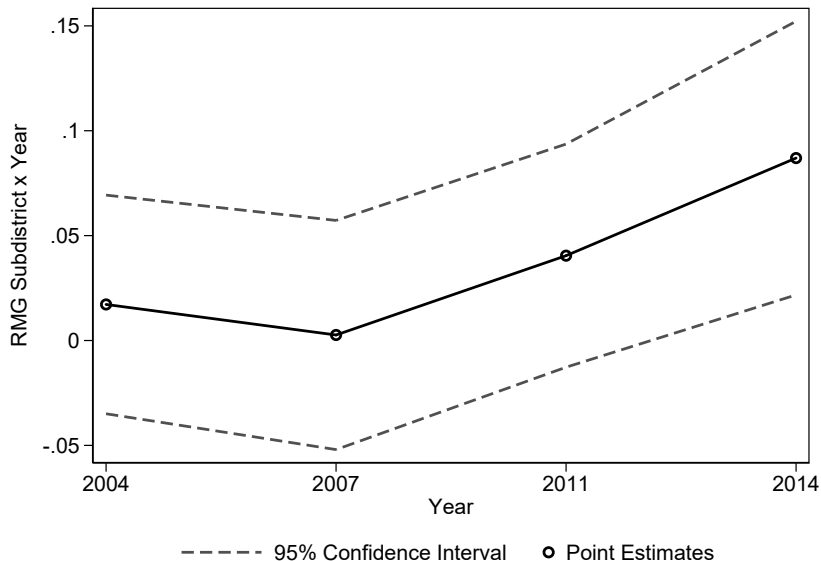
- ▶  $y_{icsdt}$  is the outcome for individual  $i$  in DHS cluster  $c$ , in subdistrict  $s$ , in district  $d$ , in year  $t$
- ▶  $RMG_s$  is an indicator indicating whether subdistrict  $s$  had at least one RMG factory in 2005
- ▶  $Post_t$  is an indicator for post-2005 round of DHS
- ▶  $\gamma_t$  is a vector of year fixed effects and  $\kappa_d$  is a vector of district fixed effects
- ▶ We also include individual level controls,  $X_{icsdt}$  (age and education of the woman and her husband)
- ▶ Robust standard errors are clustered at the district level

## Results: employment

	(1)	(2)	(3)
	Currently working	Working in factory	Husband working in factory
Baseline mean (RMG)	0.29	0.10	0.14
Baseline mean (Non RMG)	0.21	0.03	0.10
RMG subdistrict	0.05** (0.022)	0.03 (0.016)	-0.01 (0.018)
RMG subdistrict $\times$ Post	0.00 (0.023)	0.04** (0.019)	0.02 (0.018)
R sq	0.07	0.05	0.04
Observations	63030	63039	62755

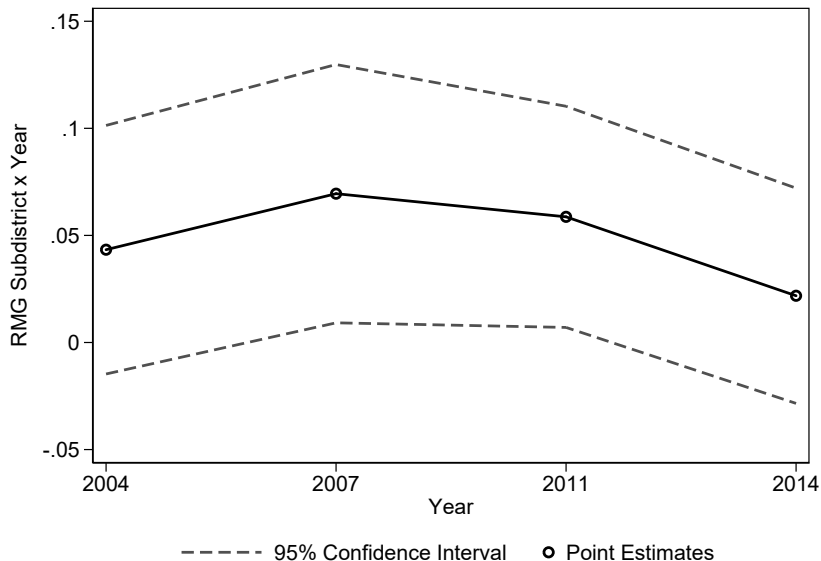
Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Results:female employment over time





## Results:female employment over time



## Results:female employment by cohort

	(1) Woman working	(2) Woman working in factory	(3) Husband working in factory
Baseline mean (RMG)	0.29	0.10	0.14
Baseline mean (Non RMG)	0.21	0.03	0.10
RMG subdistrict	0.09*** (0.032)	0.05* (0.027)	0.01 (0.036)
RMG × Post × Age 10 - 20	0.02 (0.035)	0.05* (0.032)	0.00 (0.036)
RMG × Post × Age 21 - 30	-0.02 (0.030)	0.02 (0.023)	0.02 (0.021)
RMG × Post × Age 31 and above	-0.05 (0.030)	-0.01 (0.016)	0.03 (0.022)
R sq	0.08	0.05	0.04
Observations	63030	63039	62755

## Results: marriage and first birth

	(1)	(2)
	Age at marriage	Age at first birth
Baseline mean (RMG)	15.62	17.90
Baseline mean (Non RMG)	14.93	17.42
RMG subdistrict	-0.34*** (0.126)	-0.28* (0.161)
RMG subdistrict $\times$ Post	0.24** (0.109)	0.27** (0.133)
R sq	0.45	0.39
Observations	63039	56608

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Results: marriage and first birth by cohort

	(1) Age at marriage	(2) Age at first birth
Baseline mean (RMG)	15.78	17.99
Baseline mean (Non RMG)	15.11	17.49
RMG subdistrict	-0.44*** (0.083)	-0.21** (0.094)
RMG × Post × Age 10 - 20	0.45*** (0.102)	0.41*** (0.108)
RMG × Post × Age 21 - 30	-0.54*** (0.194)	-0.60** (0.238)
RMG × Post × Age 31 and above	-2.69*** (0.764)	-1.94*** (0.431)
R sq	0.34	0.28
Observations	63039	56608

## Results: maternal health behavior

	(1)	(2)	(3)	(4)	(5)
	Qualified doctor	Unqualified doctor	Institutional delivery	Cesarean delivery	Months breastfed
Baseline mean (RMG)	0.22	0.37	0.24	0.10	24.05
Baseline mean (Non RMG)	0.09	0.40	0.11	0.04	25.65
RMG subdistrict	-0.03 (0.020)	0.05* (0.026)	-0.05** (0.023)	-0.05*** (0.014)	-0.05 (0.580)
RMG subdistrict $\times$ Post	0.08*** (0.021)	-0.05** (0.024)	0.08*** (0.022)	0.09*** (0.017)	-1.48** (0.663)
R sq	0.25	0.34	0.29	0.20	0.10
Observations	30368	30368	30369	30176	15632

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Results: child dietary intake

	(1)	(2)	(3)	(4)
	Baby formula	Milk	Meat	Veggies
Baseline mean (RMG)	0.16	0.40	0.83	0.59
Baseline mean (Non RMG)	0.06	0.39	0.83	0.59
RMG subdistrict	0.01 (0.020)	-0.02 (0.029)	-0.06*** (0.023)	-0.01 (0.023)
RMG subdistrict $\times$ Post	0.02 (0.021)	-0.04 (0.027)	0.06*** (0.022)	0.03 (0.023)
R sq	0.11	0.18	0.46	0.30
Observations	18695	15862	12656	18700

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Results: child health and morbidity

	(1)	(2)	(3)	(4)	(5)
	Height	Weight	Diarrhea	Fever	Cough
Baseline mean (RMG)	-1.99	-1.18	0.08	0.39	0.42
Baseline mean (Non RMG)	-2.19	-1.34	0.07	0.38	0.41
RMG subdistrict	0.03 (0.064)	-0.26 (0.238)	0.01 (0.010)	0.04 (0.024)	0.02 (0.024)
RMG subdistrict $\times$ Post	0.04 (0.076)	0.28* (0.158)	-0.01 (0.010)	-0.05** (0.021)	-0.01 (0.021)
R sq	0.14	0.02	0.02	0.02	0.03
Observations	28593	32125	33222	33223	33230

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.

## Results: immunization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BCG	DPT-1	OPV-1	DPT-2	OPV-2	DPT-3	OPV-3	Measles
Baseline mean (RMG)	0.95	0.95	0.96	0.92	0.93	0.86	0.87	0.83
Baseline mean (Non RMG)	0.93	0.92	0.94	0.88	0.89	0.81	0.82	0.81
RMG subdistrict	0.01 (0.017)	0.03 (0.017)	0.02 (0.015)	0.04* (0.021)	0.03* (0.018)	0.05** (0.023)	0.05** (0.021)	0.03 (0.023)
RMG subdistrict × Post	-0.02 (0.013)	-0.03** (0.012)	-0.01 (0.010)	-0.04*** (0.014)	-0.03** (0.013)	-0.05*** (0.017)	-0.05*** (0.015)	-0.04** (0.019)
R sq	0.11	0.08	0.07	0.11	0.10	0.13	0.13	0.10
Observations	33314	32388	32441	31753	31689	31157	31096	28261

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.



## Results: immunization and access to healthcare

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	BCG	DPT-1	OPV-1	DPT-2	OPV-2	DPT-3	OPV-3	Measles
Baseline mean (RMG)	0.95	0.95	0.96	0.92	0.93	0.86	0.87	0.83
Baseline mean (Non RMG)	0.92	0.90	0.94	0.87	0.89	0.80	0.83	0.79
RMG subdistrict	0.02 (0.026)	0.03 (0.026)	0.03 (0.023)	0.03 (0.028)	0.03 (0.026)	0.02 (0.032)	0.02 (0.029)	0.03 (0.034)
RMG subdistrict $\times$ Post	-0.03 (0.020)	-0.04** (0.020)	-0.03 (0.017)	-0.05** (0.023)	-0.04* (0.021)	-0.06** (0.029)	-0.05* (0.026)	-0.06* (0.031)
RMG $\times$ Post $\times$ Health facility $\leq$ 5km	-0.21** (0.091)	-0.16 (0.097)	-0.14** (0.062)	-0.25** (0.105)	-0.18* (0.092)	-0.39*** (0.107)	-0.29*** (0.099)	-0.43*** (0.144)
R sq	0.12	0.10	0.07	0.13	0.12	0.14	0.14	0.14
Observations	5159	5031	5040	4936	4911	4850	4825	4373

Data used from 1999, 2004, 2007, 2011, and 2014 Bangladesh DHS survey and BG-MEA database. All regressions include district and year of birth fixed effects, individual controls (age, education). Robust standard errors clustered at the DHS cluster level.