Leadership and Gender Discrimination: Experimental Evidence from Ethiopia

Shibiru Ayalew[1] **Shanthi Manian**[2] Ketki Sheth[3]

[1]Arsi University

[2]Washington State University

[3]UC Merced

February 8, 2018

Funding: East Africa Social Science Translation Collaborative (EASST)

Motivation

- Women are under-represented in senior management globally
  - Women hold 17% of board directorships in the world's 200 largest companies (African Development Bank, 2015)
- Raises concerns about both gender equity and lost productivity
- Understudied in developing country labor markets, especially among white-collar workers

Research Question

- Existing literature:
  - Supply-side differences between men and women (human capital, differences in preferences, "leaning in")
  - Discrimination in hiring and promotion
- Alternate mechanism: discrimination from below
  - Could discrimination by *subordinates* make female leaders less effective?
- This paper:
  - Document and describe discrimination from below
  - Consider implications for discrimination at the "top"

Discrimination from below

- Are subjects causally less likely to follow advice from female leaders?
- Source of discrimination: Does information about leader ability affect the gender gap?
- Lab-in-the-field experiment:
  - Sample: Highly educated administrative employees at large public university in Ethiopia
  - Subjects randomly matched to an unseen leader
  - Cross-randomize leader **gender** and information on leader's **ability**

Discrimination at the top

- Implication: positive selection $\Longrightarrow$ discrimination may reduce or reverse at the "top"
- Hypothetical resume evaluation experiment for management position
  - Senior management position
  - Are female candidates evaluated differently?
- Wage analysis
  - How does the gender wage gap change with education level?

Preview of results

- Female leaders face discrimination from below
  - With no information on ability, subjects are 10% less likely to follow the advice of female leaders
  - This reduces performance of female-led subjects by 3.5 percent
- This discrimination responds to information
  - With ability information, the gender gap reverses: subjects are *more* likely to follow female leaders
- Consistent with selection, no discrimination at the "top":
  - No discrimination in resume experiment
  - Large and unexplained gender wage gap on average
  - No wage gap among the highly educated

Contributions

- Well-identified evidence of discrimination against female leaders
  - Large literature on how leadership styles differ among men and women (Eagly, 2013)
  - Newer literature on discrimination toward female experts (Egan, Matvos and Seru, 2017; Sarsons et al., 2017)
  - Challenge is holding leadership ability constant $\Longrightarrow$ identification from negative shocks
- Developing country setting
  - Literature on gender discrimination in the labor market focuses on developed countries (reviewed by Blau and Kahn (2017))
- Dynamics of discrimination from below
  - Fryer (2007); Bohren, Imas and Rosenberg (2017) provide theoretical frameworks for reductions/reversals of discrimination at higher levels of achievement

Application of a standard theory of discrimination

- Each manager has some ability $\theta \sim N(\bar{\theta}_g, \sigma^2_\theta)$
- Simplified, employees follow the manager if:

$$f(\tilde{E}(\theta|g)) > c(g)$$

where:

- $g \in \{\mathbf{m}ale\ manager, \mathbf{f}emale\ manager\}$
- f is a payoff that depends on the employee's beliefs

- First argument captures taste-based discrimination
- Second argument captures statistical discrimination

Application of a standard theory of discrimination

- Each manager has some ability $\theta \sim N(\bar{\theta}_g, \sigma^2_\theta)$
- Simplified, employees follow the manager if:

$$f(\tilde{E}(\theta|g)) > c(g)$$

- If the expected payoff is greater than distaste for the manager's gender, the employee will follow the manager

Proposition

Employees are less likely to follow female managers if $c(f) > c(m)$*, if* $\bar{\theta}_f < \bar{\theta}_m$*, or both.*

The role of ability signals

- Let s be a noisy signal of ability: $s = \theta + u$
  where u is independent of θ and distributed $u \sim N(0, \sigma_u^2)$
- Under Bayesian updating:

$$E(\theta|s, g) = \lambda\bar{\theta}_g + (1 - \lambda)s$$

  where $\lambda = \frac{\sigma_u^2}{\sigma_s^2}$
- Assuming the signal is unbiased, the gender gap reduces to:

$$\lambda(\bar{\theta}_m - \bar{\theta}_f)$$

Proposition

1. *Employees who learn that their manager is of high ability are weakly more likely to follow the manager*
2. *Unbiased signals of high ability reduce the gender gap in beliefs*

▸ Biased signals

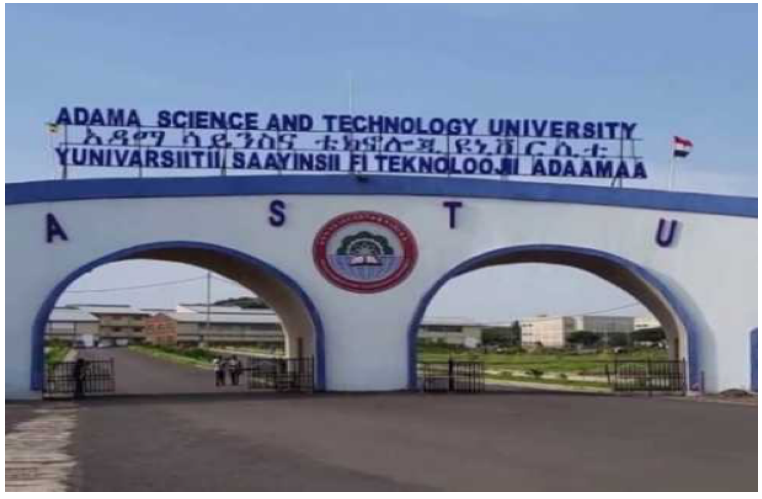
Positive selection

- Discrimination from below implies:
  - Female-led teams will perform worse at first
  - Female managers are less likely to be promoted, even by an unbiased employer
- Leads to positive selection of women into higher-level positions

  $\Longrightarrow$ We may *not* see gender disparities at the top
- Note: may also lead to underinvestment in leadership skills by women

Adama University

- Adama Science and Technology University (ASTU) in Adama, Ethiopia
- ASTU is one of the oldest and largest public universities in Ethiopia



- Human resources data on the universe of full-time ASTU administrative employees
- Lab and resume experiment sub-samples: Employees with BA or higher

Institutional data: Summary statistics

	(1) Total	(2) Male	(3) Female	(4) Diff.
Female	0.56			
	(0.50)			
Tenure	8.00	7.61	8.31	-0.71*
	(5.55)	(5.95)	(5.20)	
Years of education	12.87	13.04	12.73	0.31*
	(3.01)	(3.23)	(2.83)	
BA or higher	0.30	0.38	0.23	0.14***
	(0.46)	(0.48)	(0.42)	
MA or higher	0.02	0.04	0.01	0.03***
	(0.15)	(0.20)	(0.09)	
Salary	2354.62	2629.83	2135.97	493.85***
	(1536.24)	(1878.60)	(1151.46)	
Observations	1685	746	939	1685

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard deviations in parentheses.

Overview of design

1. 302 subjects randomly matched to a male or female leader
2. Task 1: Logic Game - 1 round (no advice given)
3. Task 2: Signaling Game - 10 rounds

Table: 2X2 design

Male leader & Control	Female leader & Control
Male leader & Ability signal	Female leader & Ability signal

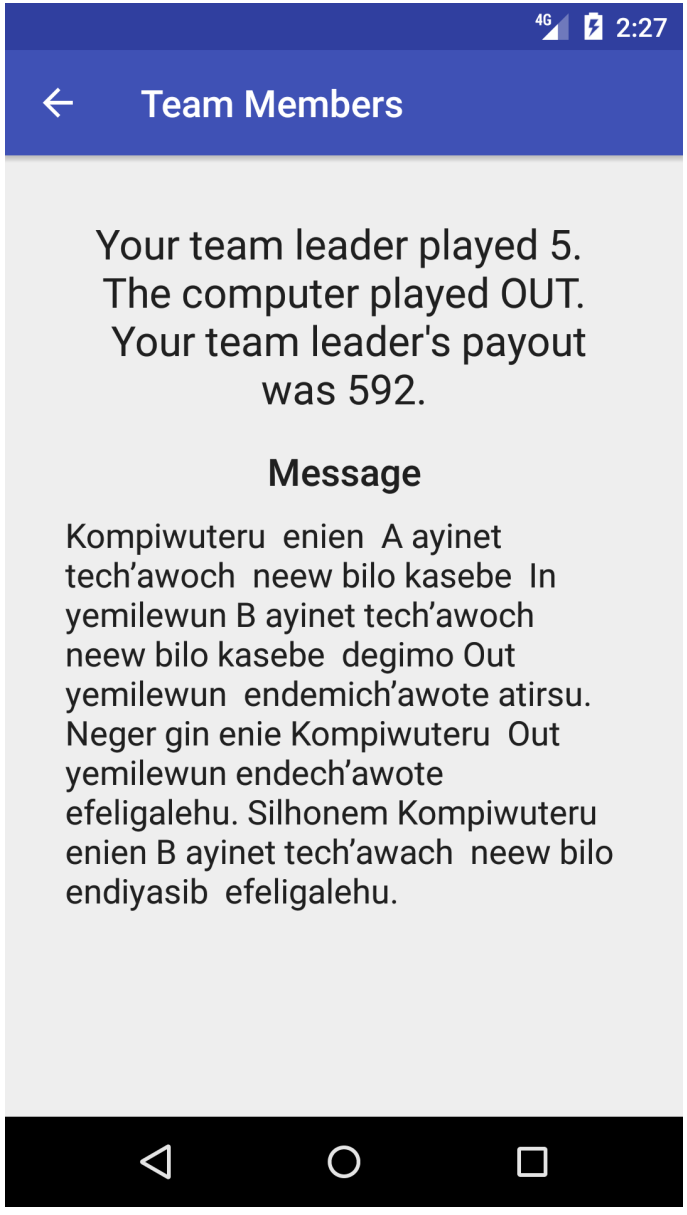
Task 2: Signaling game

- Simple signaling game adapted from Cooper and Kagel (2005)
- Opportunity for "strategic" play $\Longrightarrow$

  Naive best response is not the optimal play
- Leader advises optimal play
- Outcomes of interest
  - Strategic play (defined as in Cooper and Kagel (2005))
  - Optimal play ("Played 5")

Team leaders

- Leaders were administrative employees at another university (Arsi, 100km away)
- No direct interaction with subjects
- Subjects informed of leader's choice and computer's response before each round
- Leaders could send pre-written messages explaining strategic insight



Leader gender treatment

- **Male and female leader have identical histories and are identical in their communication with subjects**
- Salience of leader gender:
  - In Amharic, all grammar is gendered
  - Gendered pseudonyms
  - In subsample (n=102) asked to recall leader gender at end of study, 95% recalled correctly

▸ Pseudonym balance

Ability signal

Task 1:

1. Subject learned of leader's optimal performance

Task 2:

1. Subject told that leader had training and experience playing the game
2. Halfway through, added up the leader's total earnings and compared to subject's total earnings

Estimating Equation

Table: 2X2 design

Male leader & Control	Female leader & Control
Male leader & Ability signal	Female leader & Ability signal

Estimating equation:

$$R_{ir} = \alpha + \beta_1 Fem\_Lead_i + \beta_2 Ability_i + \beta_3 Fem\_Lead_i \times Ability_{ir} + \epsilon_{ir}$$

where R is:

- Strategic play
- Played 5

▸ Balance

Hypotheses

- Estimating equation:

$$R = \alpha + \beta_1 Fem\_Lead + \beta_2 Ability + \beta_3 Fem\_Lead \times Ability + \epsilon$$

- Hypotheses:
  - $\beta_1 < 0$: Female leader reduces strategic play (no ability signal)
  - $\beta_2 > 0$: Ability signal increases strategic play among subjects with male leaders
  - $\beta_3 > 0$: Ability signal reduces gender gaps
- Also of interest:
  - $\beta_1 + \beta_3$: Gender gap conditional on ability information

Leader gender and ability effects

Dependent Variable:	Strategic Play	Played 5
	(1)	(2)
(β_1) Fem. Leader	-0.0590*	-0.0640
	(0.0352)	(0.0407)
(β_2) Ability	-0.00301	0.000942
	(0.0350)	(0.0409)
(β_3) Fem. leader $\times$ Ability	0.115**	0.0998*
	(0.0479)	(0.0562)
Day FE	X	X
Round FE	X	X
Practice round	X	X
Observations	3020	3020
Control group mean	0.618	0.374
P-val.: $\beta_1 + \beta_3$	0.0891	0.366

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at subject level. Strategic play is defined as playing 4 or 5. 5 is the highest expected value play, and the leader played 5 in every round.

Leader gender and performance

Dependent Variable:	Total Points
	(1)
(β_1) Fem. Leader	-179.8**
	(79.13)
(β_2) Ability	49.36
	(78.99)
(β_3) Fem. leader $\times$ Ability	101.0
	(113.9)
Day FE	X
Practice round	X
Observations	302
Control group mean	5099.2
P-val.: $\beta_1 + \beta_3$	0.335

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Leader gender and expectations

Dependent Variable:	Leader's performance
	(1)
(β_1) Fem. Leader	-5.812
	(9.056)
(β_2) Ability	6.362
	(9.527)
(β_3) Fem. leader $\times$ Ability	14.39
	(12.98)
Day FE	X
Observations	301

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Resume Evaluation Experiment

- Sample: 264 experimental subjects located the following week
- Job description, based on a real job announcements in Ethiopia
  - Management position: Human Resource Management Director
  - Minimum required education + experience: BA + 10 years experience
- Resume:
  - Subjects given one of two similar resumes
  - Gender was cross-randomized across types
  - "Comprehension" questions to ensure salience of gender

Example Resume

I. Personal Information

Name: ----------
Sex: [Randomly Determined: Female/Male]
Birthdate: 21/07/1984

Personal Summary:

I am an outgoing, ambitious, and confident individual, whose passion for the HR sector is equally matched by my experience in it. For the previous 6 years, my primary role at ----- has been to provide HR support, guidance, advice, and services to all company staff. This has taught me to translate corporate goals into human resource development programs, as well as given me extensive knowledge of HR administration, principles, practices, and laws. I have experience sourcing candidates, overseeing hiring processes, and resolving employee relations issues. This has given me experience interacting with many different types of people and I have developed strong interpersonal skills for resolving conflicts. I am always looking for ways to improve systems in human resources, consistently complete tasks to their natural end, work well under pressure and deadlines, and adapt to changing environments.

II. Work Experience

No evidence for discrimination

	(1) Competence	(2) Likeability	(3) Likelihood of Hire	(4) Log Salary
Female Resume	-0.000946	0.0392	-0.0870	-0.0400
	(0.127)	(0.113)	(0.155)	(0.0454)
Resume Version	0.246*	0.0336	-0.103	0.0219
	(0.127)	(0.113)	(0.155)	(0.0453)
Constant	3.466***	3.759***	4.121***	8.078***
	(0.111)	(0.0984)	(0.135)	(0.0397)
Observations	263	263	263	264

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Raw gender gap in salaries

	(1) ln(Salary)	(2) ln(Salary)	(3) ln(Salary)
Female	-0.198***	-0.129***	-0.0861***
	(0.0234)	(0.0161)	(0.0197)
Tenure		0.0281***	0.0268***
		(0.00140)	(0.00168)
Years of education		0.0509***	0.0363***
		(0.00332)	(0.00402)
BA or higher		0.383***	0.337***
		(0.0262)	(0.0255)
MA or higher		0.395***	0.419***
		(0.0504)	(0.0647)
Constant	7.744***	6.701***	6.938***
	(0.0173)	(0.0403)	(0.281)
Work Unit FE	No	No	Yes
Observations	1685	1665	1665

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

(Lack of) Gaps among the educated

	(1) ln(Salary)	(2) ln(Salary)	(3) ln(Salary)
(β_1) Female	-0.143***	-0.188***	-0.134***
	(0.0206)	(0.0174)	(0.0232)
(β_2) BA or higher	0.584***	0.278***	0.272***
	(0.0308)	(0.0328)	(0.0314)
(β_3) Female $\times$ BA or higher	0.123***	0.196***	0.127***
	(0.0436)	(0.0382)	(0.0397)
Other controls	No	Yes	Yes
Work Unit FE	No	No	Yes
Observations	1685	1665	1665
$\beta_1 + \beta_3$	-0.02	0.008	-.007
P-val.	0.613	0.819	0.830

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Summary of findings

- Document discrimination from below toward female leaders
  - Having a female leader reduces strategic play by about 10%
  - Reduces a performance of female-led subjects by 3.5%
- This discrimination is responsive to information
  - Information that the leader is trained and highly competent *reverses* the gender gap
- Implies discrimination will lessen at the "top" of the labor market.
- Evidence consistent with this:
  - No gender discrimination in resume evaluation experiment for a management position
  - No gender wage gap among the highly educated

Discussion

- Mechanism of discrimination from below suggests different policy implications for improving female representation in leadership
  - Both equalizing human capital attainment and "leaning in" may not be sufficient
- Instead, suggests interventions at the employer level (e.g., providing additional information about female manager's qualifications, accounting for discrimination in promotion decisions)

References I

African Development Bank. 2015. "Where are the women: inclusive boardrooms in Africa's top listed companies?" 1–119.

Blau, Francine D., and Lawrence M. Kahn. 2017. "The Gender Wage Gap: Extent, Trends, and Explanations." *Journal of Economic Literature*, 55(3): 789–865.

Bohren, J. Aislinn, Alex Imas, and Michael Rosenberg. 2017. "The Dynamics of Discrimination : Theory and Evidence."

Cooper, David J., and John H. Kagel. 2005. "Are two heads better than one? Team versus individual play in signaling games." *American Economic Review*, 95(3): 477–509.

Eagly, Alice H. 2013. "Women as Leaders: Leadership Style Versus Leaders' Values and Attitudes."

Egan, Mark L, Gregor Matvos, and Amit Seru. 2017. "When Harry Fired Sally: The Double Standard in Punishing Misconduct."

References II

Fryer, Roland G. 2007. "Belief flipping in a dynamic model of statistical discrimination." *Journal of Public Economics*, 91(5-6): 1151–1166.

Sarsons, Heather, Mitra Akhtari, Kai Barron, Anke Becker, Kirill Borusyak, Amitabh Chandra, Sylvain Chassang, John Coglianese, Oren Danieli, Krishna Dasartha, Ellora Derenoncourt, Raissa Fabregas, John Friedman, Roland Fryer, Peter Ganong, Edward Glaeser, Nathan Hendren, Simon Jäger, Anupam Jena, Jessica Laird, Jing Li, Jonathan Libgober, Matthew Rabin, Hannah Schafer, Frank Schilbach, Nihar Shah, Andrei Shleifer, Jann Spiess, Neil Thakral, Peter Tu, Shosh Vasserman, and Chenzi Xu. 2017. "Interpreting Signals in the Labor Market: Evidence from Medical Referrals." 1–71.

Randomization balance

	(1) Fem. subject	(2) ln(Salary)	(3) Level	(4) Years Ed.	(5) MA or higher	(6) Job tenure
Female leader only (F)	0.0173	-0.0213	-0.145	0.00175	0.00848	238.2
	(0.0817)	(0.0634)	(0.446)	(0.0813)	(0.0401)	(328.3)
Ability signal only (A)	-0.0189	-0.00813	0.151	0.0556	0.0354	71.63
	(0.0803)	(0.0597)	(0.424)	(0.0865)	(0.0427)	(335.7)
Female leader & Ability (FA)	-0.0383	-0.00636	-0.149	0.117	0.0587	-276.9
	(0.0840)	(0.0610)	(0.420)	(0.100)	(0.0494)	(342.2)
Day FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	304	304	304	304	304	304
p-val: F = A	0.649	0.839	0.510	0.535	0.535	0.586
p-val: A = FA	0.812	0.977	0.481	0.554	0.650	0.268
p-val: F = FA	0.503	0.821	0.994	0.251	0.312	0.0959

Standard errors in parentheses

$^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Back

Biased signals by gender

- Instead, let s be a function of g, gender

$$s = \theta - \gamma_g + u$$

  where $\gamma_f > \gamma_m$
- For a given level of ability, females produce a lower signal
- Then we have:

$$\tilde{E}(\theta|s, g) = \lambda\bar{\theta}_g + (1 - \lambda)(s + \gamma_g)$$

Proposition

If the signal mean differs by gender, then it is possible for the signal s to reverse the baseline gender gap in beliefs about ability.

Back

Balance on pseudonym characteristics

	(1) Amhara	(2) Oromo	(3) Age	(4) Grade	(5) Orthodox
Female leader only (F)	-0.0188	-0.00914	0.670	0.219	-0.0220
	(0.0554)	(0.0708)	(2.365)	(0.263)	(0.0700)
Ability signal only (A)	-0.0537	-0.0104	-0.932	0.145	-0.0689
	(0.0568)	(0.0697)	(2.278)	(0.227)	(0.0665)
Female leader & Ability (FA)	-0.0265	0.00721	-0.409	0.160	-0.0477
	(0.0597)	(0.0754)	(2.517)	(0.270)	(0.0712)
Day FE	Yes	Yes	Yes	Yes	Yes
Observations	304	304	304	304	304
p-val: F = A	0.544	0.985	0.444	0.781	0.466
p-val: A = FA	0.658	0.807	0.816	0.956	0.743
p-val: F = FA	0.900	0.826	0.648	0.848	0.700

Standard errors in parentheses

$^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Back