

# Ready Made Garments and Women in Bangladesh

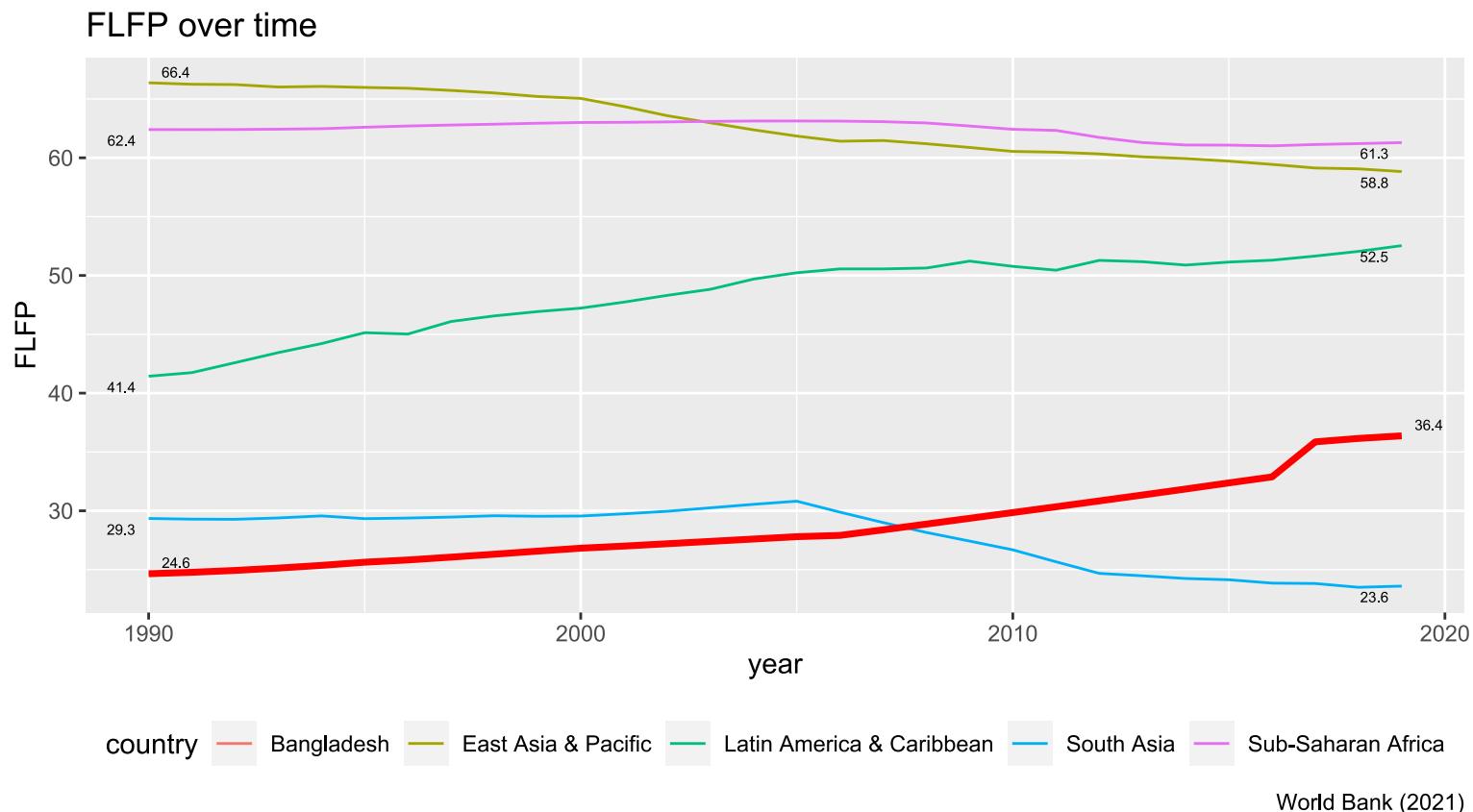
SM Shihab Siddiqui

---

06 May, 2022

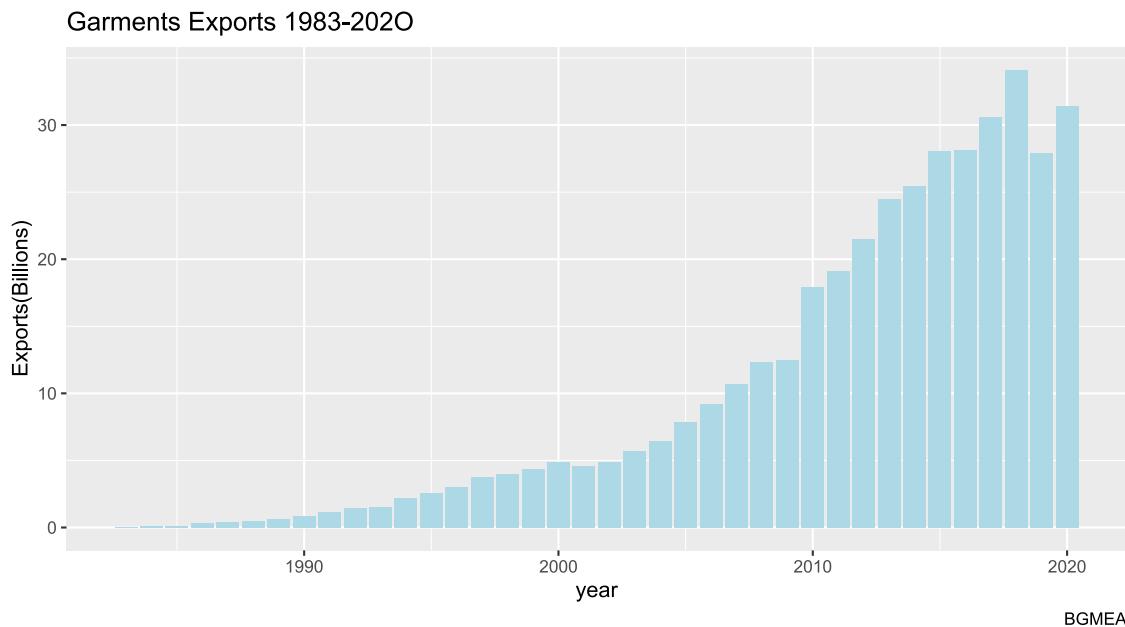
# Introduction

# Against the grain: Bangladeshi FLFP



- Labor force participation among 20-24 year olds stood at about 49% in 2015 (ADB 2016).

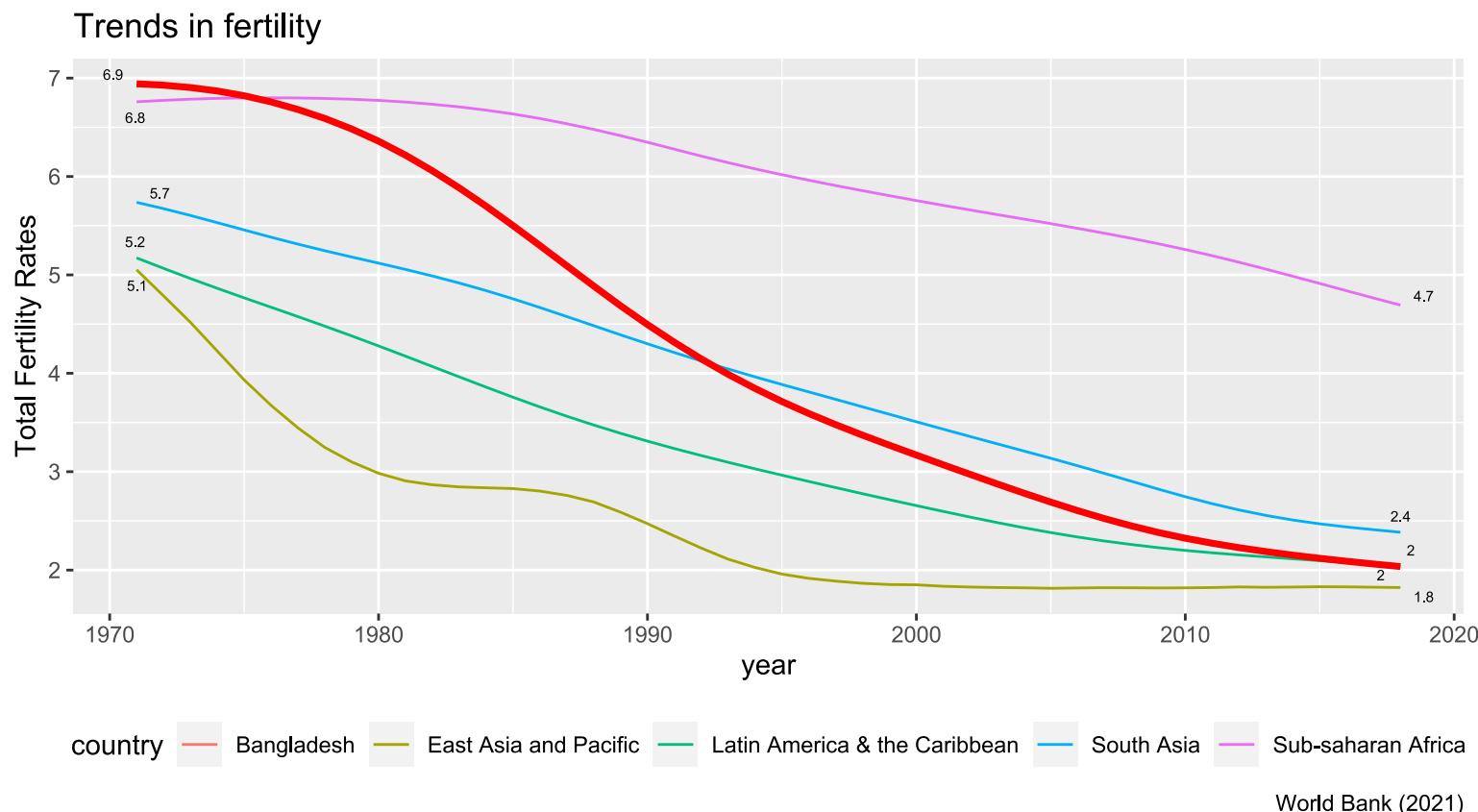
# Expansion of the garments industry



- More than 75% of Bangladesh's exports since 1997s.
- **About 60% of workers** in export oriented RMG industry are women.
  - The share seems to be declining.

# Inter-related changes?

## Declining fertility



# Inter-related changes?

## Women at school

Lower secondary (about middle school) completion rates in total female population completion rate of **4.4% in 1981** to **41% in 2019**. (World Bank, 2020)

Literacy among **15-24 age group exceeds 96 percentage in 2019**. (World Bank, 2020)

# Research question

1. I start by examining whether the garments industry **increased** and changed the **pattern** of female labor force participation in Bangladesh.
2. Labor force participation decisions maybe interrelated to **marriage formation** and **reproductive behavior**, **human capital investment on girls**, and **autonomy** of women.
  - I also examine whether the garments industry in Bangladesh changed the aforementioned dimensions of women's lives.

# Prior research

## Heath and Mobarak (2015, JDE)

- Survey of 1395 households in 60 villages in four sub-districts of Bangladesh.
  - 44 in garments commuting zones and 16 away, surveyed in 2009.
  - Average distance from capital is 1.8 KM for garment commuting zones, 6.8 KM for non-garments commuting zones.
- They found that girls exposed to the garment sector
  - Increases FLFP by 15 pp
  - Decreases fertility by 29 pp
  - Reduces gender education gap by 1.5 years.

# Prior research

## Li (2018, JIE)

- Uses Bartik-type instruments exploiting the variation in skill intensity of industries and spatial variation in industry specialization.
  - Found that high skill export shock increased educational attainment in China between 1990 to 2005.

## Autor et. al (2019, AER:I)

- Uses bartik-type instruments to find that:
  - Trade shocks reduced employment by 2.6 pp for both sexes.
  - Negative shocks to male-dominated industries reduce family formation and fertility, whereas negative shocks to female-dominated industries tend to increase family formation and fertility.

# My expected contributions

- Provide alternative estimates of the labor demand shock on FLFP and pattern of FLFP that rely on exploiting variation in knit versus woven specialization of a RMG producing region, and variation in aggregate knit and woven exports over time.
  - Controls for spatial development patterns better.
- Greater geographic and temporal coverage of data.
- Explore additional topics related to lives of women in Bangladesh.

# Data and Empirical Approach

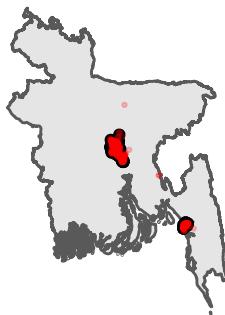
# Factory data

Factory data are primarily from **Mapped in Bangladesh Project**.

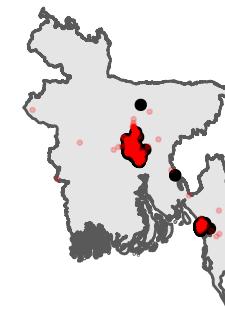
- Between 2017 and 2021, the project gathered information on all potentially existing factories from government and trade groups.
- Processed the list and physically verified locations of 3805 factories.
- But they did not have data on factories from export processing zone, which I obtained by scraping Bangladesh Garments Manufacturers and Exporters Association (**BGMEA**) website.

# Spatial Evolution of Factories

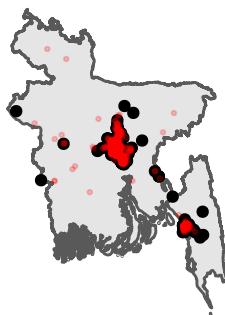
Established 90-00



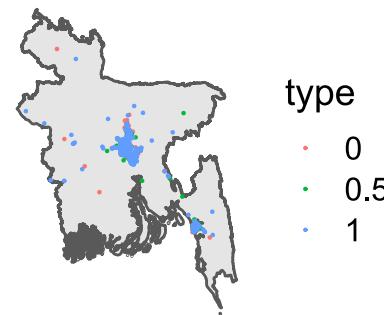
Established 00-10



Established 10-20

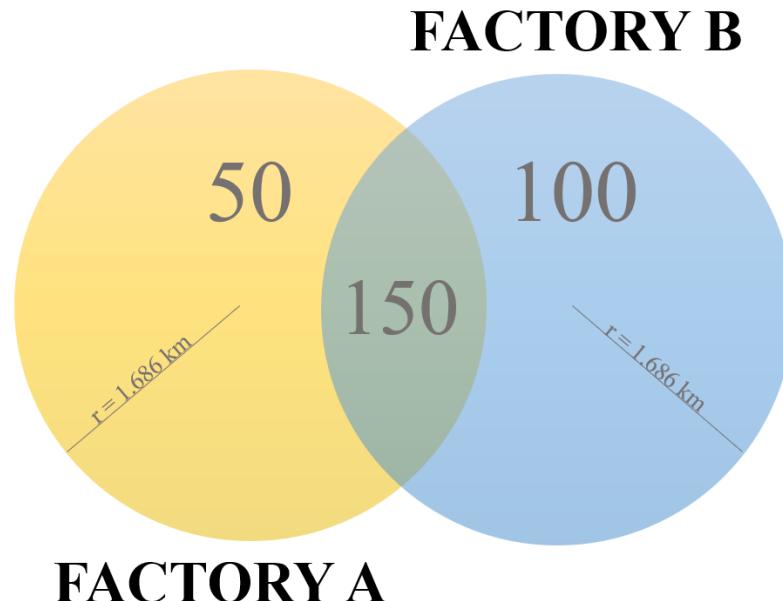


Regional Specialization?



# Factory catchment area

- For each factory, we define a catchment area of 1.686 KM based on estimates of travel time of RMG workers and walking speed estimates.
- Agglomeration leads to overlap of catchment area, and exposure in intersecting areas are summed.

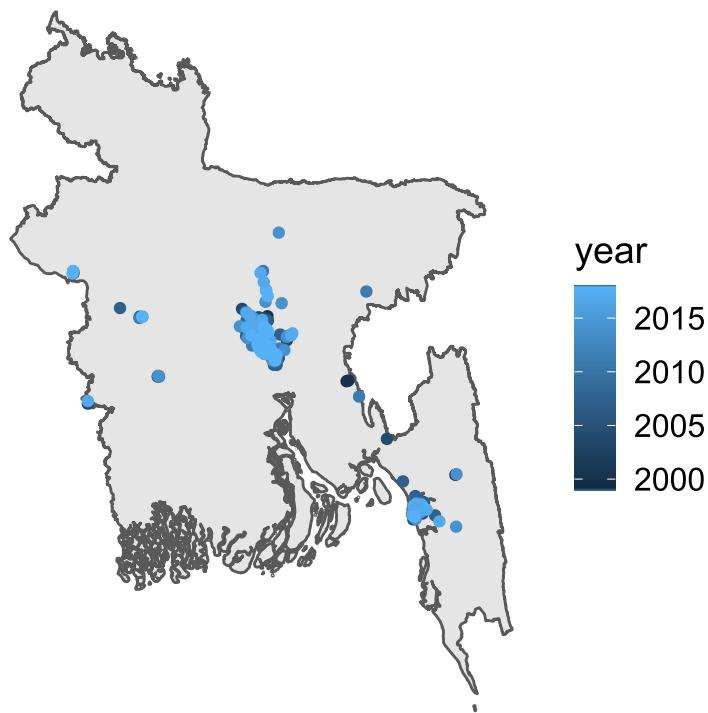


# Outcome data

- Outcome data is obtained from geo-coded **Bangladesh Demographic and Health Surveys** 2000-2018
  - Nationally representative HH survey data in 2962 clusters.
  - **Pros:** Allows us to ask questions about changes in reproductive behavior beyond fertility.
  - **Cons:** But geo-codes are randomly displaced to protect anonymity.
  - Only locations within factory catchment areas is selected to avoid comparing areas with and without any factory.

# Selected Samples

Selected Samples



# Overview of the identification strategy

I estimate regressions of the following form:

$$Y_{i,c,t} = \beta_z Z + \beta X_{c,t} + \delta_t + \text{Birth Year}_{i,c,t} + \epsilon_{i,c,t}$$

$Y_{i,c,t}$  : Outcome of person  $i$  in catchment area  $c$  at time  $t$ .

$X_{c,t}$  : Measure of export exposure in catchment area  $c$  at time  $t$

$Z$  : is a vector of individual and location specific controls

# Overview of the identification strategy

**Key challenge:** Location of exporting firms are likely correlated with other variables that likely influence the outcome variables.

- I restrict my analysis to a narrowly defined catchment area based on factory locations.
- Garment factories specialize in production of **knit or woven type of garments. But many produce both.**
  - I make use of spatial variation in knit and woven specialization, and temporal variation in export of knit and woven products to estimate plausibly exogenous measures of export exposure.

# Export exposure

I use a Bartik-type export exposure measure:

$$X_{c,t} = \text{Export Shock}_{c,t}$$

where  $\text{Export Shock}_{c,t} = \frac{\alpha_{c,t}^{\text{kni}} * \Delta \text{Knit Export}_{t-T}}{\text{Population}_{c,t}} + \frac{(1 - \alpha_{c,t}^{\text{kni}}) * \Delta \text{Woven Export}_{t-T}}{\text{Population}_{c,t}}$

$$\text{and } \alpha_{c,t}^{\text{kni}} = \frac{\text{Workers}_{c,\text{kni},t}}{\text{Workers}_{BD,t}}$$

- T = 3 in baseline specification, and
- Shares are instrumented with 3-year lags.

# Threats to identification

- Assumes orthogonality of knit and woven share to outcomes
  - Defensible since infrastructure, not labor related issues, seem to be the key factor in location choice of garments factories.
- Coordinates of sample clusters are randomly displaced.
- Firm exits are not accounted for.
  - For example, my dataset identifies about 1914 of 3548 firms in 2009.
  - One concern is if exits are geographically correlated.
  - Second concern is loss of variation.

# Results

# Contemporaneous influence on FLFP

	<i>Dependent variable:</i>			
	FLFP(RMG Adjacent)	FLFP Traditional	FLFP (Non-trad, Low skill)	FLFP (Non-trad, High skill)
	(1)	(2)	(3)	(4)
export_exposure1	0.018*** (0.003)	−0.002 (0.002)	0.020*** (0.003)	−0.0001 (0.001)
educ	−0.021*** (0.003)	−0.004** (0.002)	−0.014*** (0.003)	0.005*** (0.002)
age	0.053* (0.028)	−0.003 (0.014)	0.021 (0.025)	−0.0004 (0.013)
I(age^2)	−0.001* (0.001)	0.0003 (0.0003)	−0.001 (0.0004)	0.0001 (0.0002)
num_child5	−0.090*** (0.015)	0.004 (0.008)	−0.083*** (0.013)	−0.013** (0.007)
preg_survey	−0.076** (0.038)	−0.035* (0.019)	−0.083** (0.034)	−0.027 (0.017)
more_child	−0.041*** (0.012)	0.010 (0.006)	−0.019* (0.011)	−0.009 (0.006)
religion	−0.083 (0.052)	0.021 (0.026)	−0.016 (0.046)	−0.012 (0.023)
husb_educ	−0.005 (0.003)	−0.005*** (0.001)	−0.004 (0.003)	0.002 (0.001)
agro_share	−0.368 (0.232)	0.338*** (0.116)	0.298 (0.205)	0.003 (0.104)
rural	0.044 (0.039)	−0.008 (0.019)	0.004 (0.034)	−0.018 (0.017)
density	−0.00000*** (0.00000)	0.00000 (0.00000)	−0.00000** (0.00000)	−0.00000 (0.00000)
electrification_rate	0.054 (0.135)	−0.154** (0.068)	0.343*** (0.119)	−0.051 (0.060)
Observations	1,608	1,608	1,608	1,608
Adjusted R <sup>2</sup>	0.197	0.110	0.258	0.042

# Medium term influence on FLFP

	<i>Dependent variable:</i>			
	FLFP(RMG Adjacent)	FLFP Traditional	FLFP (Non-trad, Low skill)	FLFP (Non-trad, High skill)
	(1)	(2)	(3)	(4)
export_exposure3	0.006*** (0.001)	−0.001 (0.001)	0.007*** (0.001)	0.00002 (0.0005)
educ	−0.021*** (0.003)	−0.004** (0.002)	−0.014*** (0.003)	0.005*** (0.002)
age	0.054* (0.028)	−0.003 (0.014)	0.022 (0.025)	−0.001 (0.013)
I(age^2)	−0.001* (0.001)	0.0003 (0.0003)	−0.001 (0.0004)	0.0001 (0.0002)
num_child5	−0.090*** (0.015)	0.004 (0.008)	−0.084*** (0.013)	−0.013** (0.007)
preg_survey	−0.077** (0.038)	−0.035* (0.019)	−0.084** (0.034)	−0.027 (0.017)
more_child	−0.041*** (0.012)	0.010 (0.006)	−0.019* (0.011)	−0.009 (0.006)
religion	−0.081 (0.052)	0.020 (0.026)	−0.013 (0.046)	−0.012 (0.023)
husb_educ	−0.005 (0.003)	−0.005*** (0.001)	−0.004 (0.003)	0.002 (0.001)
agro_share	−0.363 (0.233)	0.339*** (0.117)	0.301 (0.206)	0.004 (0.104)
rural	0.041 (0.039)	−0.007 (0.019)	0.0001 (0.034)	−0.018 (0.017)
density	−0.00000*** (0.00000)	0.00000* (0.00000)	−0.00000*** (0.00000)	−0.00000 (0.00000)
electrification_rate	0.061 (0.135)	−0.157** (0.068)	0.353*** (0.119)	−0.053 (0.060)
Observations	1,608	1,608	1,608	1,608
Adjusted R <sup>2</sup>	0.196	0.109	0.255	0.042

# Migration and FLFP

	Migrants		Dependent variable:		Non-migrants
	RMG-Ad,M	Non-trad-LS,M	flfp_garments	flfp_poor_nontrad	
	(1)	(2)	(3)	(4)	
export_exposure1	0.017*** (0.003)	0.019*** (0.003)	-0.001 (0.017)	0.0003 (0.014)	
educ	-0.023*** (0.004)	-0.014*** (0.003)	0.0003 (0.010)	-0.005 (0.009)	
age	0.043 (0.034)	0.019 (0.030)	0.168* (0.087)	0.036 (0.075)	
I(age^2)	-0.001 (0.001)	-0.0002 (0.001)	-0.003** (0.002)	-0.001 (0.001)	
num_child5	-0.099*** (0.018)	-0.087*** (0.016)	-0.032 (0.038)	-0.021 (0.033)	
preg_survey	-0.066 (0.044)	-0.081** (0.039)	-0.256** (0.099)	-0.247*** (0.085)	
more_child	-0.038*** (0.015)	-0.020 (0.013)	-0.012 (0.029)	0.012 (0.025)	
religion	-0.057 (0.056)	-0.023 (0.050)	0.507 (0.364)	0.306 (0.314)	
husb_educ	-0.005 (0.003)	-0.004 (0.003)	-0.007 (0.008)	-0.008 (0.007)	
agro_share	-0.190 (0.282)	0.489** (0.249)	0.210 (1.258)	2.258** (1.086)	
rural	0.044 (0.041)	0.011 (0.036)			
density	-0.00000*** (0.00000)	-0.00000** (0.00000)	-0.00000 (0.00000)	-0.00000 (0.00000)	
electrification_rate	0.373 (0.242)	0.618*** (0.214)	-0.108 (0.275)	0.173 (0.237)	
Observations	1,301	1,301	180	180	
Adjusted R <sup>2</sup>	0.195	0.268	0.171	0.099	
---					

# Summarizing the FLFP results

One thousand dollars worth of export shock per person:

- 1.8 percentage point (pp), or 9.5 percent increase in RMG and adjacent occupations in the same year within this sample.
- 18 percent increase relative to full Bangladeshi sample.
- 0.6 percentage point (pp), or 3 percent increase in RMG and adjacent occupations in three year horizons.
- Slightly larger increases in broader low skilled, non-modern occupation.
  - Possibility of influence from allied industries
- Almost all of the increase is driven by new migrants into the area.

# Influence on autonomy

# Influence on fertility preferences

	Dependent variable:		
	Preg	Fert Pref	Male pref
	(1)	(2)	(3)
export_exposure3	-0.0001 (0.0003)	-0.002 (0.001)	0.0005 (0.001)
educ	-0.001 (0.001)	-0.017*** (0.004)	-0.002 (0.003)
age	0.0005 (0.004)	0.001 (0.012)	-0.001 (0.007)
age_mar	0.003*** (0.001)		
num_child	-0.015*** (0.002)		
religion	0.006 (0.011)	0.121** (0.057)	0.009 (0.035)
husb_educ	-0.001 (0.001)	-0.001 (0.004)	-0.001 (0.002)
agro_share		-0.665** (0.287)	0.170 (0.179)
rural	0.010 (0.010)	-0.041 (0.049)	-0.0004 (0.031)
density	0.00000 (0.00000)	-0.00000*** (0.00000)	-0.00000 (0.00000)
electrification_rate	-0.014 (0.037)	-0.149 (0.164)	0.136 (0.102)
Observations	8,154	2,367	2,367
Adjusted R <sup>2</sup>	0.052	0.086	0.013

# Education and marriage

- Not presenting at this moment due to need for checking the data cleaning process.

# Conclusion

- In my estimates, at least **11 million women** have been exposed to increased labor demand from export oriented garment manufacturing.
  - About 14 % of all Bangladeshi women.
- Results indicate that the garments industry provided opportunities for many of them to join manufacturing labor force.
  - The result seems to be driven by people moving into garment producing areas, rather than existing women changing their occupation.
- No evidence in changes in autonomy or fertility behavior. Tentatively, no evidence on education and marriage formation behavior either.
- Suggests that the changing conditions made the FLFP in formal settings possible, not the other way round.