The Demographic Transition & Structural Transformation

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Motivation

- Fertility falling (nearly) everywhere (Delventhal, Guner, Fernández-Villaverde 2022)
  - recent rapid diffusion of fertility reducing technologies
- Population size crucial for many economic growth models (Lewis 1954; Gollin et al. 2002)
- What are the consequences of falling fertility for economic growth in *developing* countries?
  - In developing economies, less cutting-edge innovation (unlike in Jones 2022) $\Longrightarrow$ endogenous growth models less appropriate

How does the demographic transition affect structural transformation?

Theory

- Demographic transition: $\downarrow$ population growth, $\uparrow$ human capital
  - land in agriculture $\implies$ $\uparrow$ returns as agricultural labor $\downarrow$
  - human capital more useful in non-agriculture

$\implies$ ambiguous net effect on agricultural employment share

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Empirics

- Key challenges:
  - Need exogenous variation in fertility and/or early-life mortality
  - Impact of lower fertility on labor market not felt until children grow up, so many years of data needed for evaluation

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Empirics

- Key challenges:
  - Need exogenous variation in fertility and/or early-life mortality
  - Impact of lower fertility on labor market not felt until children grow up, so many years of data needed for evaluation
- Two exercises:
  1. Cross-country panel regressions to identify GE effects
  2. Quasi-experimental variation in access to contraception & early-childhood vaccines 45 years ago in rural Matlab, Bangladesh to understand mechanisms
     - ★ rich data on individuals/households across several decades

Faster Demographic Transition $\implies$ Slower Structural Transformation

1. Cross-country regressions:
   - A 1 child decline in fertility in year $t - 30$ raises agricultural employment share in t by 3pp

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   - ...and 3.9pp more in agriculture

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   - Key mechanism 1: bigger households send marginal member to non-agricultural sector.
     - ★ births fell by $\sim$1 during peak childbearing years (Joshi and Schultz 2007).
   - Key mechanism 2: higher human capital sons more likely to work in nonagricultural sectors

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   - Key mechanism 2: higher human capital sons more likely to work in nonagricultural sectors
   - Not today:
     - ★ treated farmers substitute intermediate inputs for labor
     - ★ treated farmers switch to less-labor intensive crops (away from rice, into potatoes)

Contribution

First to establish causal effect of demographic transition on structural transformation

- Existing macroeconomic studies lack exogenous variation and cannot pin down mechanisms at the household/individual-level
  (Leukhina and Turnovsky 2016; Yin 2022)

Peters (2022) shows importance of population size driving rural industrialization

- This paper: low-innovation economy $\Longrightarrow$ endogenous growth model less appropriate

Show demographic transition makes agriculture less reliant on labor

- Mechanism similar to effect of emigration on agriculture
  (Hornbeck and Naidu 2014; Clemens, Lewis, and Postel 2018; Andersson et al. 2022; San, 2023)

Talk Outline

1. Model
2. Cross-Country Evidence
3. Bangladesh Quasi-Experiment

Simple Model of Structural Transformation

Setup

- Consider a small open economy with L households 'partially' open Tombe 2015 charts
- Two sectors: nonagriculture (m) and agriculture (a) 3 sector model
- Three factors: labor (L), imported intermediates (Z), and land (T)
- Per-capita human capital (h) only yields returns in nonagricultural sector
  (as in Caselli & Coleman 2001; Porzio, Rossi, & Santangelo 2022)

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- Per-capita human capital (h) only yields returns in nonagricultural sector (as in Caselli & Coleman 2001; Porzio, Rossi, & Santangelo 2022)
- Nonagricultural production:

$$Q_m = A_m Z_m^{\alpha} (hL_m)^{1-\alpha}$$

- Agriculture production:

$$Q_a = A_a \left[\omega Z_a^{\frac{\epsilon-1}{\epsilon}} + (1-\omega) L_a^{\frac{\epsilon-1}{\epsilon}} \right]^{\frac{\theta\epsilon}{\epsilon-1}} T_a^{1-\theta}$$

Simple Model of Structural Transformation

Equilibrium

Marginal product of labor in agriculture falling in L_a due to fixed factor land

Simple Model of Structural Transformation

Equilibrium

Marginal product of labor in agriculture falling in L_a due to fixed factor land

Human capital acts via the wage on agricultural employment share:

$$\frac{L_a^*}{L} \propto \left(\frac{\left[\left(\frac{\omega}{1-\omega}\right)^{\epsilon} \left(\frac{w^*}{p_z}\right)^{\epsilon-1} + 1 \right]^{\frac{\theta\epsilon}{\epsilon-1}-1}}{\left(\frac{\alpha}{1-\alpha}\frac{w^*}{p_z}\right)^{\alpha} h^{1-\alpha}} \right)^{\frac{1}{1-\theta}} \frac{T}{L}$$

where $w^* \propto h$

Simple Model of Structural Transformation

Comparative Statics

Consider the effect of $\downarrow L$ and $\uparrow h$

- Demographic transition on net reduces pop growth in long run
- Raises human capital via improving health and child quality investments by parents

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Predictions:

- $\downarrow L \implies \uparrow \frac{L_a}{L}$
- Effect of $\uparrow h$ depends on parameter values:

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Comparative Statics

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- Demographic transition on net reduces pop growth in long run
- Raises human capital via improving health and child quality investments by parents

Predictions:

- $\downarrow L \implies \uparrow \frac{L_a}{L}$
- Effect of $\uparrow h$ depends on parameter values:
  - $\frac{\partial L_a/L}{\partial h}$ is negative iff

$$\frac{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-1}}{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-1}+1} < \frac{1-\epsilon(1-\theta)}{p_z}$$

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Cross-Country Estimation

Specification:

$$AES_{ct} = \alpha_c + \alpha_t + \beta TFR_{c,t-\tau} + \epsilon_{ct}$$

where

- α_c, α_t are country, year FEs
- AES_{ct} is agricultural employment share
- $TFR_{c,t-\tau}$ is total fertility rate

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Data:

- Comprehensive data on AES from Wingender (2014) updated w/ ILO data through 2021
  - some missings before 2008 filled in w/ ILO data & ETD from GGDC by Kruse et al. (2022)
- Total fertility rate collected from the UN

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Addressing endogeneity

- Threat: time-varying, country-specific shocks (e.g., skill-biased technical change)
- Instrument for TFR using abortion policy index of Bloom et al. (2009)
    - Timing of adoption of abortion policies within country provides exogenous variation in fertility (given set of fixed effects)

Lower fertility $\implies$ Lower future agricultural employment share

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Dependent variable: Agriculture employment share						
		Whole Sample						
Total fertility rate, t		0.018***						
		(0.0050)						
N		6,798						
Dep. var. mean		0.399						
Country FEs		✓						
Year FEs		✓						

Notes: The table presents regression results at the country-year level. Standard errors clustered at the country-level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Lower fertility $\Longrightarrow$ Lower future agricultural employment share

	First stage	Dependent variable: Agriculture employment share						
		Whole Sample			Developing countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total fertility rate, t		0.018***						
		(0.0050)						
Total fertility rate, t-30			-0.010*	-0.031*	-0.0044	-0.038**		
			(0.0053)	(0.017)	(0.0052)	(0.018)		
Abortion policy index, t-30	-0.11***							
	(0.029)							
N	2,279	6,798	2,279	2,279	1,672	1,672		
Dep. var. mean	5.06	0.399	0.330	0.330	0.362	0.362		
Country FEs	✓	✓	✓	✓	✓	✓		
Year FEs	✓	✓	✓	✓	✓	✓		
1st-stage F-statistic				14.4		14.3		

Notes: The table presents regression results at the country-year level. Standard errors clustered at the country-level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Various lags

Lower fertility $\Longrightarrow$ Lower future agricultural employment share

	First stage	Dependent variable: Agriculture employment share						
		Whole Sample			Developing countries			
	(1)	(2)	(3)	(4)	(5)	(6)	(7) Closed	(8) Open
Total fertility rate, t		0.018***						
		(0.0050)						
Total fertility rate, t-30			-0.010*	-0.031*	-0.0044	-0.038**	-0.0084	-0.059*
			(0.0053)	(0.017)	(0.0052)	(0.018)	(0.012)	(0.032)
Abortion policy index, t-30	-0.11***							
	(0.029)							
N	2,279	6,798	2,279	2,279	1,672	1,672	500	1,172
Dep. var. mean	5.06	0.399	0.330	0.330	0.362	0.362	0.446	0.325
Country FEs	✓	✓	✓	✓	✓	✓	✓	✓
Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
1st-stage F-statistic				14.4		14.3	4.7	14.8

Notes: The table presents regression results at the country-year level. Standard errors clustered at the country-level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Various lags Closed defined as absorption in agricultural sector of >95% (as of 2005), otherwise considered open.

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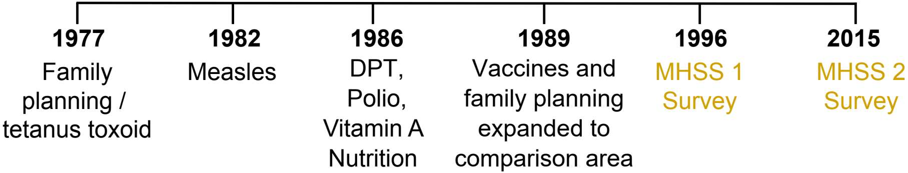
Matlab Mother and Child Health and Family Planning Program

MCH-FP



- Monthly in-home visits by community health workers

Matlab Mother and Child Health and Family Planning Program

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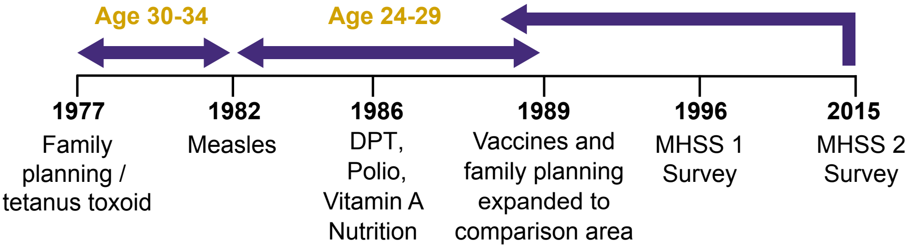
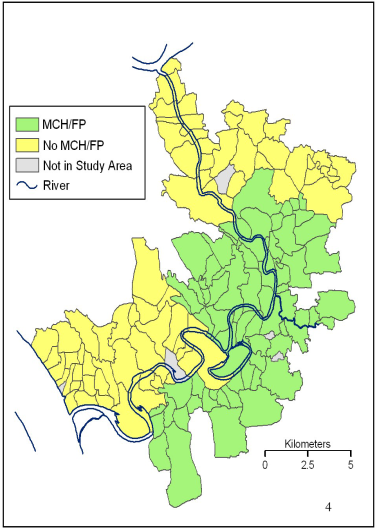


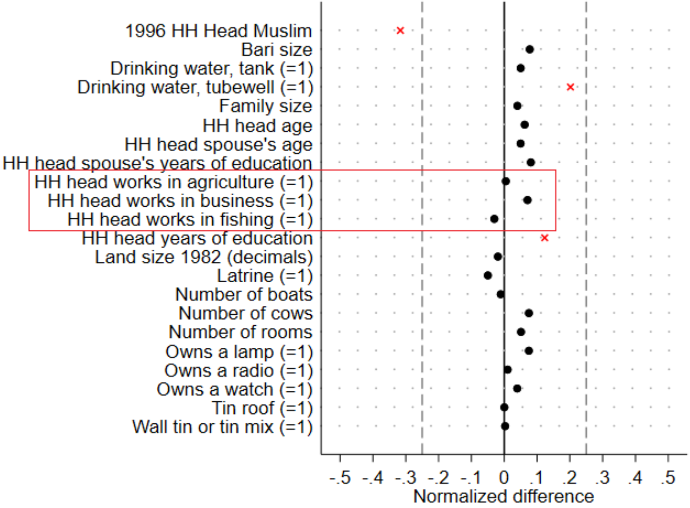
- Monthly in-home visits by community health workers
- Matlab Health and Socio-Economic Survey (MHSS) 1996 & 2015

Matlab Maternal and Child Health / Family Planning Program



- Highly successful, large rise in contraceptive prevalence, immunization
  Chart
- Comparison villages socially and economically similar pre-intervention (Phillips et al. 1982; Koenig et al. 1990)
- Clustering reduced information spillovers (Huber and Khan 1979) and facilitated estimation of community effects

Baseline Balance (in 1974) between Treatment and Control Households



Data—Matlab Health and Socioeconomic Surveys (MHSS)

- Very low attrition
  - Intense effort to follow internal and international migrants who left Matlab subdistrict
  - Followed 90% of men born during the experimental period
- Demographic Surveillance System facilitates linkages across time and to ancestors
- Pre-intervention variables derived from 1974 and 1982 cenuses

Baseline Estimation Strategy

Compare conditional means between treatment and control households

Estimate at the 1996 household level Detail:

$$Y_h = \omega_0 + \omega_1 T_h + \zeta X_h + \varepsilon_h$$

for household h

- Outcome Y_h
- Treatment eligibility T_h based on 1974 village of 1996 household head (intent-to-treat approach) Detail
- X_h is a vector of 1974 baseline controls tied to the 1996 household head
- cluster SEs at 1974 village level

No effect in medium-run — 19 years after program start (1996)

	Dependent variable: % of household working in sector	
	(1)	(2)
	Agriculture	Nonagriculture
Treated	-0.00	0.01
	(0.02)	(0.02)
Observations	2534	2534
Mean	0.67	0.36
% chg. rel. to mean	-0.0	2.0
Baseline controls	Y	Y
Controlling for embankment	Y	Y

Notes: The table presents estimates for outcomes measured in 1996 aggregated at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by the MHSS1 household head's pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Large Effect ∼35 years after program start

As a fraction of total hours worked, treated households spent 3.2pp less time in nonagriculture and 3.9pp more in agriculture

Dependent variable: % of household work time spent per sector			
	(1) Agriculture	(2) Manufacturing	(3) Services
Treated	0.04***	-0.02	-0.01
	(0.01)	(0.01)	(0.02)
Observations	2488	2488	2488
Mean	0.21	0.20	0.48
% chg. rel. to mean	18.8	-10.9	-2.0
Baseline controls	Y	Y	Y
Controlling for embankment	Y	Y	Y

Notes: The table presents estimates for outcomes measured in 2015 aggregated at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by the MHSS1 household head's pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Key Mechanisms

- Key mech 1: household size
  - Program reduced number of births among peak-fertility-age women by $\sim$1 (Joshi and Schultz 2007), so fewer marginal members went into non-agricultural jobs 1st-stage 2nd-stage
- Key mech 2: human capital
  - Program increased human capital of vaccine reicipients (Barham 2012; Barham et al. 2022)
  - Vaccine recipient men more likely to work in services Analysis

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- Additional adjustment margin:
  - Treated farmers adjust to fewer household members by growing less labor intensive crops, more non-labor intensive crops (preliminary)
- Heterogeneity:
  - Effects mediated by rural-to-urban migration Rural Urban
  - Effects not driven by international emigration

Conclusion

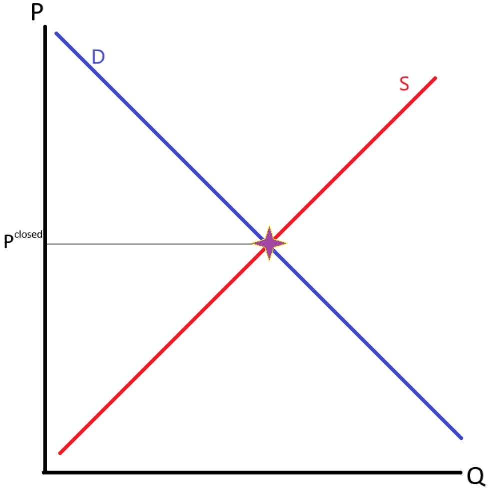
- Shown first well identified causal evidence of effect of the demographic transition on structural transformation
- On net, the demographic transition slows down structural transformation
  - driven by smaller household sizes
  - human capital effects go in opposite direction, but in magnitude smaller

$\Longrightarrow$ In long-run, human capital effects may overtake labor force size effects [speculative]

- Policy implication: contraceptive programs should be paired with human capital enhancing interventions to sustain movement of workers out of agriculture

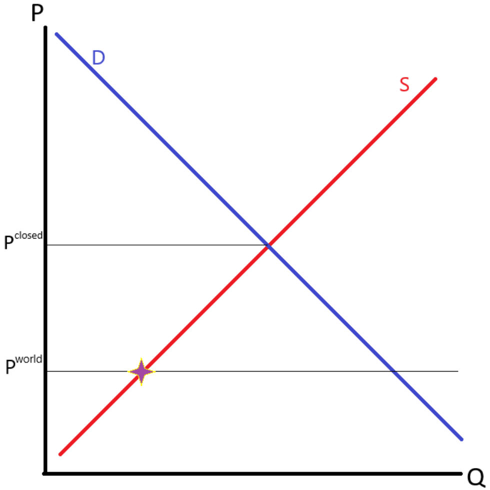
Appendix

Closed vs. Open Economy Equilibrium



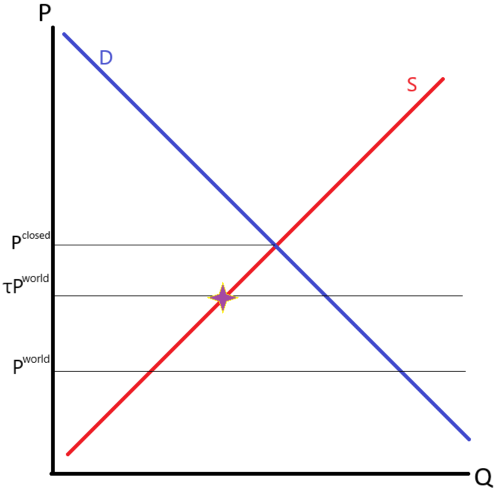
In closed economy, food problem (i.e., demand for agr. goods) is salient

Closed vs. Open Economy Equilibrium



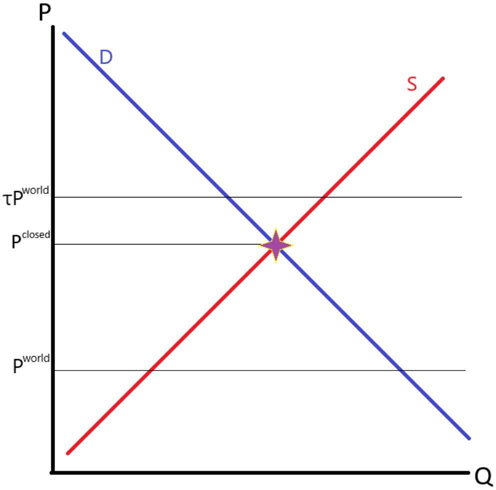
In open economy, imports alleviate food problem

Closed vs. Open Economy Equilibrium



Let τ = import trade costs

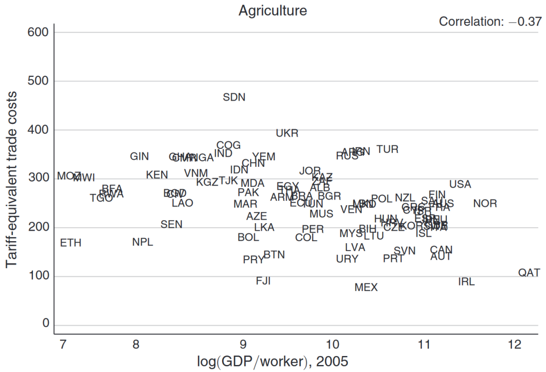
Closed vs. Open Economy Equilibrium



If τ big enough / diff. between world and closed price small enough, return to closed economy

How reasonable is the small open economy assumption?

Panel A. Average trade costs, by importer



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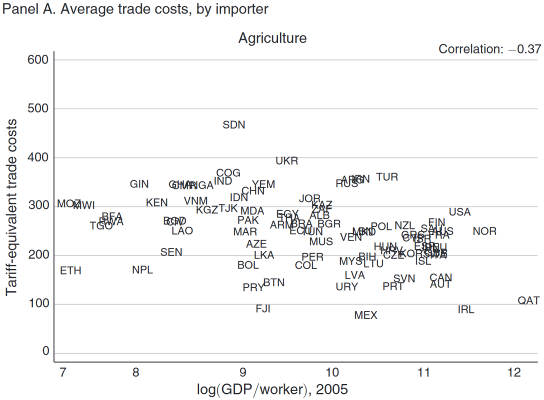

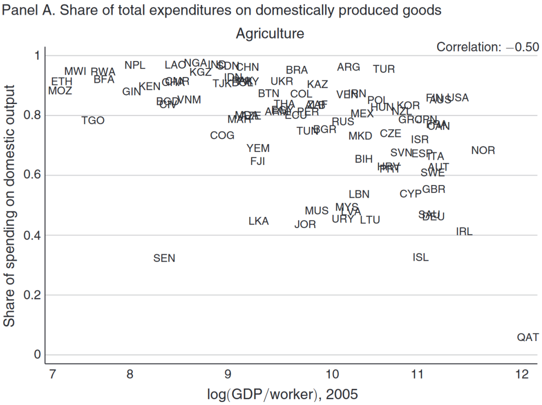

from Tombe (2015)

Model with Nontradable Sector

To baseline model, add nontradable service sector with production function

$$Q_s = A_s Z_s^{\alpha} (hL_s)^{1-\alpha}$$

assume a Cobb-Douglas utility function: Evidence on consumption shares

$$U(c_{a,L}, c_{m,L}, c_{s,L}) = c_{a,L}^{\eta_a} c_{m,L}^{\eta_m} c_{s,L}^{\eta_s}$$

and that landowners consume some fraction ξ locally, such that:

$$Q_s = c_{s,L} L + c_{s,T} \xi T$$

$\implies$ obtain same analytic result for $\frac{L_a}{L}$ as in 2 sector model

- effect on $\frac{L_s}{L}$ ambiguous: $\frac{\partial L_s^*/L}{\partial h} = \Gamma \left(\varepsilon_{r,h} - \varepsilon_{w,h} \right)$

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Agricultural Employment Share in Equilibrium

$$\frac{L_g^*}{L} = \left(\Lambda \frac{\left[\left(\frac{\omega}{1-\omega} \right)^{\epsilon} \left(\frac{w^*}{p_z} \right)^{\epsilon - 1} + 1 \right]^{\frac{\theta\epsilon}{\epsilon-1} - 1}}{\left(\frac{\alpha}{1-\alpha} \frac{w^*}{p_z} \right)^{\alpha} h^{1-\alpha}} \right)^{\frac{1}{1-\theta}} \frac{T}{L}$$

where $\Lambda \equiv \frac{(1-\omega)^{\frac{\theta\epsilon}{\epsilon-1}} \theta}{1-\alpha} \frac{p_g}{p_m} \frac{A_g}{A_m}$

$$w^* = (1-\alpha)(p_m A_m)^{\frac{1}{1-\alpha}} \left(\frac{\alpha}{p_z} \right)^{\frac{\alpha}{1-\alpha}} h$$

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Key Mechanism 1: Household Size

First-stage

	(1) Number of Men Age 24-34	(2) Number of Women Age 24-34
Treated	-0.13***	-0.05
	(0.04)	(0.04)
Observations	2453	2453
Adjusted R^2	0.005	-0.001
Mean	0.8	0.7
% chg. rel. to mean	-16.04	-6.77
Baseline controls	Y	Y
Controlling for embankment	Y	Y

Notes: The table presents estimates of the effect of the MCH-FP on 2014 outcomes at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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Key Mechanism 1: Household Size

Second stage

	(1) Agriculture	(2) Manufacturing	(3) Services
Num. males age 24-34	-0.402**	0.244*	0.0813
	(0.170)	(0.146)	(0.116)
% chg. rel. to mean	-178.4	132.3	19.6
Mean	0.23	0.18	0.41
First-stage F-stat.	9.1	9.1	9.1
Baseline controls	Y	Y	Y
Embankment controls	Y	Y	Y
Observations	2453	2453	2453

Notes: The table presents 2SLS estimates for outcomes measured in 2014 aggregated at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by the 1996 household head's pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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Comparative Statics

Effect of a change in population:

$$\frac{\partial L_a/L}{\partial L} = -\frac{L_g^*}{L^2} < 0$$

Effect of a change in human capital:

$$\frac{\partial L_a/L}{\partial h} = \frac{1}{1-\theta}\frac{L_a^*}{L}\left[(\theta\epsilon - \epsilon + 1)\frac{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-2}}{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-1}+1}\frac{\partial w^*}{\partial h} - \frac{\partial w^*/\partial h}{w^*}\right]$$

which is negative iff

$$\frac{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-1}}{\left(\frac{\omega}{1-\omega}\right)^{\epsilon}\left(\frac{w^*}{p_z}\right)^{\epsilon-1}+1} < \frac{1-\epsilon(1-\theta)}{p_z}$$

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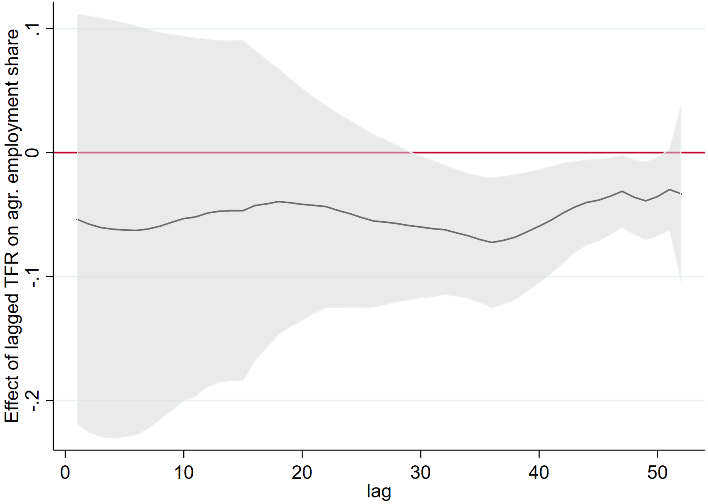
Robustness of Cross-Country Result to Alternative Lags



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Effect on Rural Households

	(1) Agriculture	(2) Manufacturing	(3) Services
Treated	0.0421**	0.00356	-0.0229
	(0.0164)	(0.00798)	(0.0151)
% chg. rel. to mean	19.0	7.8	-10.6
Mean	0.22	0.05	0.22
Baseline controls	Y	Y	Y
Embankment controls	Y	Y	Y
Observations	2453	2453	2453

Notes: The table presents regression estimates for outcomes measured in 2014 aggregated at the 1996 household-level. Variable means refer to the comparison group. Standard errors are clustered by the 1996 household head's pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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Effect on Urban Households

	(1) Agriculture	(2) Manufacturing	(3) Services
Treated	0.0110*	-0.0358***	0.0121
	(0.00628)	(0.0118)	(0.0167)
% chg. rel. to mean	281.0	-25.8	6.1
Mean	0.00	0.14	0.20
Baseline controls	Y	Y	Y
Embankment controls	Y	Y	Y
Observations	2453	2453	2453

Notes: The table presents regression estimates for outcomes measured in 2014 aggregated at the 1996 household-level. Variable means refer to the comparison group. Standard errors are clustered by the 1996 household head's pre-program village. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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Assigning Treatment Status

Intent-to-treat approach

- Treatment during program (1977-1988) assigned based on village of residence
- But outcomes observed in 2012-2015
  - Household's location may be affected by MCH-FP (Barham and Kuhn 2014)
- Therefore, we link respondents back to their 1974 household
- 1974 household location determines treatment status

Two issues:

- Affected individuals might not be alive in 1974
- Households may have mixed treatment status

→ Assign household treatment status based on household head (or ancestors) in 1996.

Back

Estimation Strategy

Aggregation

In MHSS wave 2 (2012-2014), we measure

- employment at the individual level
- agriculture at the household level

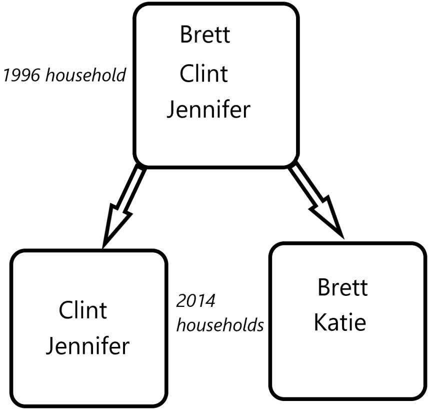
We estimate our baseline regressions at the MHSS wave 1 (1996) household level

- Want to avoid household formations and splits that results from the program between waves 1 and 2
- Typically, household makes migration/employment decision, not individual
- Maintain consistent unit of observation across regressions

→ Results robust to alternative aggregations (individual or village)

Back

Household Aggregation



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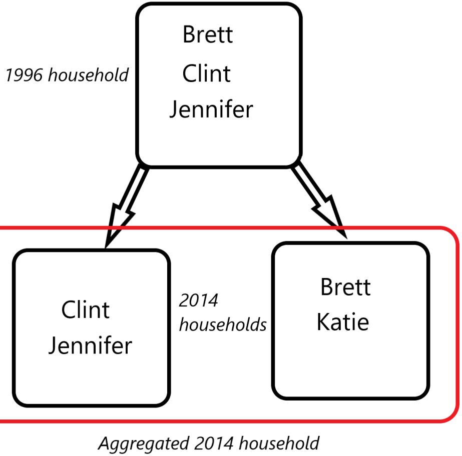

Back

Effect of MCHP-FP on Consumption Shares

	(1) Agriculture	(2) Manufacturing	(3) Services
Treated	0.01	0.00	-0.01
	(0.01)	(0.00)	(0.02)
Observations	2575	2575	2575
Adjusted R^2	-0.001	0.002	-0.001
% chg. rel. to mean	1.4	0.3	-2.3
Mean	0.49	0.19	0.35
Embankment dummies	Y	Y	Y
Baseline controls	Y	Y	Y

Notes: The table presents estimates of equation 14 for consumption shares measured in the MHSS2 aggregated at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by the 1996 household head's pre-program village. Baseline and embankment control variables assigned based on the MHSS1 household head's traceback household. Consumption goods classified into sectors based on **?**. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively

Back

Effect of MCHP-FP on Revenue and Profits per Acre

	(1) Revenue per acre (min. price)	(2) Revenue per acre (max. price)	(3) Profit per acre (min. price)	(4) Profits per acre (max. price)
Treated	-0.591	24.74	-10.63	-34.27
	(39.52)	(143.0)	(52.18)	(144.3)
% chg. rel. to mean	-0.1	16.0	-1.6	-41.4
Mean	446.13	154.24	683.45	82.84
Embankment controls	Y	Y	Y	Y
Baseline controls	Y	Y	Y	Y
Observations	1411	1411	1411	1411

Notes: The table presents estimates of the effect of the MCH-FP on 2014 outcomes at the MHSS1 household-level. Standard errors are clustered by pre-program village. Prices derived from the national Bangladeshi statistical yearbooks 2012-2014. Minimum prices are the minimum price listed in the yearbook for a given year within a crop type (e.g., Paddy Aman) amongst all varieties of that crop type (e.g., coarse or fine). Profits net of imputed family farm labor costs. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Back

Effects of MCH-FP on Long-term Employment by Fraction of Household Treated

PANEL A: Share of household members employed by sector			
	(1)	(2)	(3)
	Agriculture	Manufacturing	Services
% HH treated	0.051***	-0.021***	-0.007
	(0.014)	(0.008)	(0.010)
% chg. rel. to mean	23.0	-19.5	-2.5
Mean	0.22	0.11	0.26
Baseline controls	Y	Y	Y
Embankment control			
Observations	2580	2580	2580
PANEL B: Fraction of household hours worked by sector			
	(1)	(2)	(3)
	Agriculture	Manufacturing	Services
% HH treated	0.053***	-0.033**	-0.006
	(0.016)	(0.015)	(0.016)
% chg. rel. to mean	23.81	-18.13	-1.56
Mean	0.22	0.18	0.41
Baseline controls	Y	Y	Y
Embankment control	Y	Y	Y
Observations	2580	2580	2580

Notes: The table presents estimates for outcomes measured in 2014 aggregated at the MHSS1 household-level. Variable means refer to the comparison group. Standard errors are clustered by the 1996 household head's pre-program village. The dependent variable in panel A is the share of household members working in each sector. The dependent variable in panel B is the fraction of total hours worked with the MHSS1 household allocated to each sector. Industry employment shares do not sum to 1 for two reasons. First, we do not report results for two small sectors, construction and mining. Second, a small set of respondents not providing sufficient information to classify them into sectors. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Back

Effect of MCH-FP on Sectoral Employment

	Share hours by sector			
	(1)	(2)	(3)	(4)
	Agriculture	Manufacturing	Services	Hours worked
Treatment × Born 1982-88	0.03*	-0.04*	0.03	54.3
	(0.02)	(0.02)	(0.02)	(80.1)
Treatment × Born 1977-81	0.02	-0.03	-0.01	-48.2
	(0.03)	(0.02)	(0.03)	(122.5)
Treatment × Not born 1977-88	0.03	0.0010	-0.02	-131.7**
	(0.02)	(0.010)	(0.02)	(59.5)
% Chg., Treat×(Born 1982–88)	25.8	-21.1	10.1	3.1
% Chg., Treat×(Born 1977–81)	11.68	-19.10	-4.47	-2.52
% Chg., Treat×(Born Pre-1977 or Post-1988)	10.98	1.58	-11.60	-11.02
Mean if born 1982-88	0.11	0.17	0.30	1775.58
Mean if born 1977-81	0.14	0.15	0.32	1910.72
Mean if born pre-1977 or post-1988	0.26	0.06	0.18	1194.70
Observations	6140	6140	6140	6141

Notes: The table presents estimates of the effect of the MCH-FP on 2014 outcomes for men at the individual-level. Means by age group refer to the non-treated. Standard errors are clustered by pre-program village. Regressions are weighted to adjust for attrition between birth and the MHSS2 survey. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Back

Effect of MCH-FP on Sectoral Employment

Individual-level (Women only) Back

	Share hours by sector			
	(1)	(2)	(3)	(4)
	Agriculture	Manufacturing	Services	Hours worked
Treatment × Born 1982-88	0.0596***	0.00754	-0.0214	76.12
	(0.0220)	(0.0260)	(0.0193)	(78.60)
Treatment × Born 1977-81	-0.0193	-0.00957	0.0255	-52.51
	(0.0367)	(0.0288)	(0.0271)	(89.69)
Treatment × Not born 1977-88	0.0124	-0.00839	-0.00907	-42.77
	(0.0282)	(0.0120)	(0.0110)	(44.29)
% Chg., Treat×(Born 1982–88)	41.1	6.1	-28.9	16.8
% Chg., Treat×(Born 1977–81)	-10.61	-8.68	41.44	-11.22
% Chg., Treat×(Born Pre-1977 or Post-1988)	5.02	-22.00	-18.98	-12.53
Mean if born 1982-88	0.14	0.12	0.07	454.43
Mean if born 1977-81	0.18	0.11	0.06	468.01
Mean if born pre-1977 or post-1988	0.25	0.04	0.05	341.43
Observations	3322	3322	3322	3322

Notes: The table presents estimates of the effect of the MCH-FP on 2014 outcomes for women at the individual-level. Means by age group refer to the non-treated. Standard errors are clustered by pre-program village. Regressions are weighted to adjust for attrition between birth and the MHSS2 survey. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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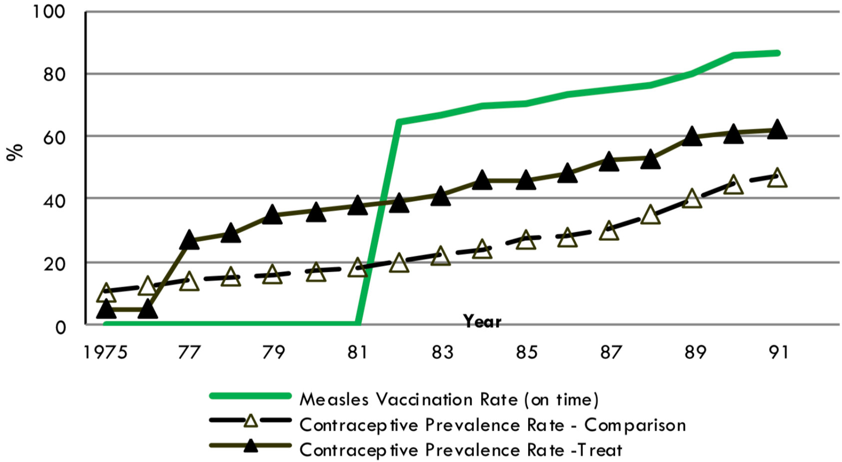
Program Rollout Succeeded

Phillips et al. 1984; Koenig et al. 1990, 1991; icddbr,b 2007; Joshi and Schultz 2013



Back

Key Mechanism 2: Human Capital

Disaggregating from Households to Individuals

Whose sectoral choice (within the HH) is affected by the program?

- Workers may select into sectors depending on their human capital
  (Young 2014; Gollin et al. 2014; Hicks et al. 2021)

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$\Longrightarrow$ Estimate program effects at the individual-level, stratified by cohort

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- Program rollout staggered, so cohorts differentially exposed to program arms

- Estimate equation of the form:

$$Y_i = \beta_0 + \gamma_1 (T_i \times Born_i^{77-81}) + \gamma_2 (T_i \times Born_i^{82-88}) + \gamma_3 (T_i \times Not\ born_i^{77-88}) + \nu X_i + \epsilon_i$$

Back

Effect of MCH-FP on Sectoral Employment

Individual-level (Men only)

overall women Back

	Share hours by sector			
	(1) Agriculture	(2) Manufacturing	(3) Services	(4) Hours worked
Treatment × Born 1982-88	-0.005	-0.08**	0.07*	-7.7
	(0.02)	(0.03)	(0.04)	(106.7)
Treatment × Born 1977-81	0.06*	-0.04	-0.04	10.1
	(0.03)	(0.03)	(0.05)	(122)
Treatment × Not born 1977-88	0.05*	0.02	-0.04	-223**
	(0.027)	(0.02)	(0.03)	(104)
% Chg., Treat×(Born 1982–88)	-5.7	-35.3	13.2	-0.2
% Chg., Treat×(Born 1977–81)	59.37	-24.32	-6.97	0.31
% Chg., Treat×(Born Pre-1977 or Post-1988)	18.68	16.90	-10.05	-9.8
Mean if born 1982-88	0.09	0.22	0.52	3073
Mean if born 1977-81	0.10	0.18	0.57	3291
Mean if born pre-1977 or post-1988	0.28	0.09	0.35	2277
Observations	2819	2819	2819	2819

Notes: The table presents estimates of the effect of the MCH-FP on 2014 outcomes for men at the individual-level. Means by age group refer to the non-treated. Standard errors are clustered by pre-program village. Regressions are weighted to adjust for attrition between birth and the MHSS2 survey. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

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