

The Women Empowering Effect of Higher Education

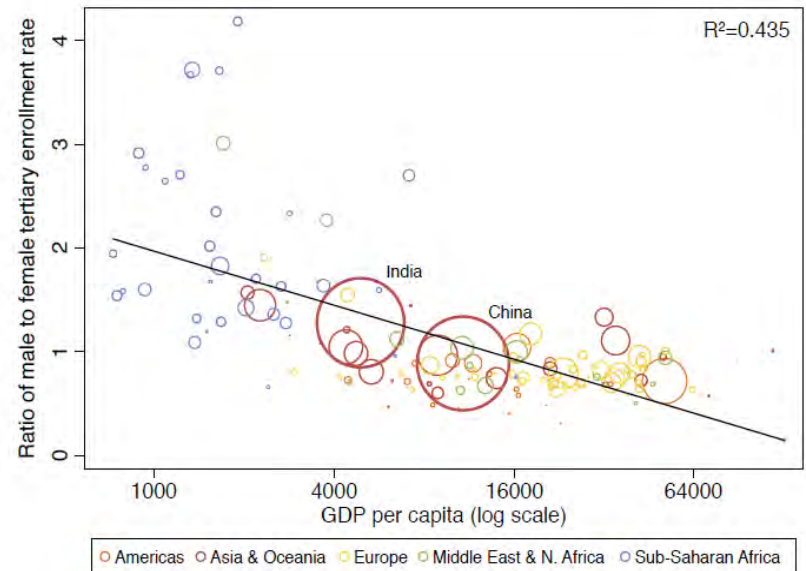
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Motivation/Introduction

- Gender disparities in educ still persist in several developing countries despite considerable reductions over last decades.
- Male bias links gender inequality in educ. & economic development (Duflo 2012, Jayachandran 2015)
- Why this is the case?
 - Expected returns for girls lower: boys supporting the Hhld at old age
 - Costs for girls higher: social cost/stigma
- Educ Policies (even gender-neutral) benefit girls more (Glick 2008; Evans 2019)

Gender Gap in Educ Enrolment and GDP

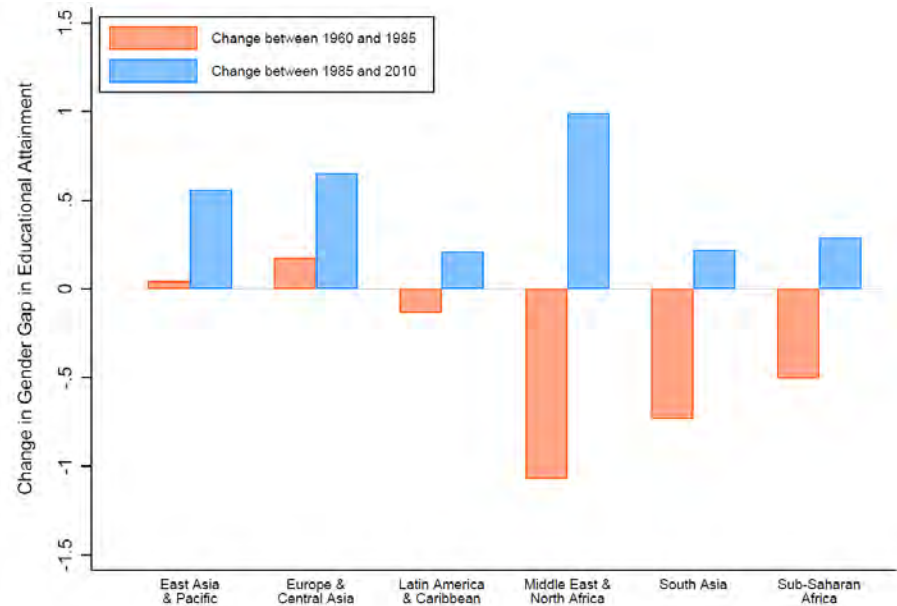


(a) College enrollment rate (M/F ratio)

Motivation/Introduction

- The MENA region is a success story in reducing gender gaps:
 - policies address educ costs (free education/ increase supply of schools/ reduction in years of schooling, etc.) helped women (Assaad & Saleh 2018; Elsayed & Marie 2020)
 - policies that changed returns to education e.g., public policy employment (e.g., Binzel & Carvalho 2016; Assaad et al. 2020)
- MENA paradox: despite improvements in educ, no similar pattern in social & economic empowerment of women
- Generally, no much evidence on higher educ role & outcomes

Change in gender gaps in educ



What we do in this paper

- We investigate the impact of higher education on labor (and marriage) outcomes, with a particular focus on economic and social empowerment of women in a setting known for lower levels of female empowerment.
- For identification, we exploit the expansion of higher education through constructing public universities in Egypt in 1960's and 1970's where the policy was to construct a university in each province (16 universities over the time period).
- The new universities reduced the cost of attaining higher education for the two genders, but more for women who were previously constrained with social norms
- We combine data on the time of university openings within governorates together with individual data on education outcomes (university education attainment/ years of schooling) and later on measures of labor market outcomes for the two genders and marriage & social empowerment of women.

What we find in the paper

- We find positive effects of the higher education expansion on university educ: opening a university in a province increases the probability to get higher education by about 10%.
- The impact is mainly driven by women (35%), who previously were constrained by social norms which hindered them from getting education at distant universities.
- Longer-term positive impact on LM & marriage outcomes and social empowerment for women.

Relevance to literature

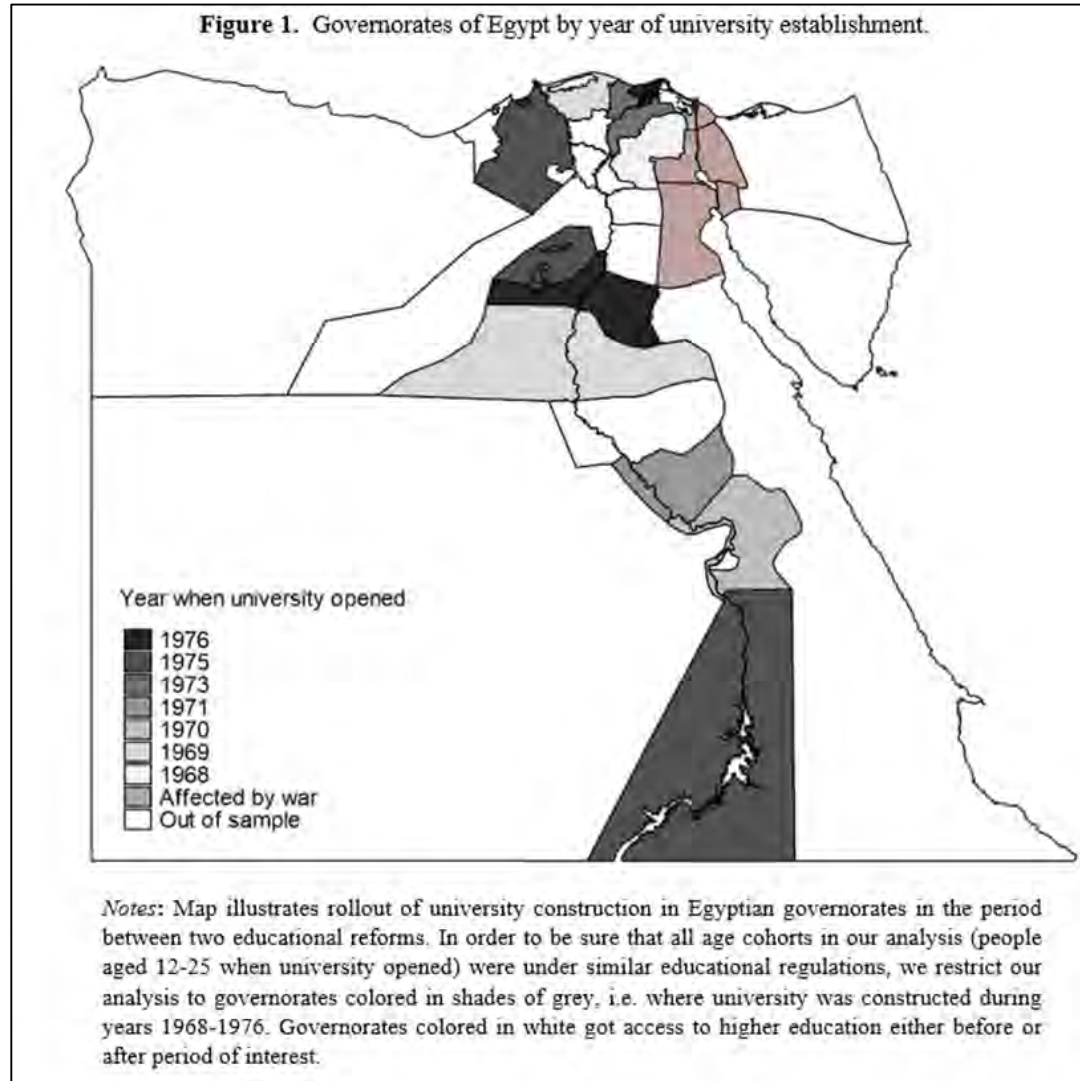
We contribute to three strands of economic literature:

1. Small, yet growing literature on returns to higher education with mixed evidence (Card 1995; Blundell et al. 2000; Kyui 2016; Fengyan et al. 2018)
2. Gender bias especially in developing countries with strong preference for sons (Rosenzweig & Schultz 1982, Basu 1989, Borooah 2004, Duflo 2005, Jaychandaran & Kuziemko 2011, Barcellos et al. 2014, Choi & Hwang 2015, Ashraf et al. 2019)
3. Education policy reforms (Harmon & Walker 1995; Card 1999; Oreopoulos 2007; Devereux & Harts 2010; Doyle et al. 2007, Lindeboom et al 2009, Lochner & Moretti 2004, Machin et.al 2011, Spohr 2003, Kirdar et al. 2014, Büttner & Thomsen 2013; Elsayed 2020)

Context: Education in Egypt

- Pre-university educ system in Egypt: 6 years of primary stage (ages 6-11), 3 years of preparatory stage (ages 12-14) and 3 years of general or vocational secondary education (ages 15-17)
- General secondary track mostly leads to higher (tertiary) educ, while less so for vocational: only distinguished students
- After independence in 1950's only 3 universities in in Giza, Cairo and Alexandria
- In 1960s-1970s, 16 new universities were constructed, one per each governorate, mostly in governorates, that previously had no higher institutions on their territory
- Public employment policy: post compulsory diploma was for long time the gate for a public job, this changed over the last couple of decades (Assaad 2014)
- University education: 4 years for most schools, STEM & Medicine usually longer.
- Education is generally for free but transportation cost not trivial + costs for books + costs to compensate for the low quality of education (See: Assaad & Krafft 2015)

Year of university construction



Data and variables

- We combine data on:
 - The exact time of university construction from Egyptian presidential decrees + official webpages of public universities + World higher education database → Cross-checked
 - Education & labor market outcomes from ELFS 2006-2017
 - Marriage & Social empowerment from ELMPS 2006 and 2012 waves
- We restrict our analyses to the governorates that got access to higher education for the first time between 1968 and 1976
- We limit the analyses to individuals who ever attended school, aged 12-25 years old when a university opened in their governorate.
- Treatment status, a dummy variable that takes the value 1 if the individual was aged 12-18 when the university opened, 0 if he/she is between 19-25.
- Our sample for education and LM outcomes from ELS consists of 119,901 observations (86,174 men and 33,727 women)
- For marriage & social empowerment, the ELMPS sample is about 4,000 women

Outcome variables

- Education
 - Finish university
 - Total years of education
- LM
 - Prob. of being currently in a Paid job/ Formal job / Public sector job
 - Working hours (log)
 - Hourly wage (log)
- Marriage (women)
 - Age at marriage
 - Intra-household decision making (e.g., making large purchases/family & friends visits/food to be cooked, etc.)
 - Husband's years of education

Empirical strategy

- Staggered diff-in-diff approach to evaluate the impact of exposure to higher educ for exposed cohort (1 if aged 12-18 when a university is available, 0 if 19-25)

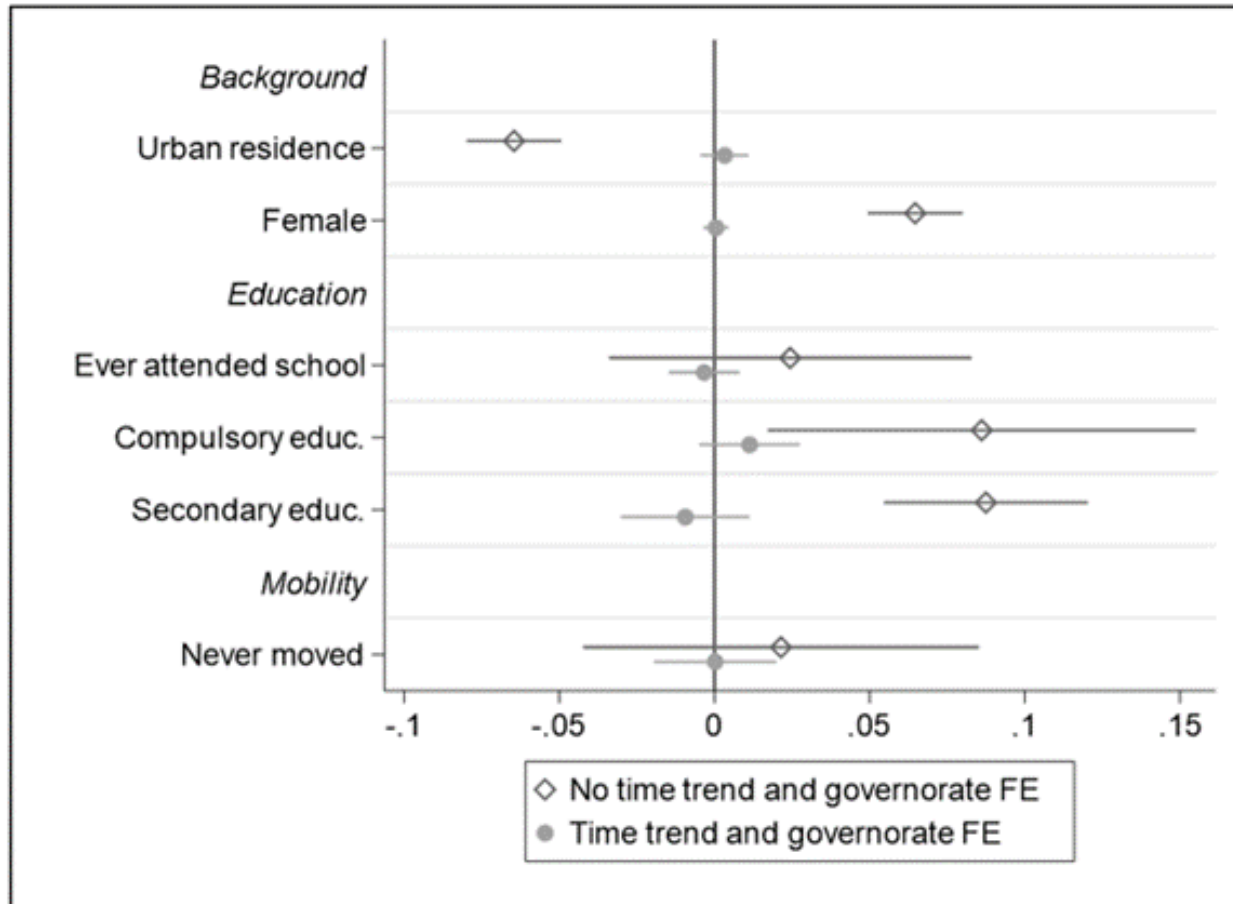
$$Y_{irk} = \beta E_{ir} + X_{irk}\gamma + \varphi_r + \mu_k + \vartheta_r(k * \varphi_r) + \varepsilon_{irk}$$

- Y_{irk} – dependent variable that indicates outcome of interest for individual i from governorate r , who belongs to cohort k
- E_{ir} is a dummy variable indicating if an individual belongs to the exposed group, (i.e. if she was 12-18 years old when governorate got access to higher education)
- X is a vector of controls
- φ_r and μ_k denote governorate and cohort of birth fixed effects, respectively
- ε_{irk} is an error term
- $(k * \varphi_r)$, governorate-specific cohort trends to control for differences in educational trends at the national level

Empirical strategy: identifying assumptions

- Families should not be able to take strategic decisions in response to the construction of univ in order for it to apply as an exogenous shock:
 - Decision is at the national level, difficult to control by average individuals
 - Families could migrate in expectation of university opening. We exclude migration as a channel:
 - The impact will be lower bound if people move for sake of education
 - We show that migration is rather limited in our sample/ we exclude individuals from war affected governorates (Suez, Port Said, and Ismalia)
 - Several robustness checks with place of birth vs. place of residence
 - We checked the impact of universities in neighboring governorates
- Selection in our case is at the gov. level and we need to show it is (conditionally) as good as random
 - Policy introduced in governorates with specific education pre-trends?
 - Individuals before/after treatment within gov not identical (accounting for natural time trends)?

Selection into treatment?



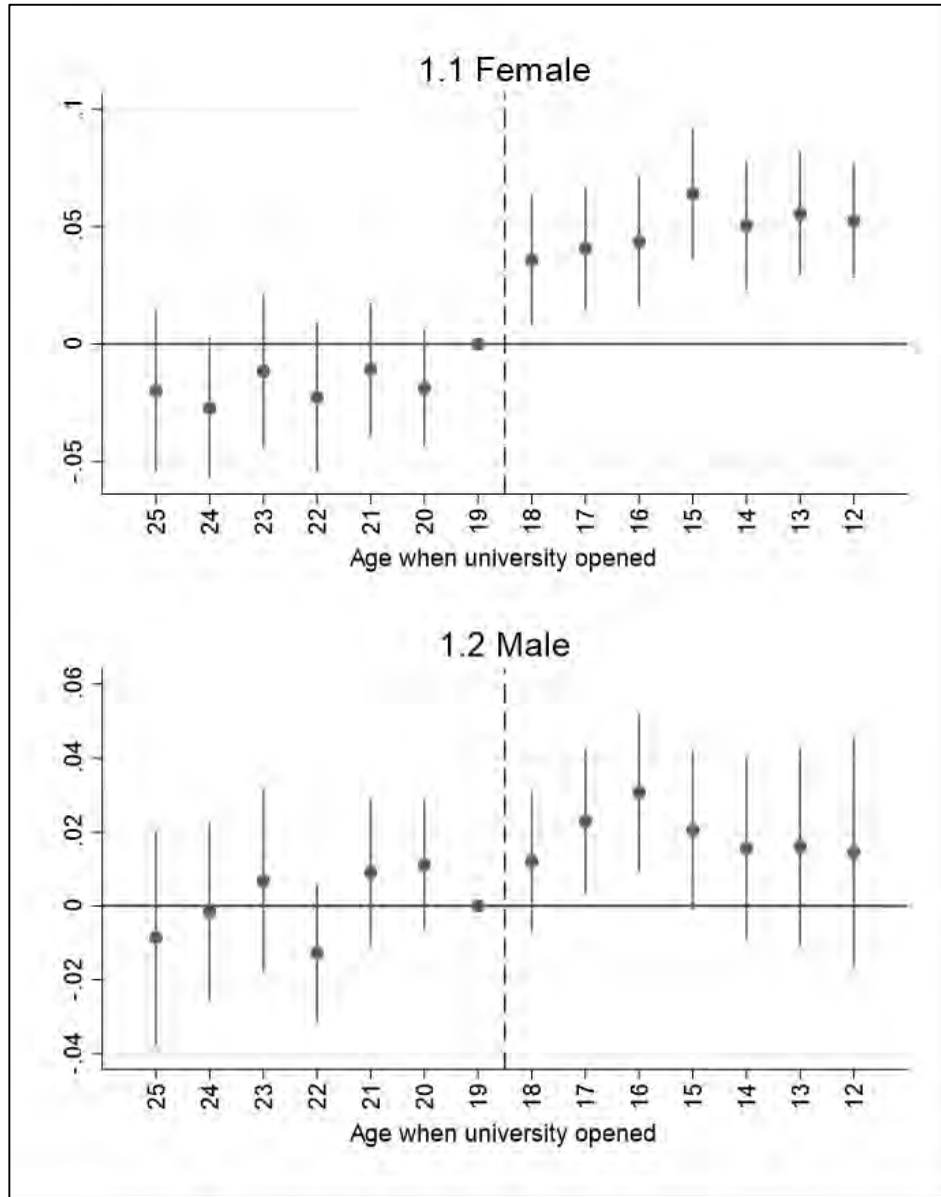
Notes: the Figure shows estimated coefficients with 95% confidence intervals. Sample restricted to individuals born between 1942 and 1965, who have completed at least one year of education, and for whom university in their governorate opened between years 1967 and 1977. The dependent variable is a dummy that equals 1 if person was below age 18 when university in governorate opened, and equals 0 otherwise. The independent variables are displayed in the vertical axis. Time trend and governorate FE controls are year of birth and governorate dummies. Standard errors clustered at the governorate level. Number of observations used is 140,539 from four waves of LFS, where information on mobility outcomes is available.]

Check pre-trends in governorates

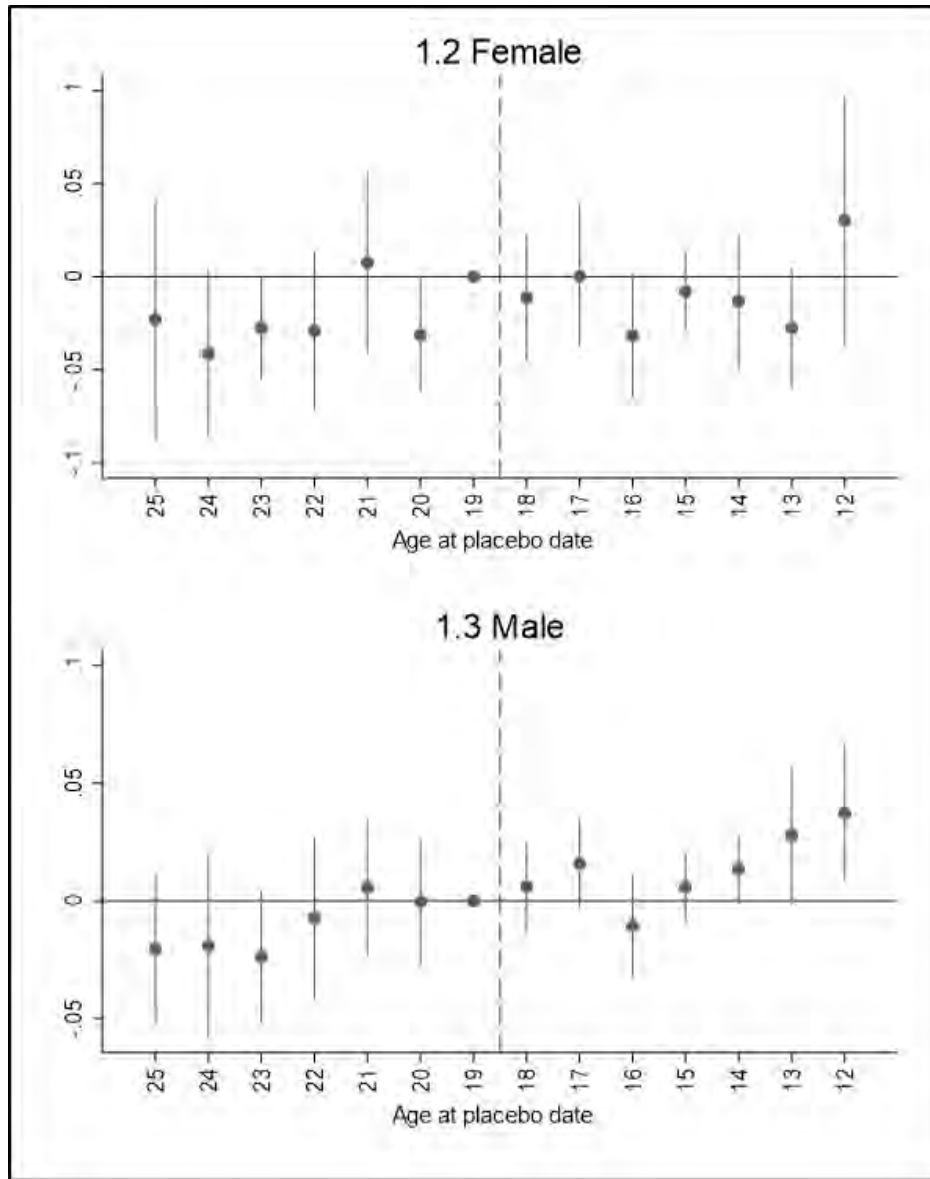
$$Y_{irk} = \beta_l \sum_{l=12}^{25} d_{irl} + X_{irk}\gamma + \varphi_r + \varepsilon_{irk} \quad (2)$$

- d_{irl} is a dummy variable that equals one if respondent i in region r was l years old when university opened. Omitted dummy d_{ir19} indicates a group of individuals who was 19 years old when university in their governorate opened.
- We use this estimates to check robustness of the findings and show results graphically.
- Since coefficients β_l represent the effect of the university construction on people who were of particular age at that time, we would expect β_l to be close to zero for all $l > 18$.

Change in prob. to finish university



Change in prob. to finish university (Placebo: 6 years earlier)



Identification strategy (Staggered diff-in-diff)

$$Y_{irk} = \beta E_{ir} + X_{irk}\gamma + \varphi_r + \mu_k + \vartheta_r(k * \varphi_r) + \varepsilon_{irk}$$

- Y_{irk} outcome of interest for individual i , governorate r , and k cohort of birth
- E_{ir} is a dummy variable indicating if an individual belongs to the exposed group, i.e. if she was 12-18 years old when governorate got access to higher education.
- X is a vector of controls
- φ_r and μ_k denote governorate and cohort of birth fixed effects, respectively
- ε_{irk} is an error term;
- Governorate-specific cohort trends, denoted by $(k * \varphi_r)$, to control for differences in educational trends within governorates

Education Outcomes

Education outcomes

Table 1. Impact of access to university on higher degree attainment, LFS.

VARIABLES	University degree								
	Whole sample			Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated	0.016*	0.019***	0.016*	0.036**	0.042***	0.039***	0.008	0.009	0.008
	(0.005)	(0.004)	(0.007)	(0.010)	(0.009)	(0.011)	(0.005)	(0.005)	(0.006)
	[0.059]	[0.009]	[0.092]	[0.022]	[0.009]	[0.008]	[0.249]	[0.108]	[0.346]
<i>Observations</i>	119,901	119,901	119,901	33,727	33,727	33,727	86,174	86,174	86,174
<i>R-squared</i>	0.055	0.055	0.055	0.057	0.057	0.058	0.055	0.054	0.055
<i>Mean of Outcome</i>	0.15	0.15	0.15	0.109	0.109	0.109	0.163	0.163	0.163
<i>Effect size, %</i>	10.77	12.45	10.85	32.99	38.77	35.59	4.69	5.58	4.7
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Governorate FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
General time trend squared	No	Yes	No	No	Yes	No	No	Yes	No
Governorate-specific time trend	No	No	Yes	No	No	Yes	No	No	Yes

Labor & Marriage Outcomes

LM outcomes

Table 5. Impact of university opening on labor market outcomes, LFS.

VARIABLES	Paid job (1)	Formal job (2)	Public sector job (3)	Working hours (log) (4)	Hourly wage (log) (5)
Panel A: Female					
<i>Treated</i>	0.037** (0.010) [0.014]	0.037*** (0.010) [0.004]	0.045*** (0.010) [0.006]	0.039 (0.032) [0.339]	-0.010 (0.028) [0.727]
<i>Observations</i>	29,639	29,639	29,639	13,174	11,295
<i>R-squared</i>	0.089	0.144	0.091	0.596	0.478
<i>Mean</i>	0.23	0.18	0.20	3.36	2.18
Effect size, %	15.9	20.96	22.81	3.9	-1.0
Panel B: Male					
<i>Treated</i>	-0.002 (0.002) [0.289]	-0.007 (0.012) [0.584]	-0.006 (0.013) [0.668]	-0.007 (0.006) [0.259]	0.029** (0.013) [0.048]
<i>Observations</i>	69,072	69,072	69,072	67,897	42,526
<i>R-squared</i>	0.021	0.306	0.076	0.822	0.391
<i>Mean</i>	0.99	0.55	0.41	3.54	2.03
Effect size, %	-0.18	-1.25	-1.34	-0.7	2.9

Marriage outcomes (ELMPS, women only)

VARIABLES	Finish university (1)	Age at marriage (2)	Husband's educ years (3)	Intra-HH DM (4)
Treated	0.042*** (0.015)	0.355 (0.444)	1.458*** (0.561)	0.152** (0.071)
Observations	4,021	2,806	1,487	2,613
R-squared	0.084	0.089	0.310	0.180
Mean of Outcome	.033	19.122	2.4	-
Effect size	128.35	1.86	6.76	-
Controls	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes
Governorate FE	Yes	Yes	Yes	Yes
Governorate-specific time trend	Yes	Yes	Yes	Yes

Conclusion (so far...)

- Positive effects of university construction on university enrolment and finishing higher (tertiary) education especially among women in Egypt.
- Long-term positive effects on LM & marriage outcomes and social empowerment for women.
- Next step → The role of different areas of study (variation in the timing of establishing departments within the same university)

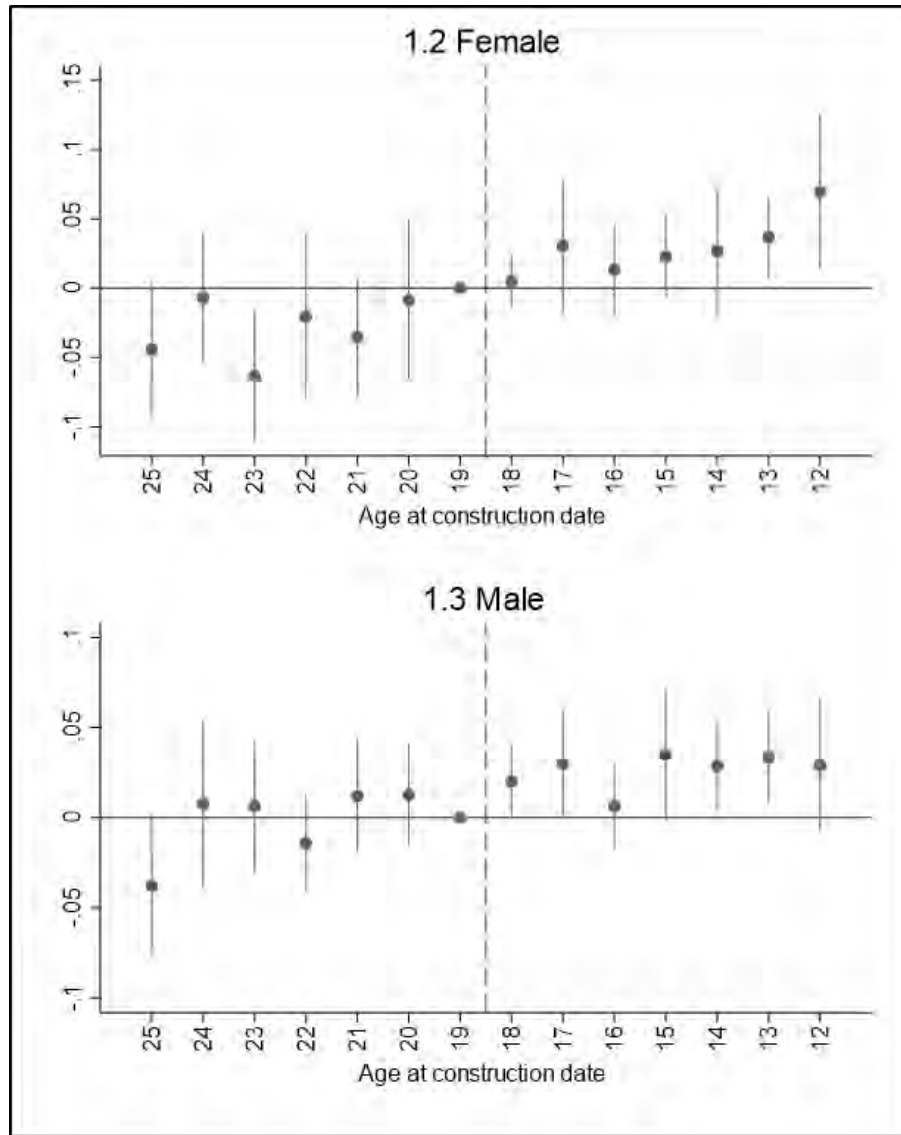
Additional Slides

List of governorates

Table A1. Governorates of Egypt listed by year of university establishment.

	Governorate	Year when first public university was opened
1	Giza	1839
2	Cairo	1908
3	Alexandria	1938
4	Matruh	1954
5	Asyut	1957
6	Monufia	1958
7	Gharbia	1963
8	Qalyubia	1963
9	Sharqia	1968
10	Kafr El Sheikh	1969
11	Minya	1969
12	Qena	1970
13	Sohag	1971
14	Dakahlia	1973
15	Aswan	1975
16	Beheira	1975
17	Faiyum	1975
18	Port Said	1975
19	Suez	1975
20	Beni Suef	1976
21	Damietta	1976
22	Ismailia	1976
23	New Valley	1993
24	Luxor	1996
25	North Sinai	2016

Neighboring governorates

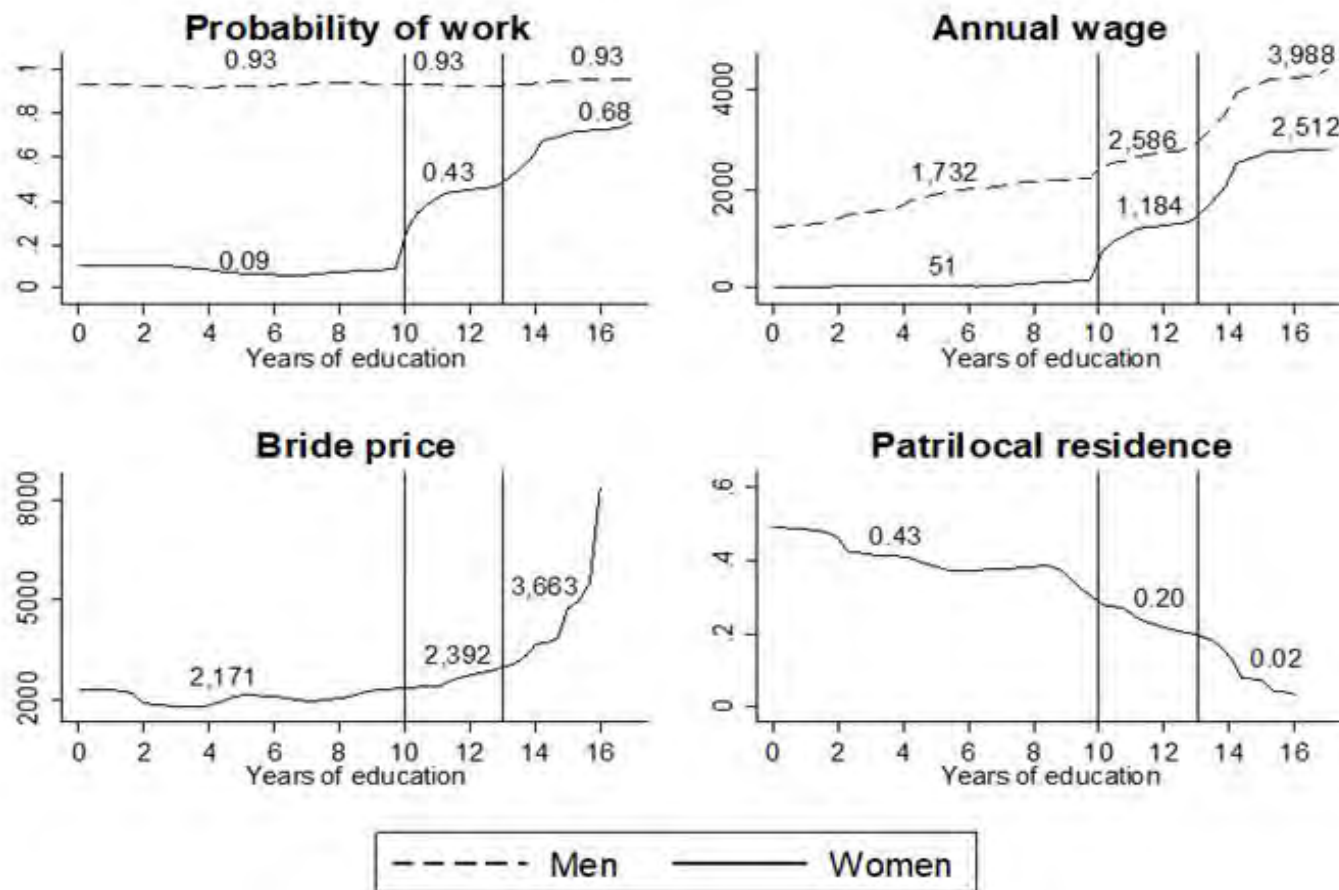


Spillover on earlier stages of educ.

Table 4. Impact of university opening on school education attainment, LFS.

VARIABLES	Attended school (1)	Compulsory education (2)	Secondary education (3)	University degree (cond.) (4)
<i>Female</i>				
<i>Treated</i>	-0.005 (0.004) [0.267]	-0.006 (0.010) [0.656]	0.017 (0.016) [0.356]	0.059** (0.019) [0.021]
<i>Observations</i>	188,470	34,303	24,834	18,759
<i>Male</i>				
<i>Treated</i>	0.002 (0.009) [0.885]	-0.003 (0.004) [0.582]	0.005 (0.006) [0.421]	0.008 (0.012) [0.535]
<i>Observations</i>	180,693	77,138	59,778	47,712

Channels: Returns to Education at Various Stages



Note: Outcomes of education prior to the policy using ELMPS data. Annual wage is conditional on work. The vertical lines represent the end of the preparatory/compulsory stage (the left line), and the end of secondary stage (the right line). The numbers above the graph represent the average value for each education stage: primary, preparatory, and secondary.