Does the Internet Reduce Gender Gaps? The Case of Jordan

Background paper for the Regional Report "New Economy Agenda" (MNACE)

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WIDER Development Conference
Transforming economies - for better jobs
Bangkok
September 12, 2019

Female LFP is low in the MENA region

▪ MENA has one of the lowest female LFP rates in the world: ~20%

▪ Some hypotheses: social norms, legal barriers, lack of childcare options

▪ We study the impact of **digital technologies** (internet adoption) on **women's LFP** and other labor outcomes in Jordan and how **social norms** can shape the relationship

▪ Important policy implications: substantial progress in reducing gender gaps in other dimensions (education) with no impact on women's labor outcomes

Internet can have positive impacts on FLFP

▪ Reduction in barriers to information about job opportunities; flexible forms of employment (telecommuting); change in social norms and shift in the bargaining power within the household

▪ What other studies find?

    ○ Positive impacts on labor outcomes: Kuhn & Mansour (2014), Bagues & Sylos Labini (2007), Kolko (2012)

    ○ Larger impacts on women: Klonner & Nolen (2010), Dettling (2017)

    ○ Our contribution: we use longitudinal data and focus on a context with large gender disparities

What we do?

▪ What is the impact of internet adoption on female and male LFP in Jordan?

▪ We use individual panel data for 2010 and 2016 and propose an identification strategy based on the roll-out of 3G cell towers in the country, across different subdistricts and over time

▪ We also analyze:

- o Impact on LFP by age, educational level and marital status

- o Other labor market outcomes: job search using the web, employment and unemployment

- o Potential mechanisms: change in social norms regarding gender roles, marriage and birth rates

Main dataset - JLMPS

■ We use a longitudinal HH survey (JLMPS) conducted in 2010 and 2016. Sample: Jordanian nationals only aged 15-64

Descriptive Statistics from JLMPS

	Women		Men	
	2010	2016	2010	2016
Labor market outcomes				
Labor force participation rate	18.5	26.7	74.5	79.0
Technology access				
=1 if hhld owns a mobile phone	0.98	0.99	0.99	0.99
=1 if hhld has internet access	0.16	0.35	0.16	0.34
Individual characteristics				
Age	30.7	37.5	30.3	37.2
=1 if married	0.57	0.76	0.50	0.74
=1 if basic education or less	0.52	0.43	0.58	0.50
=1 if secondary education	0.22	0.17	0.22	0.18
Observations	2,843		2,758	

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Female LFP by subdistricts
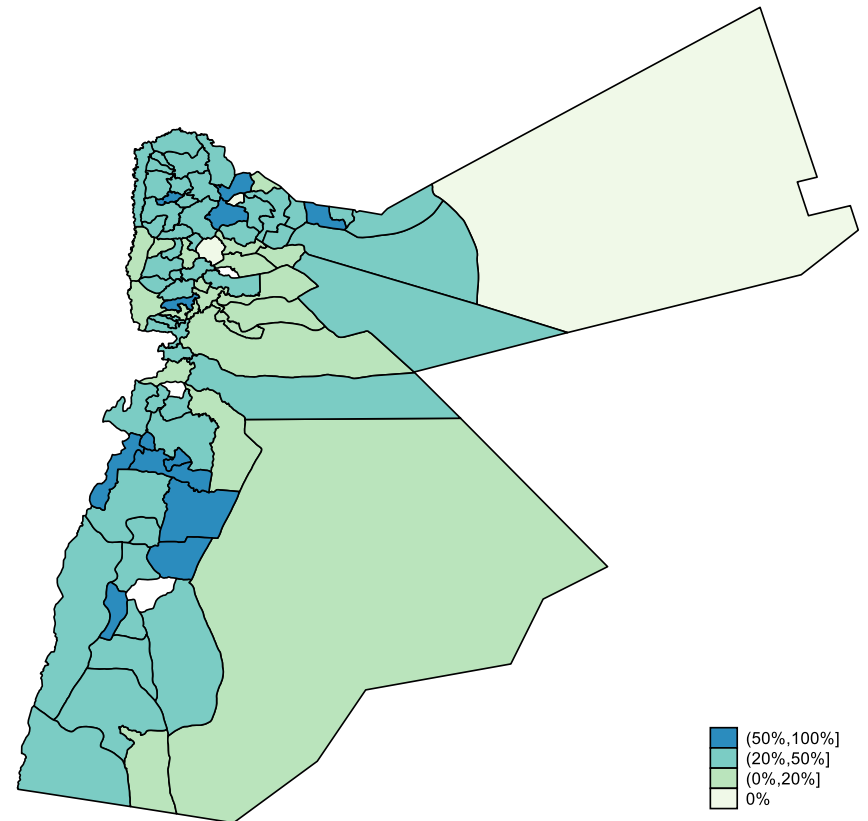
2010

FLFP=0 in 11/84 subdistricts
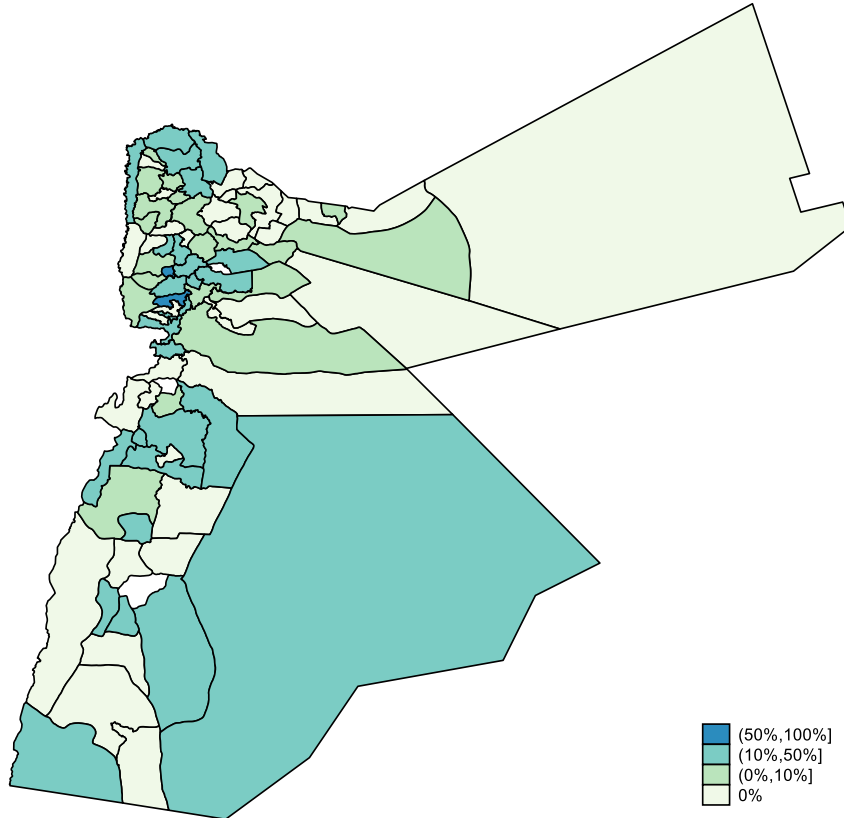
FLFP < 50% in all subdistricts
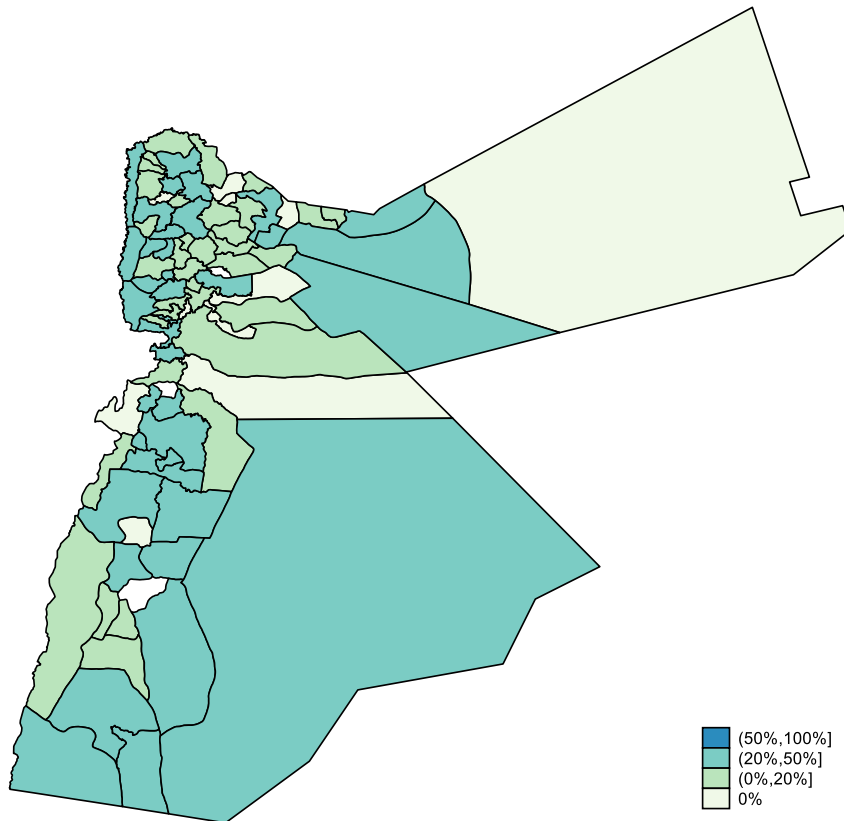
2016

FLFP=0 in 3/84 subdistricts

FLFP > 50% in 12 subdistricts
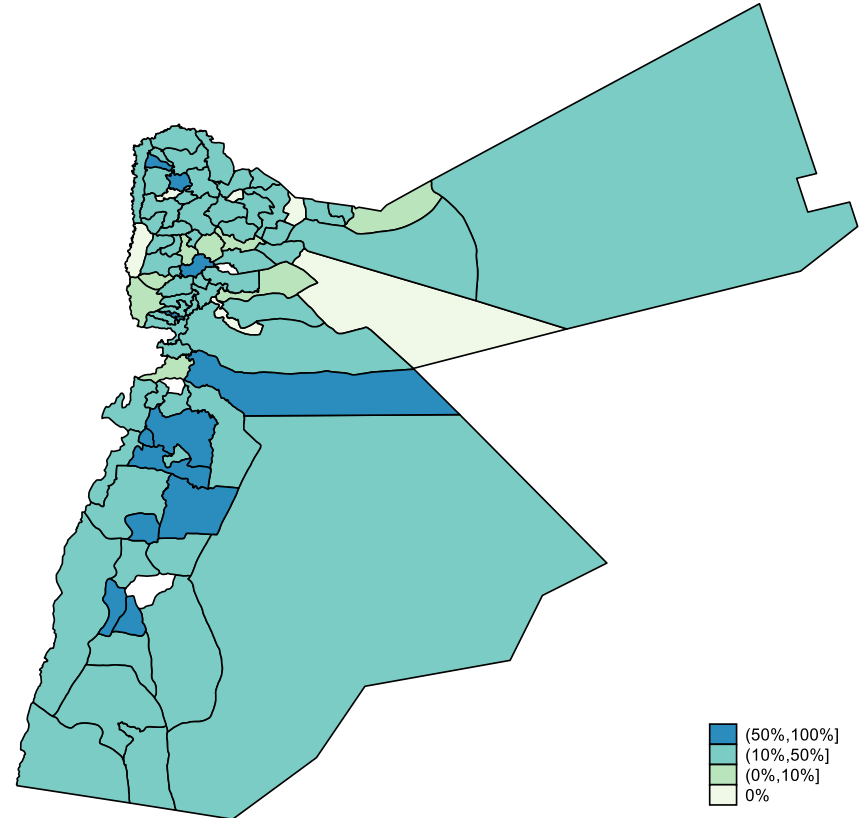
Internet access by subdistricts

2010

< 10% in 57 subdistricts
Between 10%-50% in 26 subdistricts

2016

< 10% in 15 subdistricts
Between 10%-50% in 55 subdistricts

Identification strategy

Reduced-form for men and women separately:

$$\Delta Y_i^g = \alpha^g + \beta^g Internet_i^g + \Gamma^g X_i^g + \varepsilon_i^g$$

ΔY_i^g is the change between 2010 and 2016 in an indicator of LFP

$Internet_i^g$ indicates internet adoption or continuation between 2010 and 2016 in the household where person i of gender g lives

X_i^g includes individual and HH characteristics in 2010: age, education, marital status, HH size, HH wealth, urban/rural area, and governorate fixed effects

Distance to 3G cell towers as instrument

$$Internet_i^g = \theta^g + \varphi^g Distance\ tower_s^g * Exp_r^g + \eta^g X_i^g + \xi_i^g$$

$Distance\ tower_s^g$ is the log of the avg. distance to the nearest 3G cell tower in the subdistrict s where person (i, g) lives. Source: OpenCellID Project 2018

Exp_r^g is the pc expenditure in communications in 2010 in the governorate r where person (i, g) lives. Source: HEIS of 2010

Justification: We expect a shorter distance to increase internet access and to reduce access costs disproportionally in locations where internet prices were higher in 2010

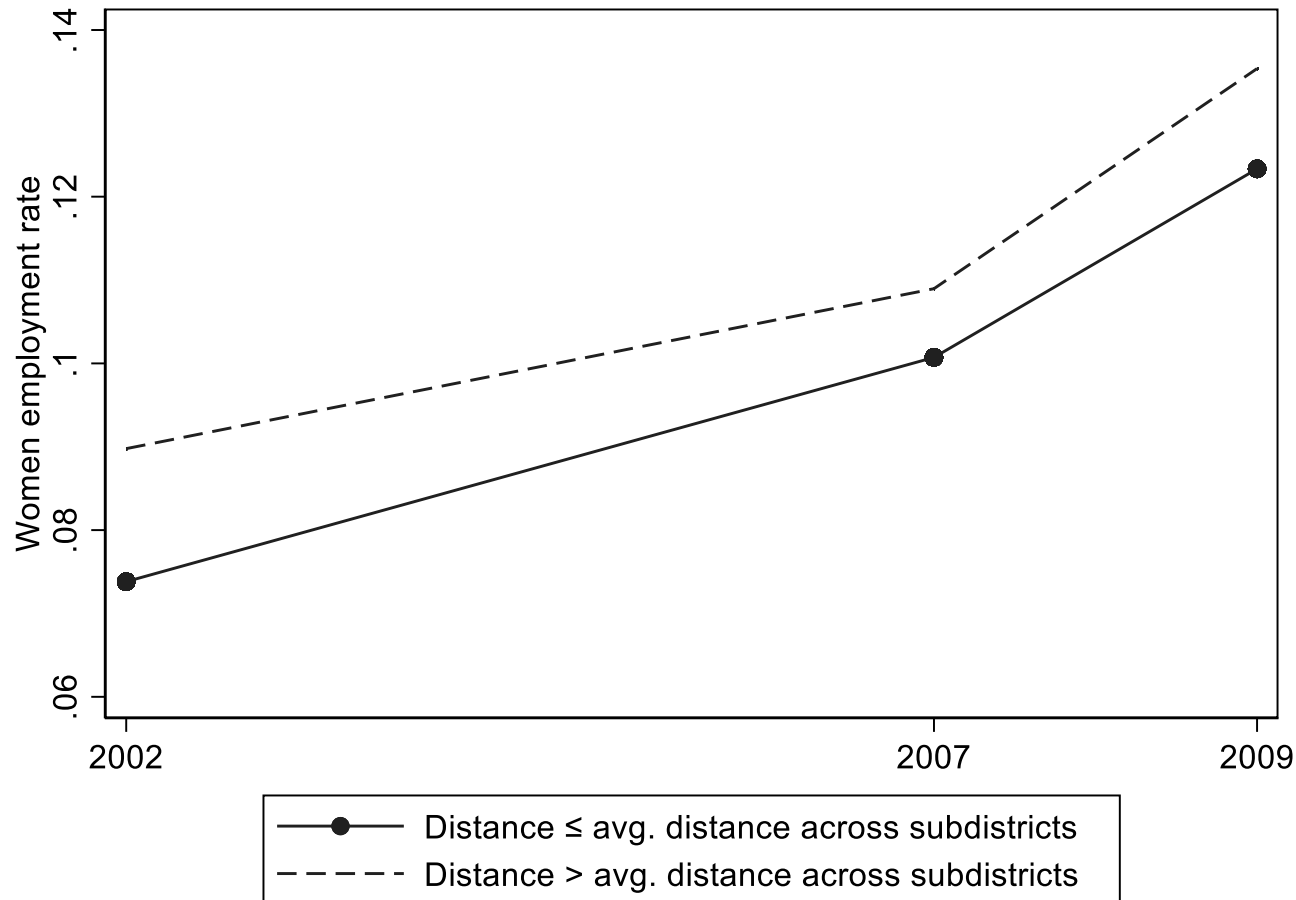# Increase in internet access explained by 3G mobile access

Subscribers to fixed and mobile internet
Source: Telegeography (2018)
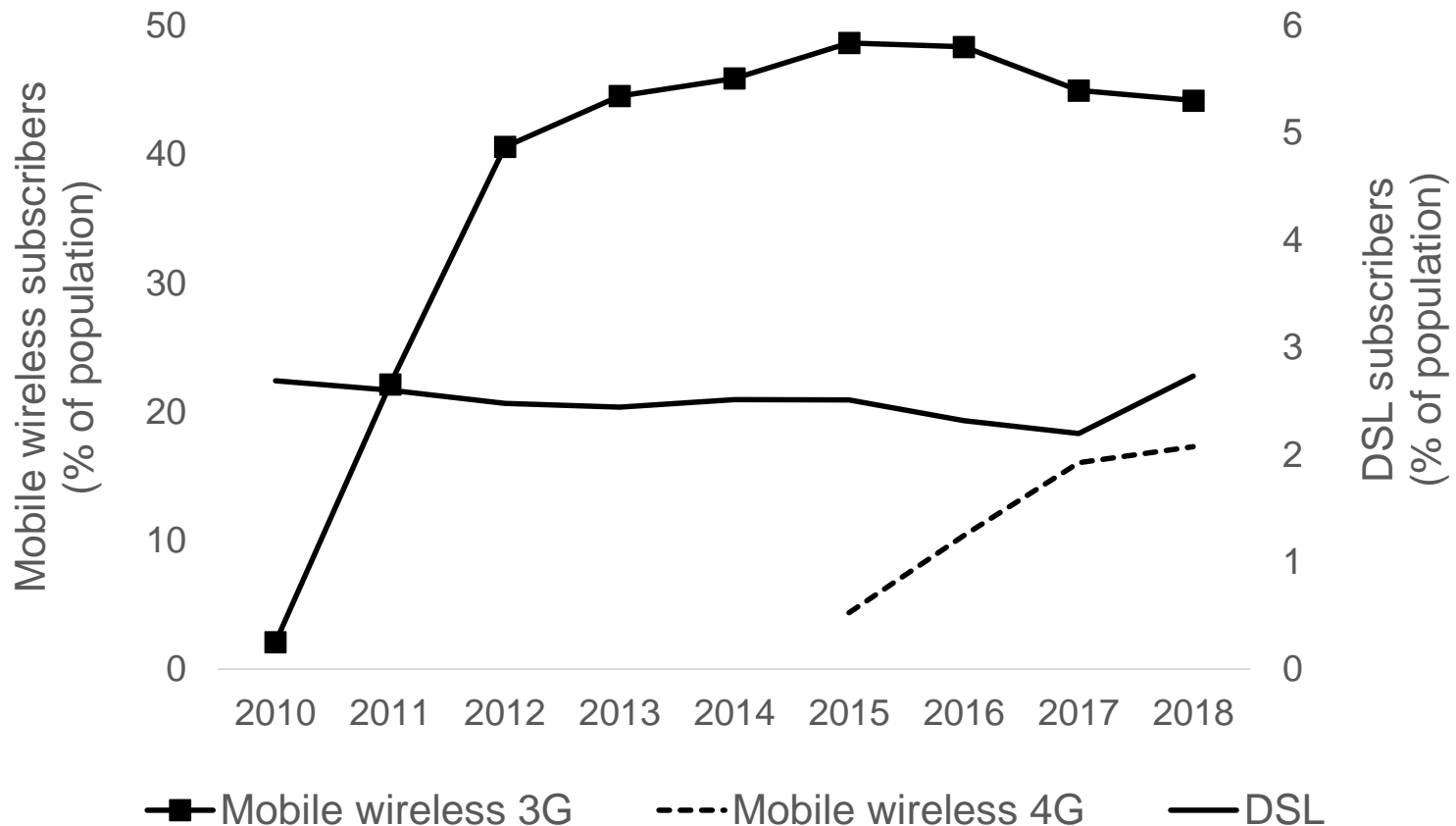
Evidence on the validity of the instrument

Female employment previous to the roll-out of 3G technology
Source: JPFHS 2002, 2007 and 2009

Negative and significant first stage results

Dependent variable:	=1 if internet adoption or continuation			
	Women		Men	
Log of distance to nearest 3G tower *	-0.00022	-0.00017	-0.00021	-0.00016
pc exp.in communications in 2010	[0.0001]***	[0.0000]***	[0.0000]***	[0.0000]***
Individual controls	Yes	Yes	Yes	Yes
Household controls	No	Yes	No	Yes
Observations	2,843	2,843	2,758	2,758
R-squared	0.075	0.115	0.077	0.094
F stat of excluded instruments	18.44	16.95	23.10	16.54
Estimated effect of a 10% reduction in distance and avg. pc exp. in communication (235 JOD)	0.51	0.40	0.50	0.38

Increase in women's LFP and no effect on men

Dependent variable:	Change in LFP			
	Women		Men	
=1 if internet adoption	0.716	0.819	0.0999	0.0386
	[0.132]***	[0.181]***	[0.237]	[0.238]
Individual controls	Yes	Yes	Yes	Yes
Household controls	No	Yes	No	Yes
Observations	2,843	2,843	2,758	2,758

We find an **increase in female LFP**, 0.7-0.8 percentage points for each 1 percentage point of increase in internet adoption, and **no effect on men**

Who were mostly impacted by internet adoption?

	Change in LFP					
	By age		By education		By marital status	
	15-30	31-64	Less than secondary	Secondary or more	Not married	Married
=1 if internet adoption	0.831	0.707	0.996	0.676	1.051	0.324
	[0.161]***	[0.392]*	[0.507]**	[0.0990]***	[0.270]***	[0.288]
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,457	1,386	1,642	1,201	1,170	1,673
F stat of first stage	15.76	8.31	25.63	16.16	9.18	12.04

Internet adoption impacted positively in LFP of:

- Young and adult women
- Larger impact in low-educated than high-educated women
- Not-married women and no effect on married women

Do women find a job when entering the labor force?

Dependent variable:	Change in job search using internet	Change in employment	Change in unemployment
=1 if internet adoption	0.325	0.302	0.518
	[0.0592]***	[0.220]	[0.102]***
Individual controls	Yes	Yes	Yes
Household controls	Yes	Yes	Yes
Observations	2,843	2,843	2,843
F stat of first stage	18.44	16.95	16.95

- o Women change their job search strategies
- o But they are not successful, and the increased LFP translates into an increase in the probability of being unemployed
- o Larger impact in unemployment for low-educated women (1.1 pp)

Mechanisms: Change in social norms

Dependent variable:	Change in social norms		
	Decision making power index	=1 if accesses home money	=1 if has saving or owns valuables
=1 if internet adoption	-0.0911	0.298	-0.187
	[0.104]	[0.231]	[0.199]
Observations	2,728	2,731	2,731
F stat of first stage	12.99	13.18	13.18

	Need of permit index	Husband beats wife index	=1 if afraid of disagreeing	Opinion index
=1 if internet adoption	-0.156	-2.651	-1.307	0.139
	[0.231]	[1.244]**	[0.695]*	[0.132]
Observations	2,726	1,584	2,730	2,842
F stat of first stage	12.88	9.48	12.84	17.15

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Mechanisms: Change in marriage and birth rates

Dependent variable:	Change in marriage for not married women in 2010	Number of 5-year-old or younger kids in 2016
=1 if internet adoption	-0.675	-0.529
	[0.204]***	[0.191]***
Individual characteristics	Yes	Yes
Household characteristics	Yes	Yes
Observations	1,170	2,843
F stat of first stage	9.18	16.95

o Reduction in marriage and birth rates

o Larger impacts for low-educated women

Mechanisms: Comparative exercise

- We compare our results with estimates for a country where barriers for women are lower: Chile

- We use individual panel data (Panel CASEN 2006-2009) and estimate the same model we proposed for Jordan

- Female LFP increased from 49% to 52% and internet access from 20% to 37%

- Proposed instrument: Share of HH having a fixed telephone line in each province in 2002 (from national Census)

- Justification: The public fixed telephone network was the main component of the internet infrastructure in the early 2000s

Mechanisms: Comparative exercise

Impact of internet adoption in LFP in Chile (2006-2009)

Dependent variable: Change in LFP	Women	Men
Panel A: Second stage		
=1 if internet adoption or continuation	0.056	-0.0627
	[0.121]	[0.0896]
Individual characteristics	Yes	Yes
Household characteristics	Yes	Yes
Observations	4,261	3,641
Panel B: First stage		
Share of hhlds with fixed telephone line	0.556	0.458
	[0.0846]***	[0.0733]***
Observations	4,261	3,641
R-squared	0.215	0.23
F stat of excluded instruments	43.14	38.95

Robustness checks

We confirm our results:

- Including having a laptop and a mobile phone as control variables

- Using the average distance to the 10 nearest 3G cell towers to construct the instrumental variable

Summary and Interpretation

Internet contributes to reduce gender gaps in the labor market:

- o Increase in FLFP with larger impacts for low-educated and not married women. No effect for men
- o Increase in job search using the web
- o Lack of change in employment and increase in unemployment
- o Lack of change or reductions in social norms measures related to money
- o Improvement in social norms indicating increase in women's empowerment within the HH
- o Reduction in marriage and birth rates

Thank you!