Harming to Signal *

Simon Haenni[†] Guilherme Lichand[†]

[†]University of Zurich

Symposium on Economic Experiments in Developing Countries

May 30, 2019

*Research supported by the generosity of UNICEF Switzerland's National Committee. Data collection in partnership with UNICEF Malawi, Malawi's National Statistical Office, and University of Malawi's Centre for Social Research. Excellent research assistance by Qingyang Lin.

Why do people follow traditions?

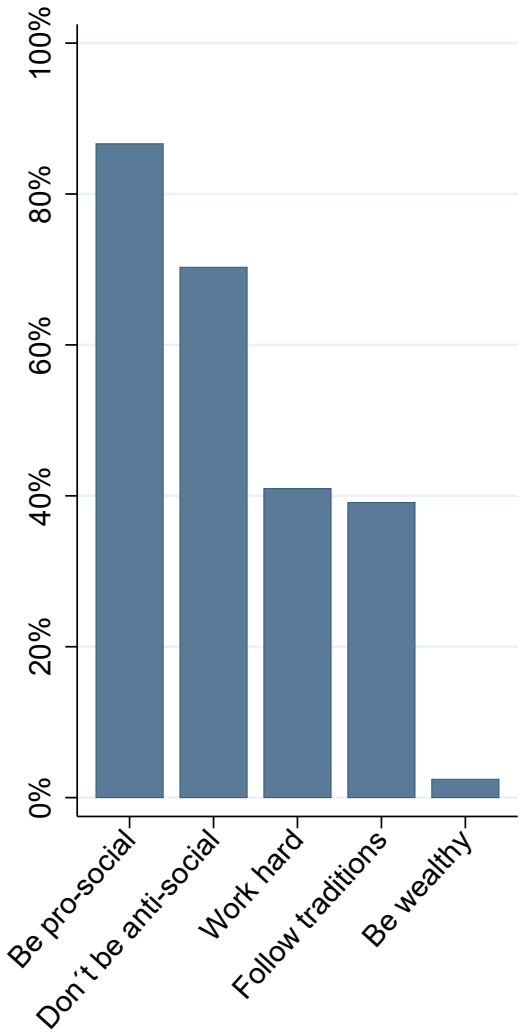
- Question lies at the core of large literature studying the relationship between culture and economic outcomes (Guiso, Sapienza and Zingales, 2006; Fernandes, 2008; Alesina and Giuliano, 2015)
- Empirical research documents that individuals comply with traditions based on:
  1. Intrinsic motivations
  2. Extrinsic motivations
  3. Beliefs about what others do or expect them to do
- **Hypothesis**: individuals follow traditions at least partly **to signal they are pro-social**
- Signaling mechanism considered theoretically (Benabou and Tirole, 2011, 2006) but *not empirically tested*

Literature

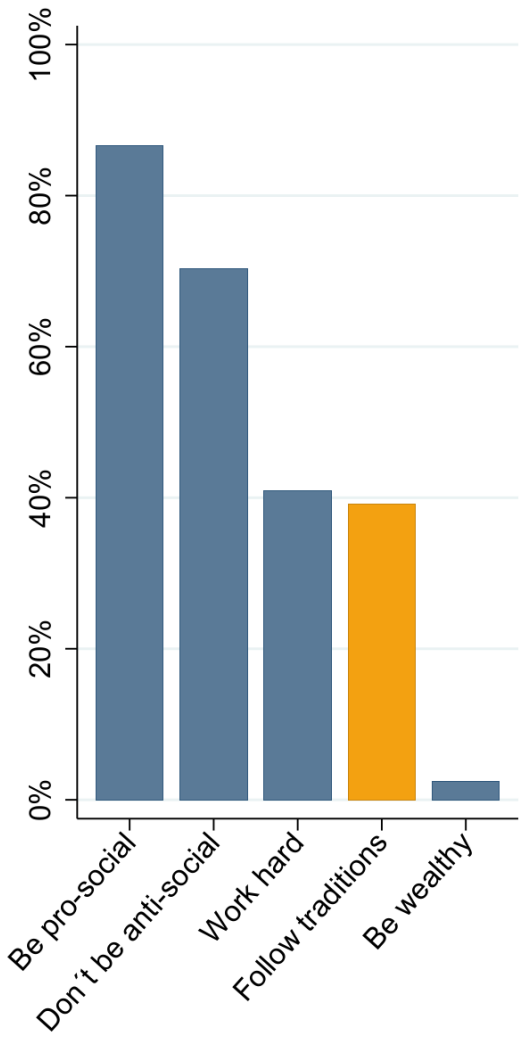
Why does it matter?

- If that is the case, alternative signals could, under certain conditions, *substitute for* social norms and traditional practices that lead to:
  - inefficient outcomes (corruption: Tirole, 1996)
  - inequality (discrimination: Basu, 2018)
  - destruction of children's human capital (child labor: Basu 2018; child marriage: Field and Ambrus 2008; violence against children: Vogt et al. 2016)

What would someone in your village most likely do to get a great public image or a great reputation?

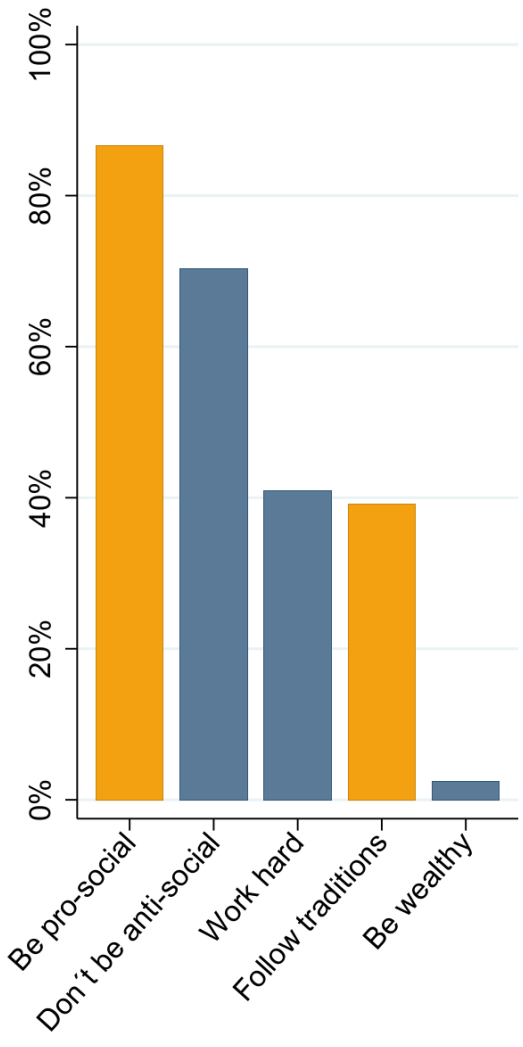


What would someone in your village most likely do to get a great public image or a great reputation?



- Does this logic also apply to traditions that **destroy children's human capital**?

What would someone in your village most likely do to get a great public image or a great reputation?



- Does this logic also apply to traditions that **destroy children's human capital**?
- Are different signals **substitutable**?

Model: intuition and implications (1 of 2)

- Repeated prisoners' dilemma, with two types of players who vary in the extent to which they value future payoffs

Model: intuition and implications (1 of 2)

- Repeated prisoners' dilemma, with two types of players who vary in the extent to which they value future payoffs
- Trust-intensive society makes it crucial to identify who is cooperative, but not easy to observe

Model: intuition and implications (1 of 2)

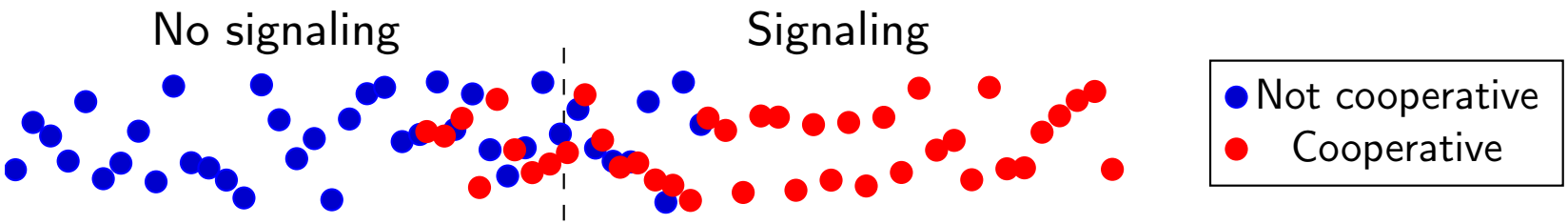
- Repeated prisoners' dilemma, with two types of players who vary in the extent to which they value future payoffs
- Trust-intensive society makes it crucial to identify who is cooperative, but not easy to observe
- Cooperative individuals may be willing to acquire costly signals to separate themselves from the uncooperative

Model: intuition and implications (1 of 2)

- Repeated prisoners' dilemma, with two types of players who vary in the extent to which they value future payoffs
- Trust-intensive society makes it crucial to identify who is cooperative, but not easy to observe
- Cooperative individuals may be willing to acquire costly signals to separate themselves from the uncooperative

Model: intuition and implications (1 of 2)

- Repeated prisoners' dilemma, with two types of players who vary in the extent to which they value future payoffs
- Trust-intensive society makes it crucial to identify who is cooperative, but not easy to observe
- Cooperative individuals may be willing to acquire costly signals to separate themselves from the uncooperative



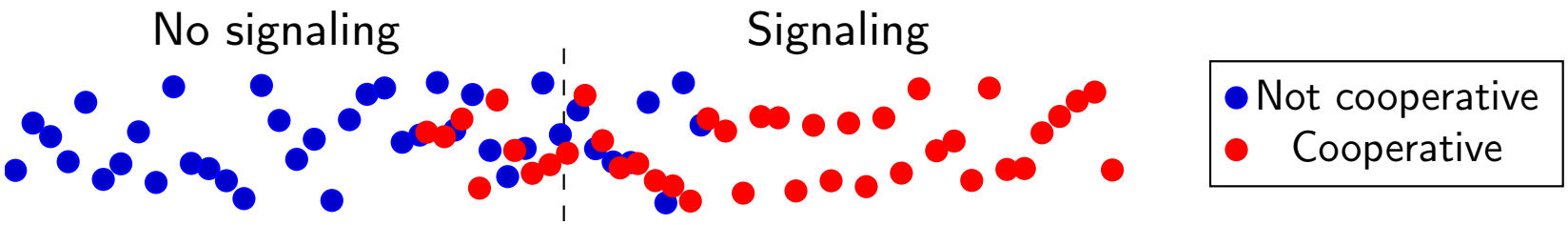
Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

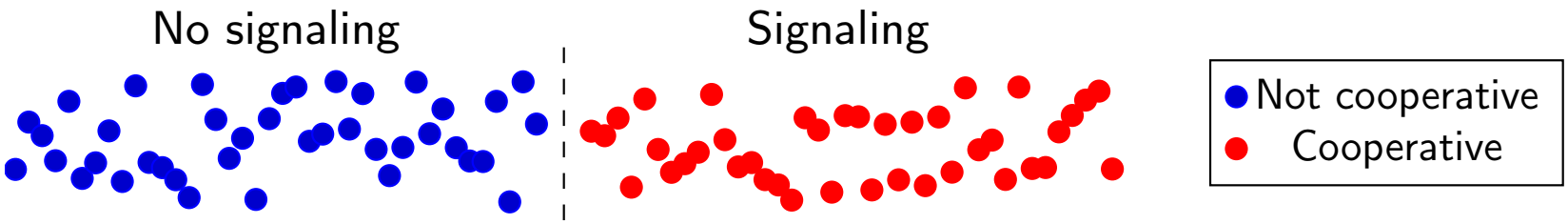
1. By introducing a new separating equilibrium, based on the new signal instead



Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

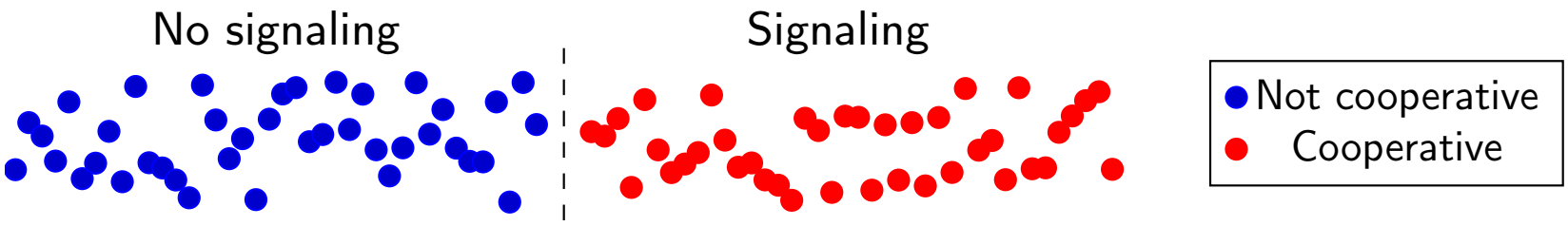
1. By introducing a new separating equilibrium, based on the new signal instead



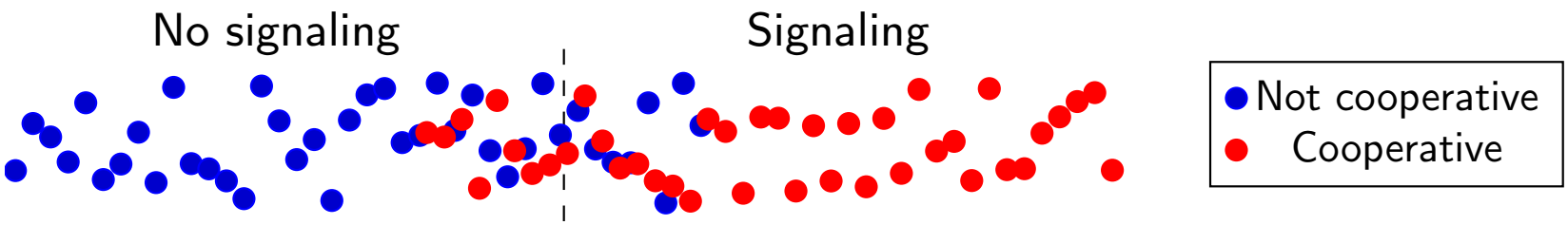
Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

1. By introducing a new separating equilibrium, based on the new signal instead



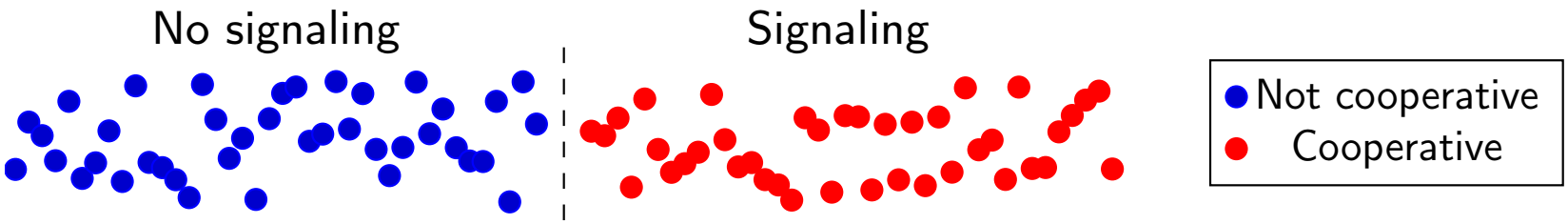
2. By breaking down the previous separating equilibrium, introducing a pooling equilibrium



Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

1. By introducing a new separating equilibrium, based on the new signal instead

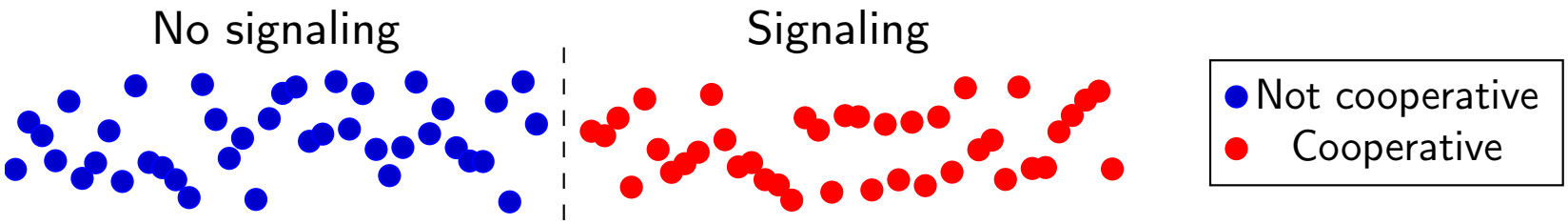


2. By breaking down the previous separating equilibrium, introducing a pooling equilibrium

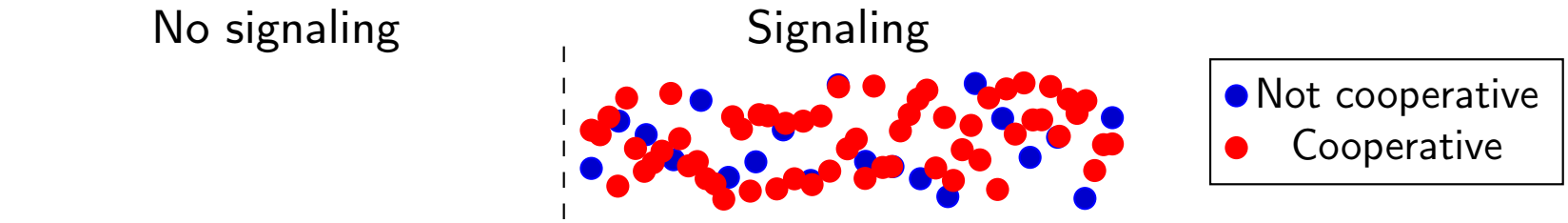
Model: intuition and implications (2/2)

- Introducing a new signal could change a prior separating equilibrium in two ways:

1. By introducing a new separating equilibrium, based on the new signal instead



2. By breaking down the previous separating equilibrium, introducing a pooling equilibrium



Research questions

Is following traditions at least partly driven by incentives to build public image? If so, could new signals substitute for traditions?

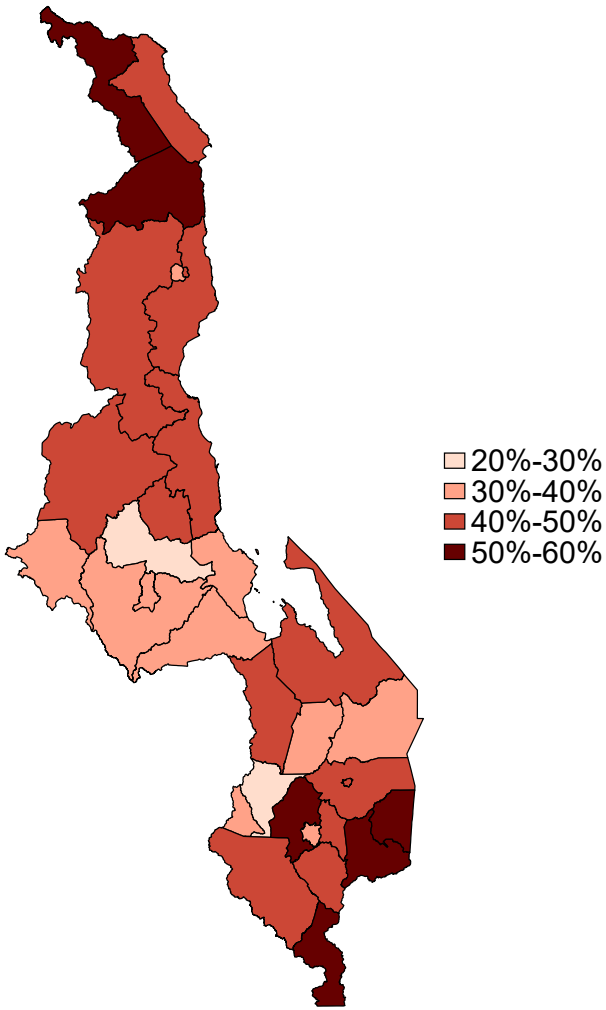
Specifically, in this context:

1. Is adherence to harmful traditions *perceived as a signal* for pro-sociality and trustworthiness?
2. Are alternative signals taken up (and by whom)? Do they change the *predictability* of pro-sociality? Do they *weaken the value* of harmful traditions as a signal?
3. Do alternative signals *decrease* willingness to follow harmful traditions?

Roadmap

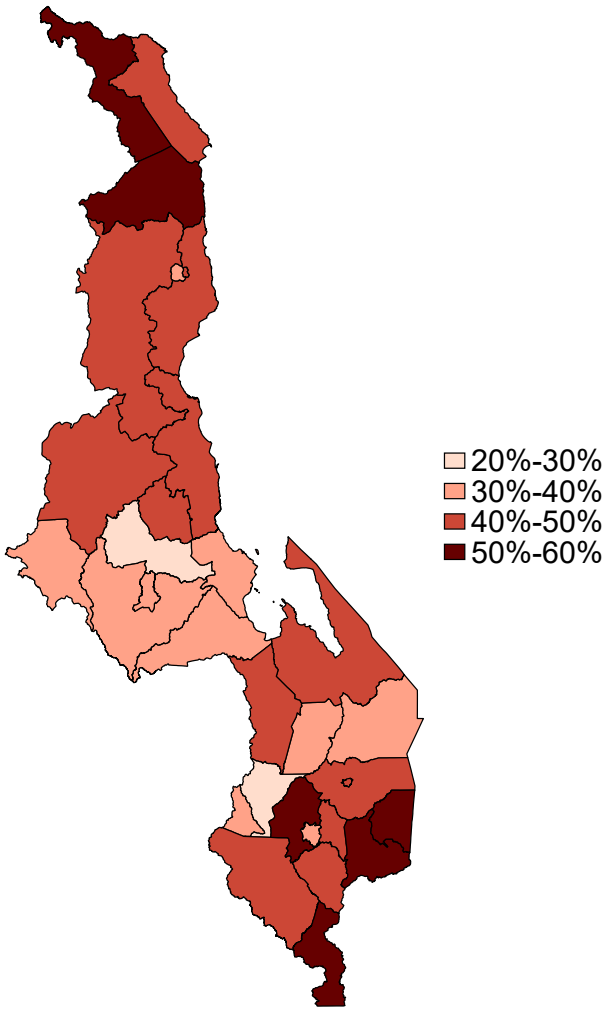
Prevalence of two potentially harmful traditions

Girl's Marriage

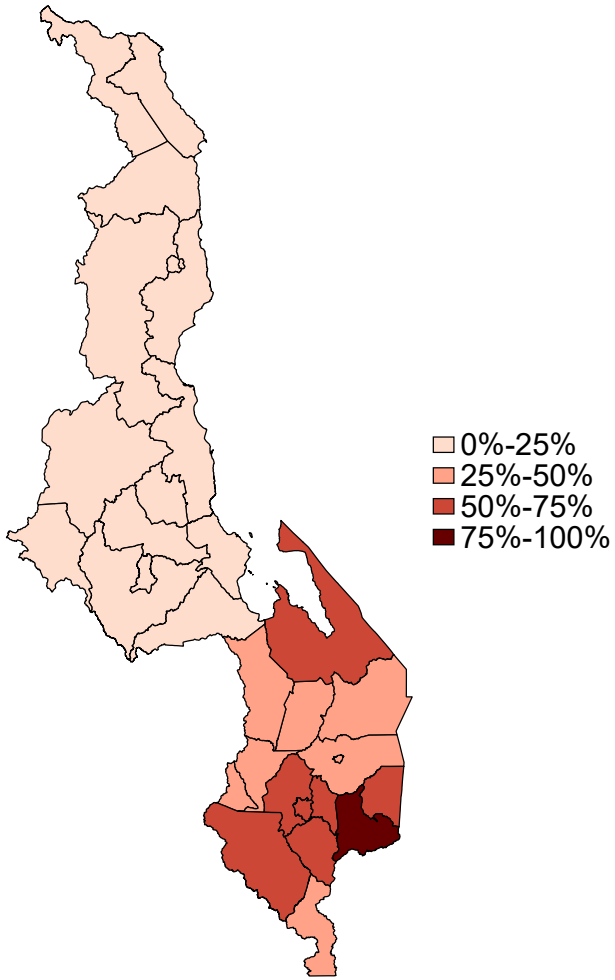


Prevalence of two potentially harmful traditions

Girl's Marriage

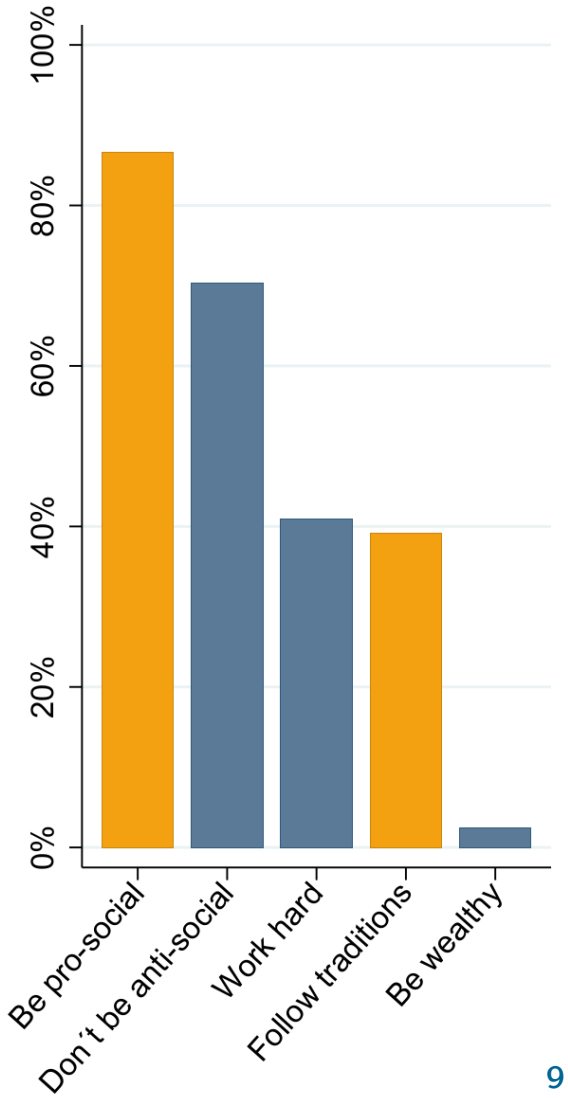


Sexual Initiation Rituals



Empirical challenges

- Two challenges for answering research questions:
  1. Availability (or costs) of different signaling strategies not randomly assigned
  2. Adoption of different strategies not randomly assigned



Two-level randomization *

Village-level RCT (5 weeks prior): Availability of lower-cost signaling strategy

		Box: Yes	Box: No
Bracelets	Yes		
	No		

Individual-level survey experiment: Adoption of different signaling strategies

		Supports child marriage: Yes	Supports child marriage: No
Wears bracelet	Yes		
	No		

Compliance | Balance: RCT | Balance: Survey experiment

* Trial AEARCTR-0002856, registered on June 11, 2018.

Availability: Box and Bracelets

Details

Availability: Only Box

Details

Availability: Only Bracelets

Details

Availability: Pure Control

Details

Adoption: John marries off his 14-year-old daughter

... and wears a Bracelet

John does NOT marry off his 14-year-old daughter

... and wears a Bracelet

Details of the survey experiment

- Each subject is presented with the same scene (and the same accompanying story) at different points of the survey twice; the only change is that the later version features bracelets.
- The two scenes and corresponding sets of questions about John's public image are set about 15 minutes apart in the survey.
- Under-15 child marriage is a more extreme and rare phenomenon, observed in less than 7% of Malawian households.

More details

Outcomes

1. Public Image (adapted from Falk et al., 2016)
   - Altruism: Helping without expecting anything in return
   - Reciprocity: Returning a favor
   - Trustworthiness: Being reliable, honest, and truthful
   - ▶ Summary measure of pro-sociality (Kling, Liebman, and Katz, 2007)

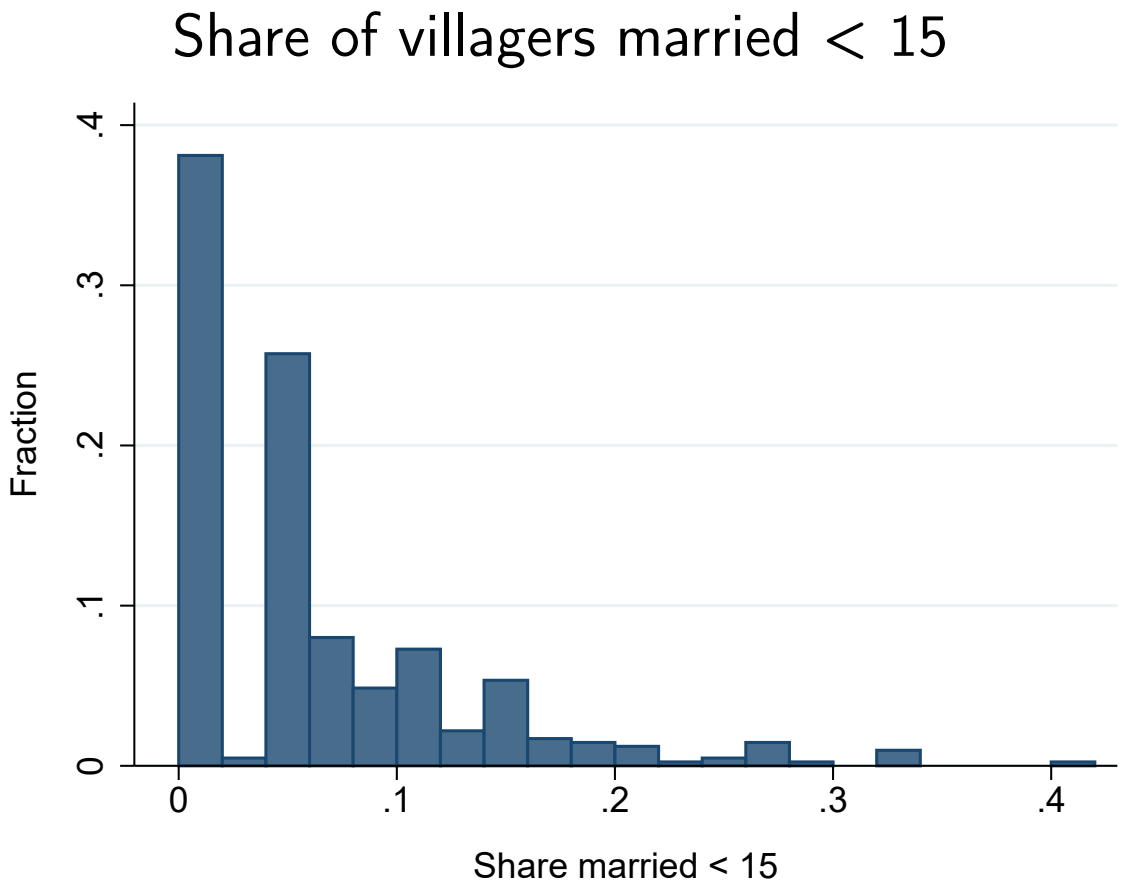
2. Favorable attitudes
   - Child marriage: *"What is the right age for a woman to get married?"*
   - Sexual initiation rituals: *"Sexual initiation rituals should be continued."*

Local prevalence of < 15 child marriage

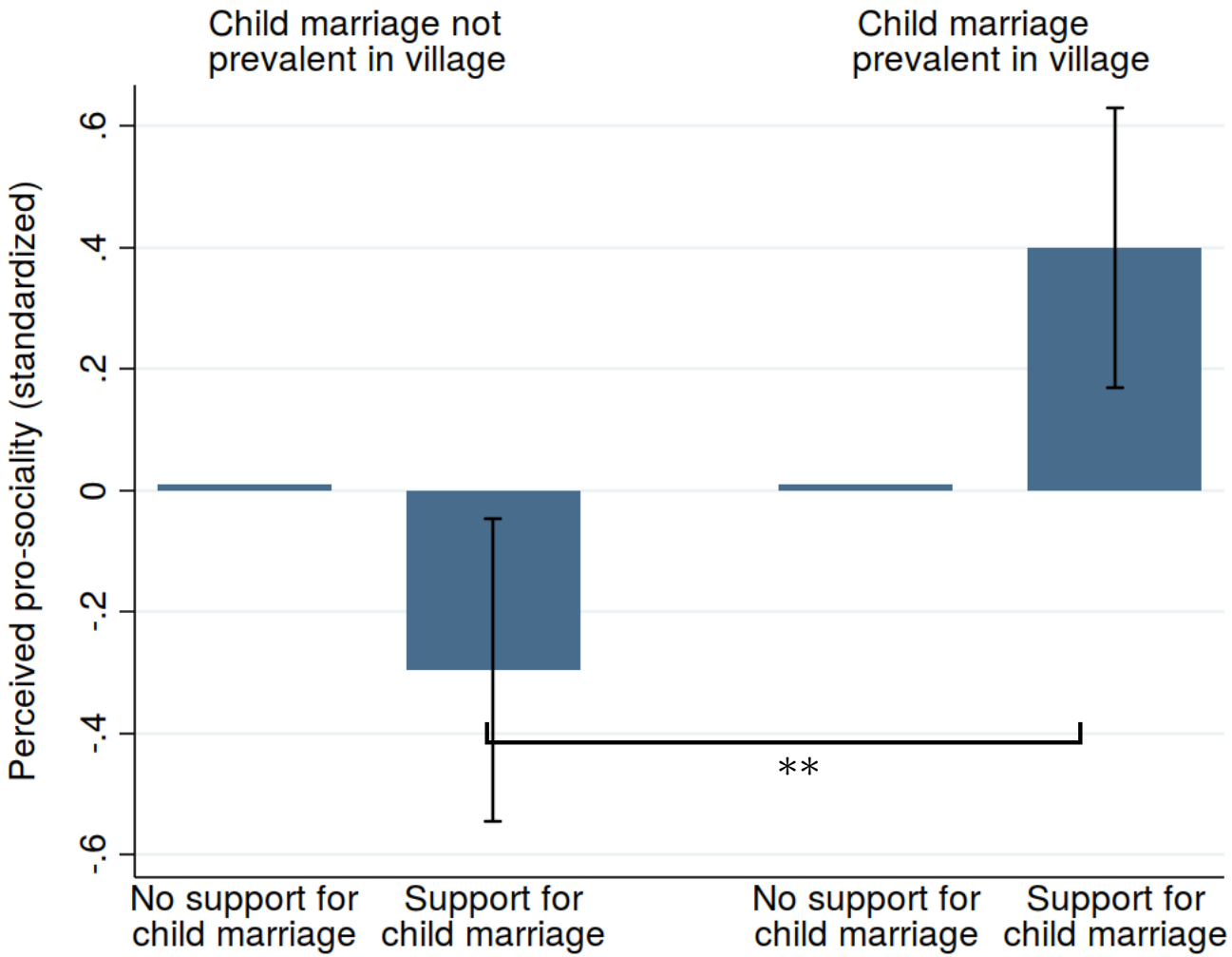
- A signaling strategy can only work if others use and understand the signal.

Local prevalence of < 15 child marriage

- A signaling strategy can only work if others use and understand the signal.
- Measure for local existence of practice: Predetermination



Villagers' public image as perceived by the chief



How likely is John to... ?

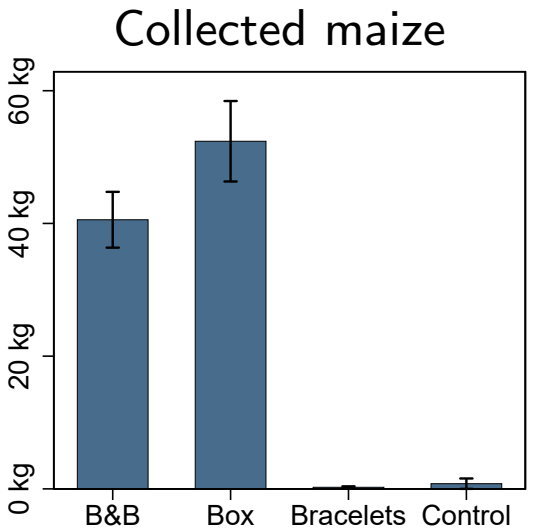
Does supporting child marriage improve public image?

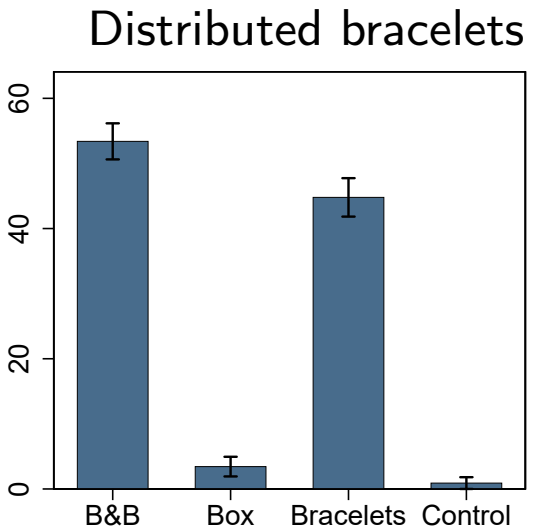
		Individual components		
Dependent variable: Perceived image of John	Summary Measure (i)	Altruism (ii)	Reciprocity (iii)	Trustworthiness (iv)
John supports child marriage × Share married < 15	1.576***	1.641***	1.080*	2.006***
	(0.468)	(0.602)	(0.618)	(0.589)
John supports child marriage	-0.612***	-0.500***	-0.429***	-0.909***
	(0.0298)	(0.0350)	(0.0382)	(0.0387)
Individual controls	✓	✓	✓	✓
Village fixed effects	✓	✓	✓	✓
Observations	6,978	6,978	6,978	6,978
Clusters	412	412	412	412

Notes: The summary measure is an equally weighted, standardized combination of individual measures for altruism, reciprocity, and trust. Regressions additionally include individual controls (female, age, age^2, age^3, and measures for own pro-sociality) plus a constant. Standard errors, clustered at the village level, in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Take-up of the new signals

Take-up of the new signals

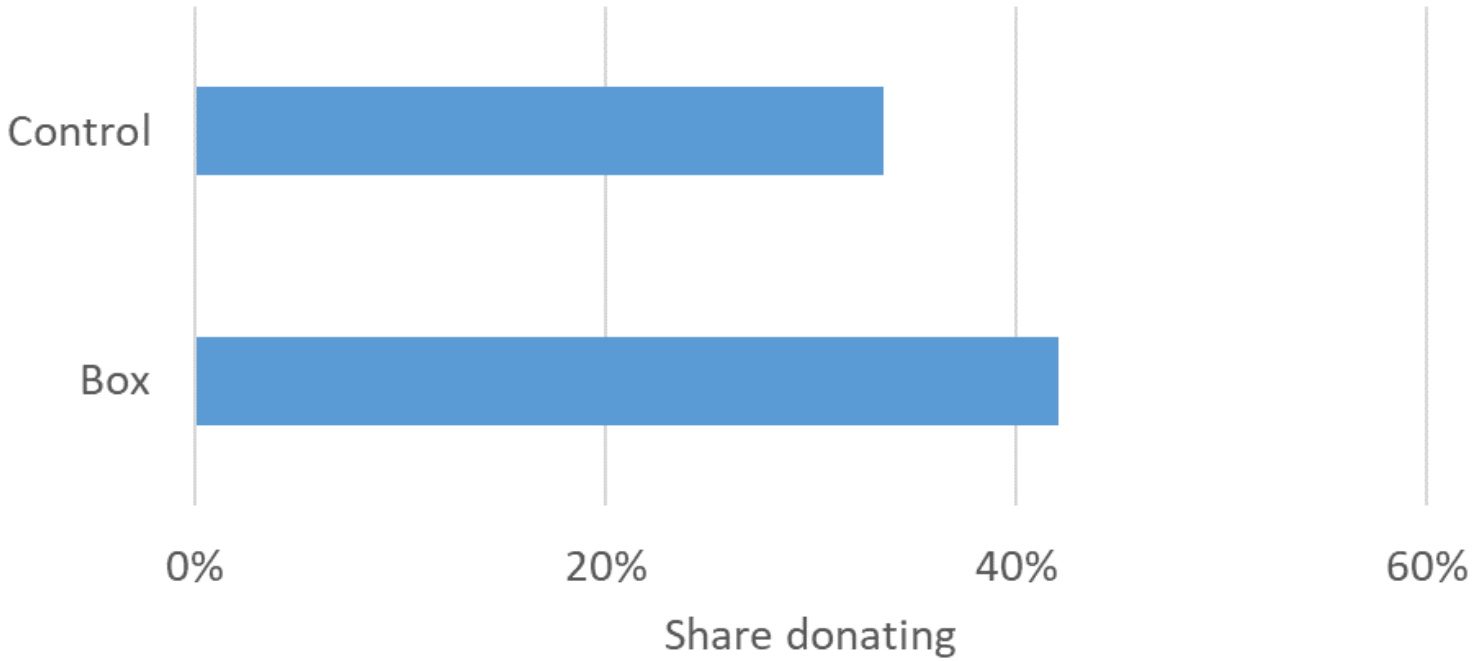




Manipulation checks

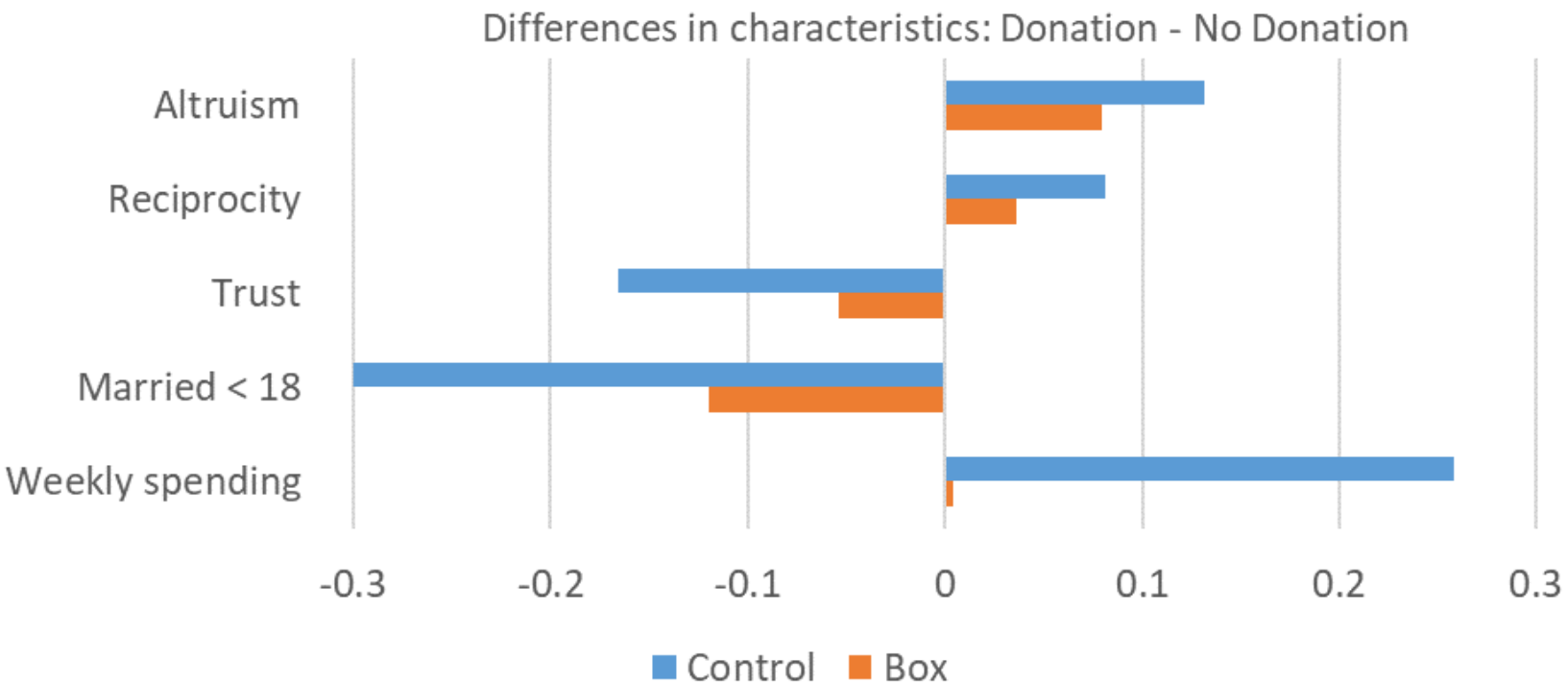
Signaling by harming or by donating?

- Making boxes available increases donations...



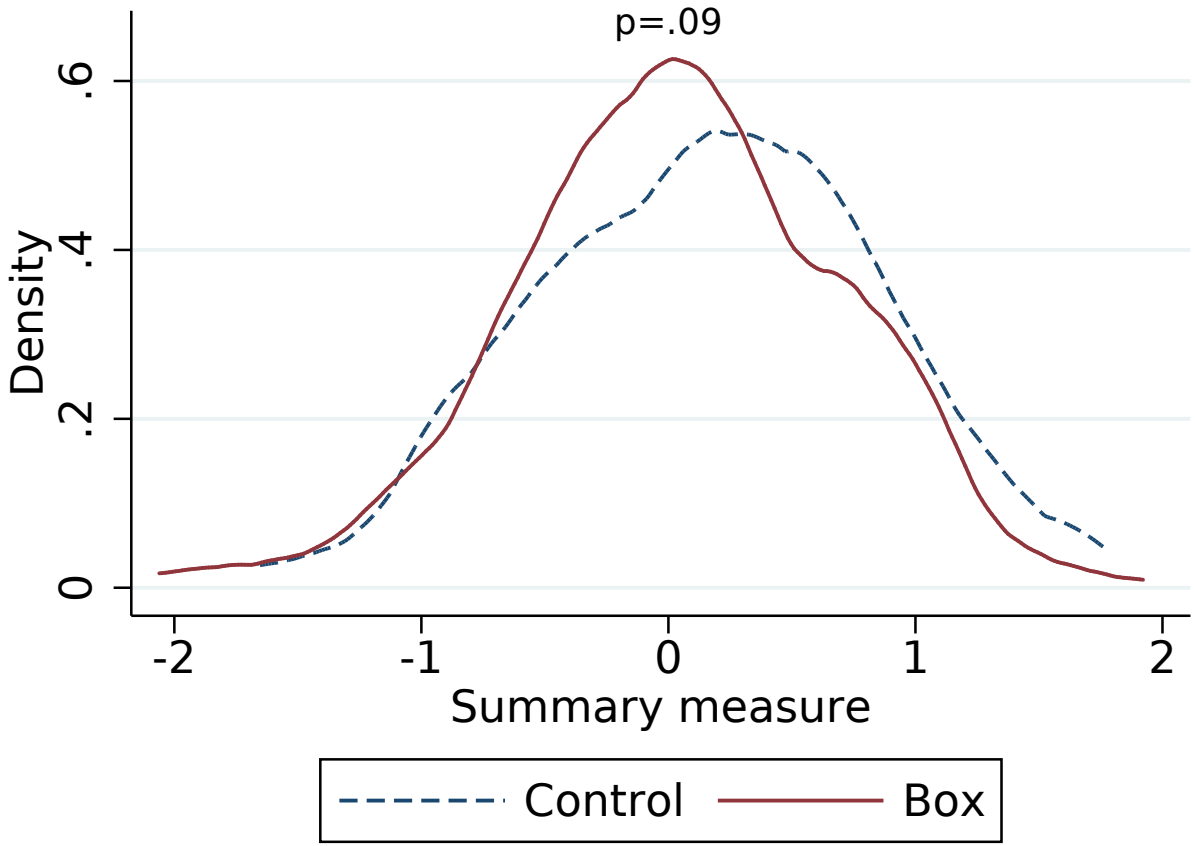
Signaling by harming or by donating?

- Making boxes available increases donations...
- ... and changes the profile of those who donate



Signaling by harming or by donating?

- Making boxes available increases donations...
- ... and changes the profile of those who donate



Signaling by harming or by donating?

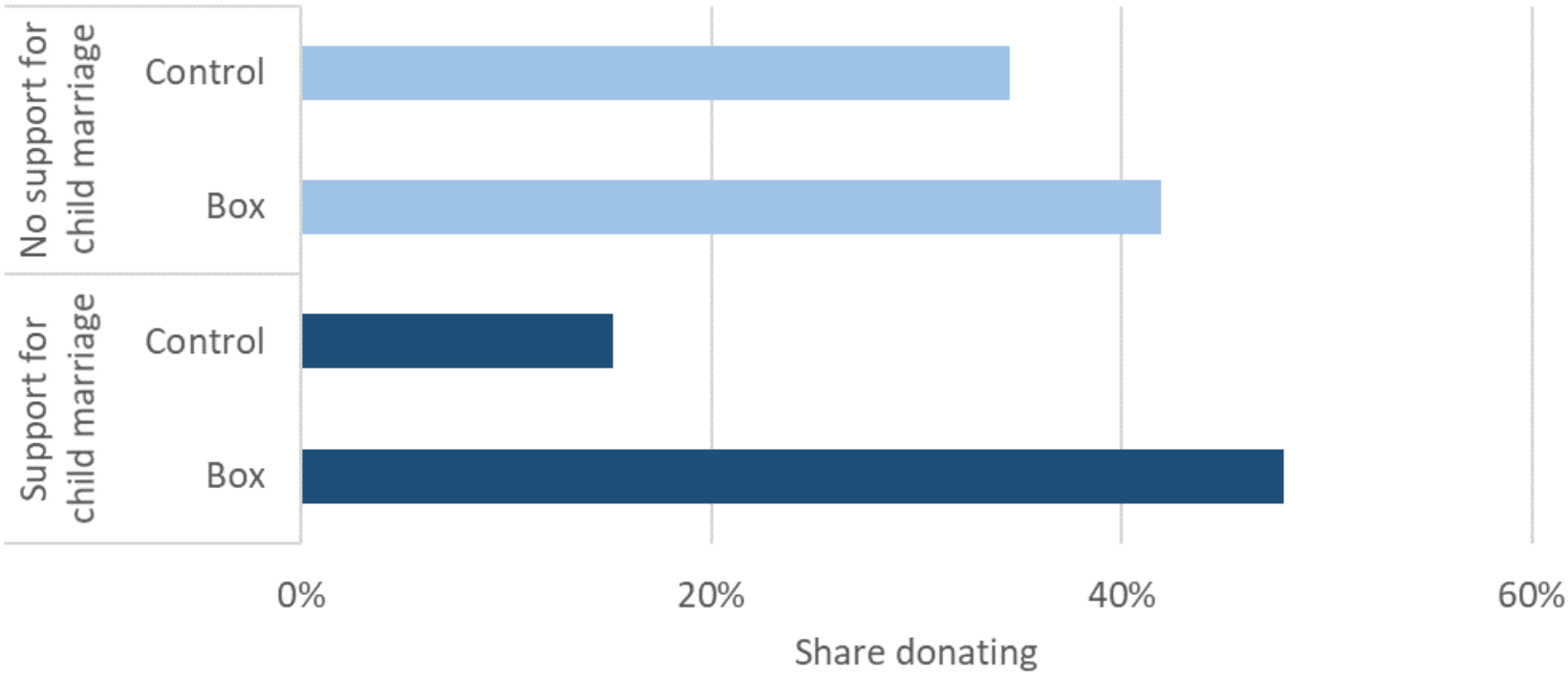
- Making boxes available increases donations...
- ... and changes the profile of those who donate
- This makes it **harder** for chiefs to predict who is pro-social

Dependent variable: |(self reported - chief assessed)|	(i) Altruism	(ii) Reciprocity	(iii) Trust
Box	0.518**	0.0874	0.118
	(0.259)	(0.229)	(0.209)
Mean dependent variable (Control)	3.241	3.053	3.511
Chi^2-test Box jointly=0, (p-val.)		0.0794	
Village chief controls	✓	✓	✓
Village controls	✓	✓	✓
Observations	787	787	787
Clusters	296	296	296

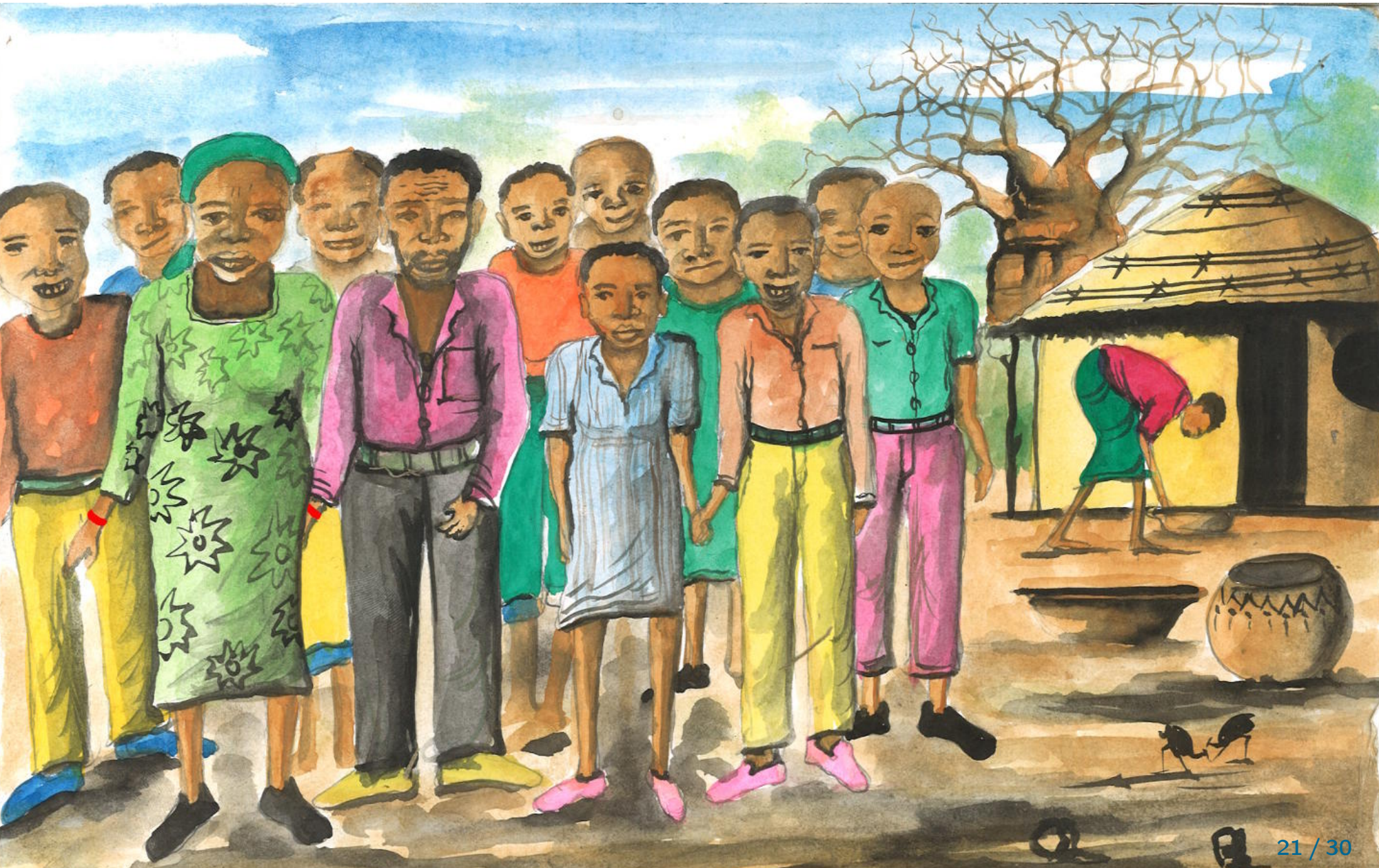
Notes: Regressions additionally include village chief controls (female, age, age^2, and age^3), village-level controls (village size, population density, urban), plus a constant. Standard errors, clustered at the village level, in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Signaling by harming or by donating?

- Making boxes available increases donations...
- ... and changes the profile of those who donate
- This makes it **harder** for chiefs to predict who is pro-social
- Joint distribution of signaling strategies shows potential for substitutability

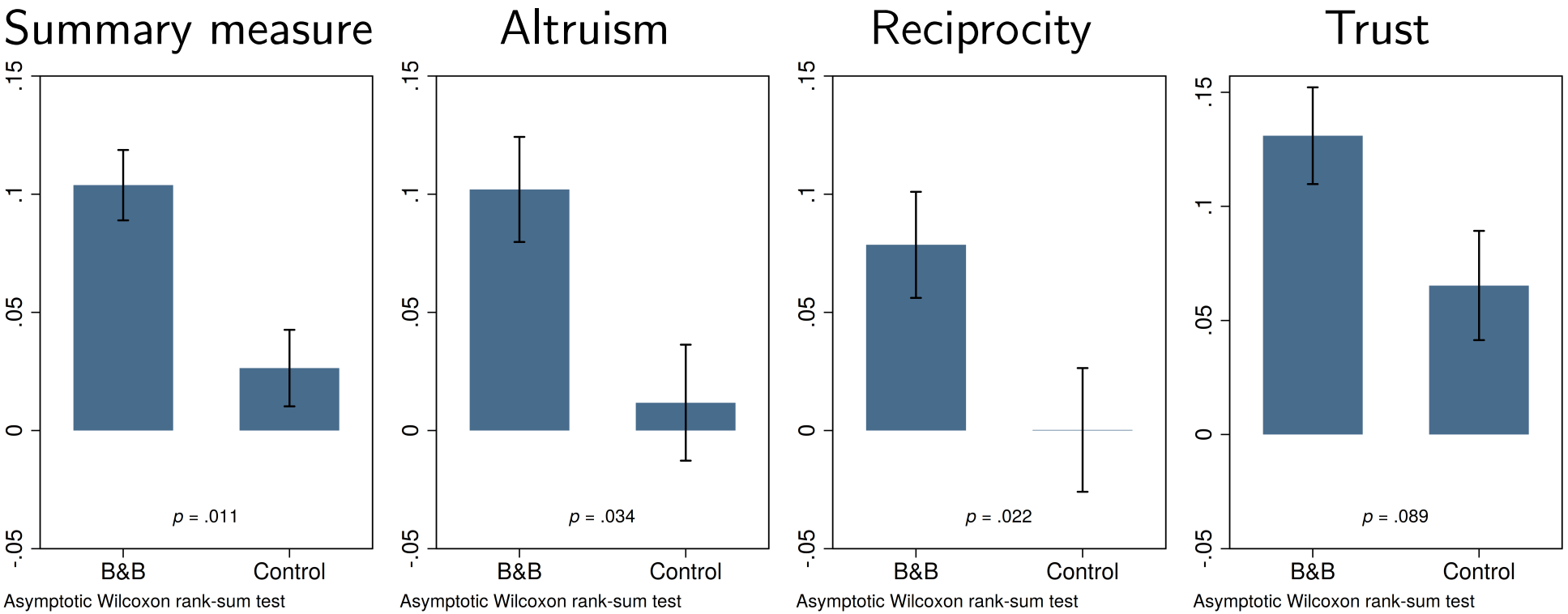


How likely is John to...



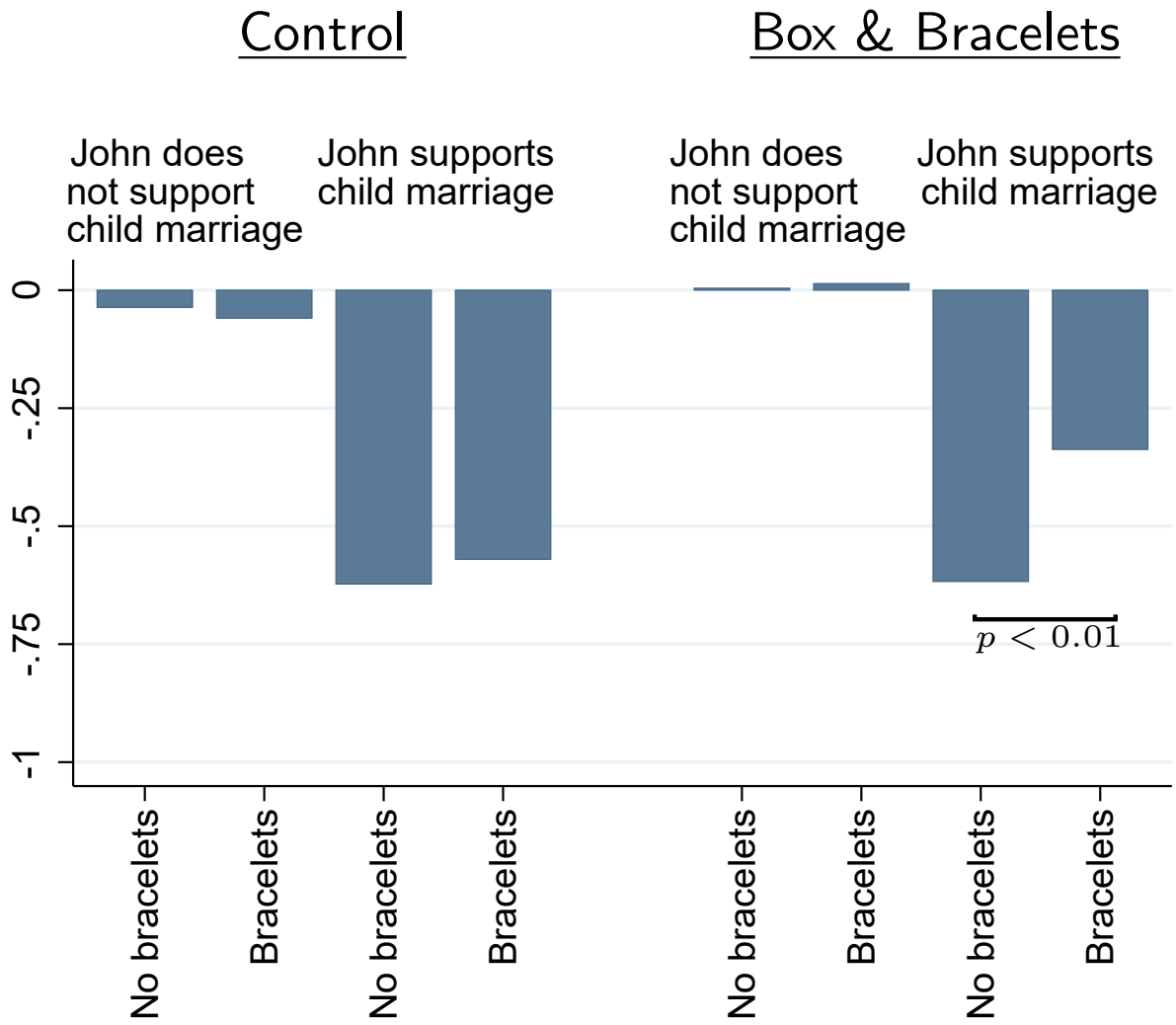
Are bracelets perceived as a signal for public image?

- Reputational benefit of John wearing a bracelet:



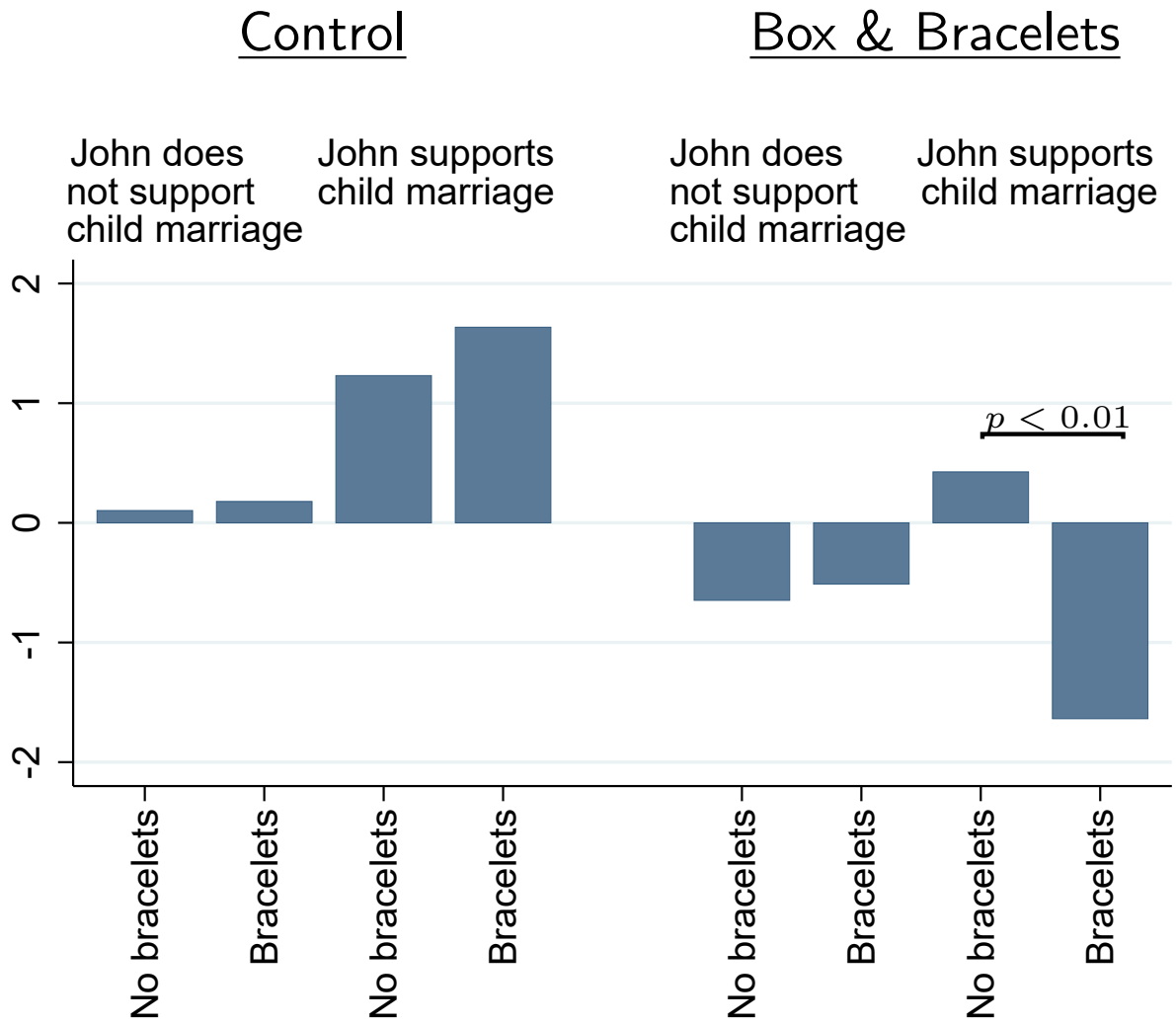
Does a New Signaling Strategy weaken the signal?

Effect of Engaging in Traditional Practices and Wearing Bracelets on Summary Measure of Public Image: **[Prevalence$_v$ = 0]**



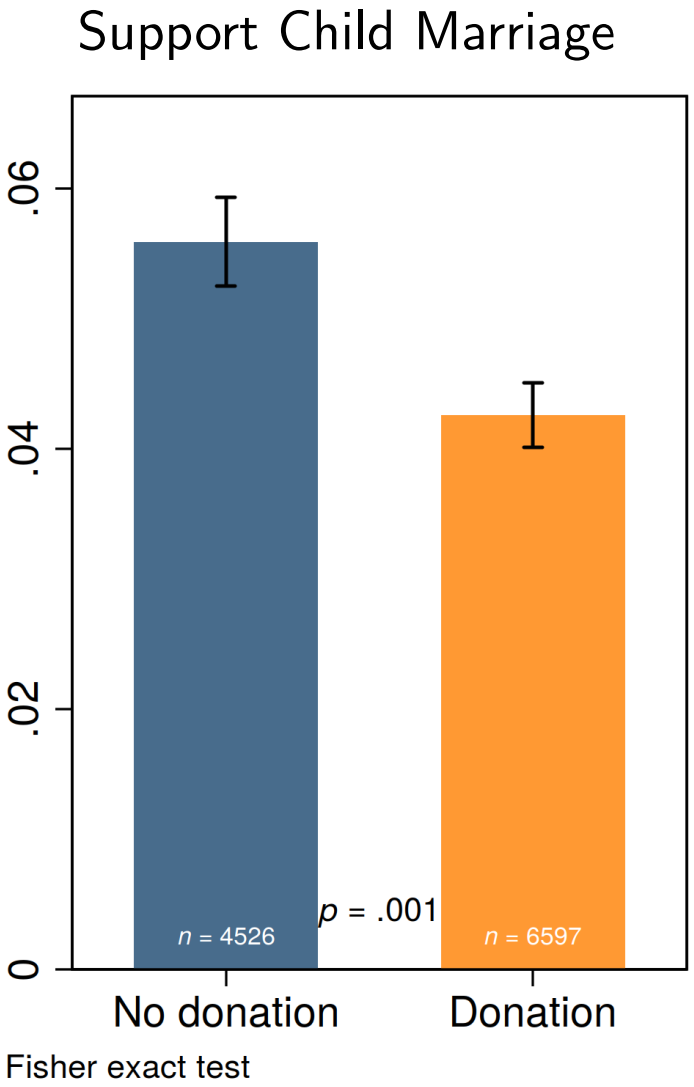
Does a New Signaling Strategy weaken the signal?

Effect of Engaging in Traditional Practices and Wearing Bracelets on Summary Measure of Public Image: **[Prevalence$_v$ = 1]**

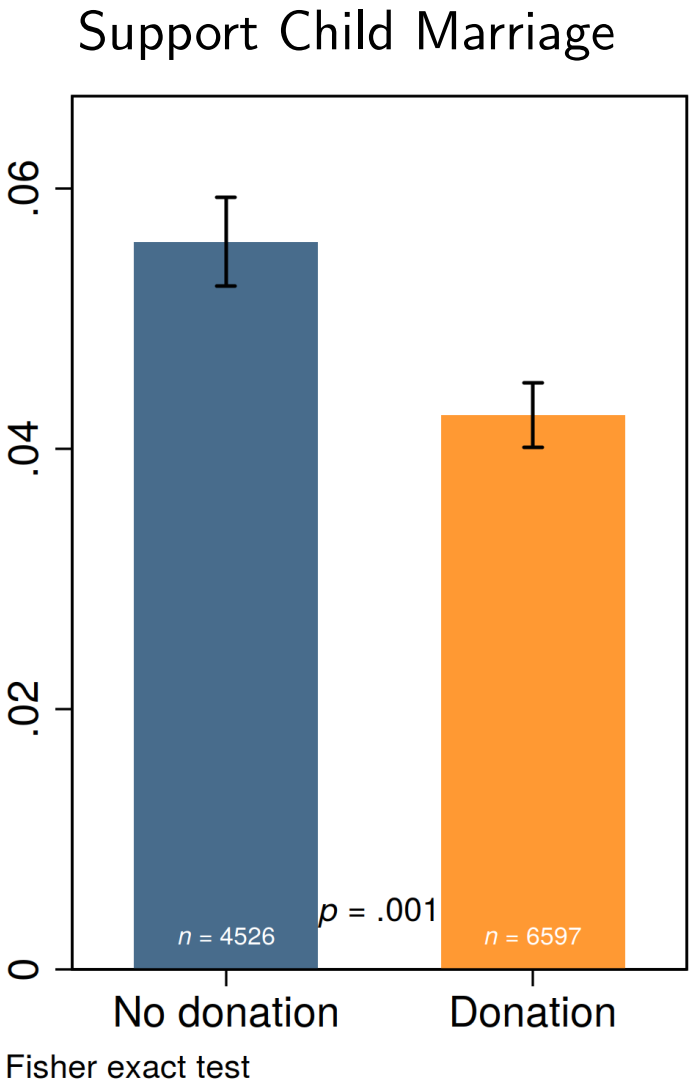


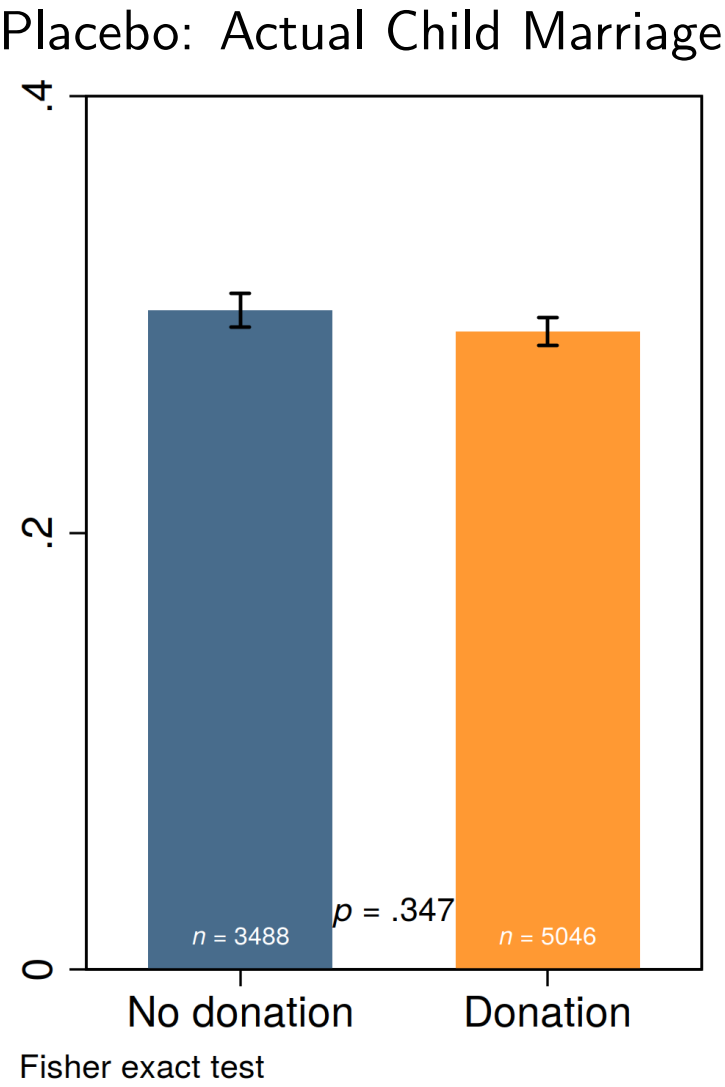
Effect on attitudes towards child marriage

Effect on attitudes towards child marriage



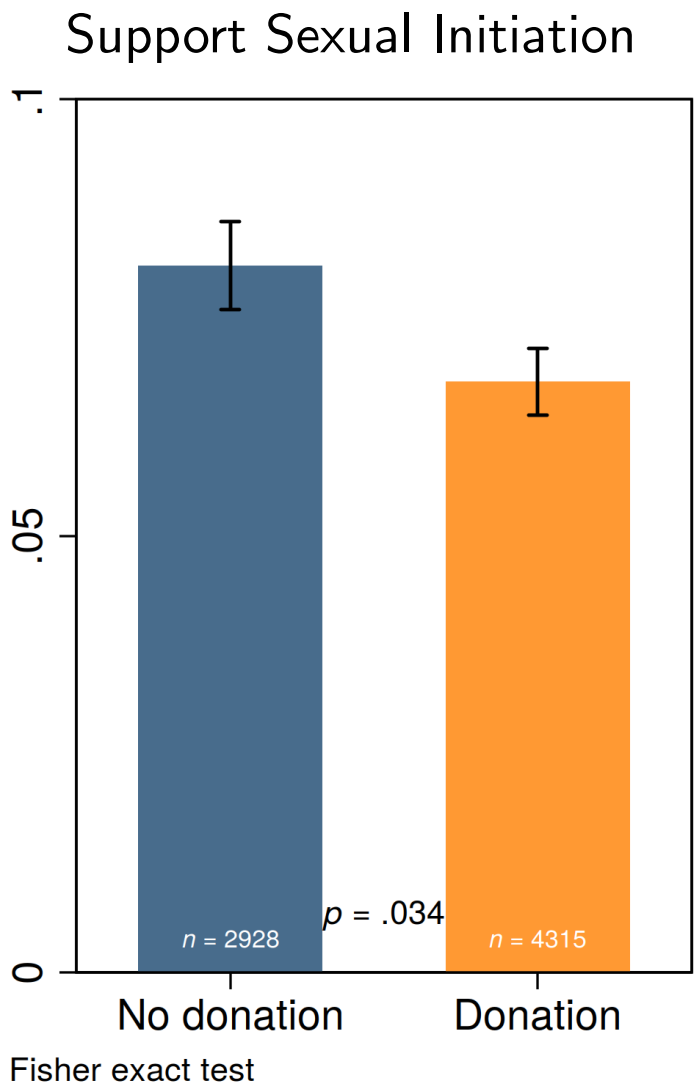
Effect on attitudes towards child marriage



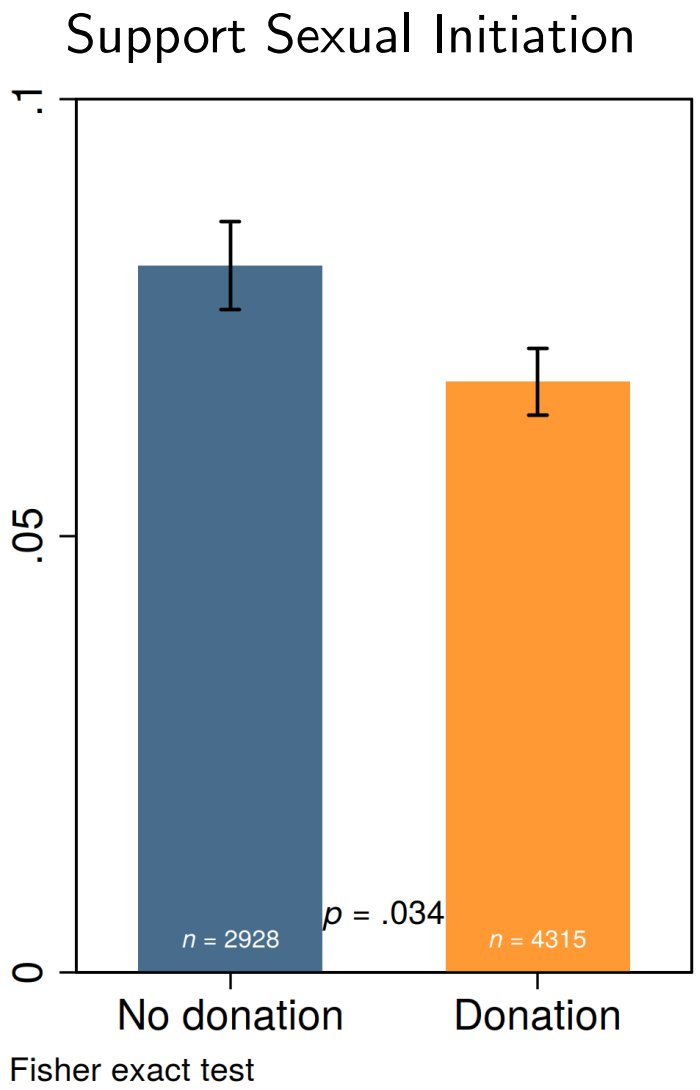


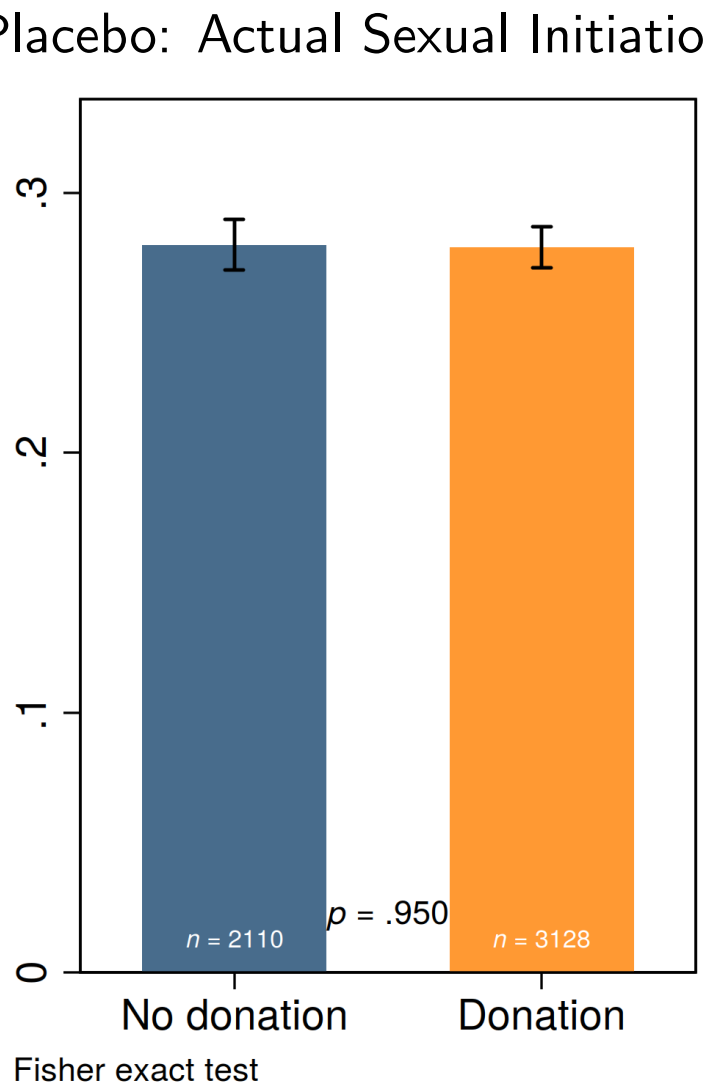
Effect on attitudes towards sexual initiation rituals

Effect on attitudes towards sexual initiation rituals



Effect on attitudes towards sexual initiation rituals





Heterogeneous effects on attitudes

- Effects are stronger for households with girls at the relevant age
  Child marriage Initiation rituals
- Effects are stronger for female respondents
  Child marriage Initiation rituals
- Effects are stronger for high-prevalence villages
  Child marriage Initiation rituals
- Effects are stronger if following traditions was reason behind own marriage Child marriage

Targeting: Do local elites matter?

Local elites have incentives to reinforce existing traditions that give them power (Alatas et al., 2012; Basurto, Dupas and Robinson, 2017)

- Chiefs control some traditions but not others

  Chiefs are in charge of initiation rituals but not marriages

- Social norms' change is not blocked when chiefs *do not control* existing traditions. Change is blocked when they *control* them *unless they are in charge* of the process of norms' change

  Child marriage vs. initiation rituals

- Consistent with chiefs disliking current traditions but holding on to them out of desire for control

  Self-esteem intervention

Concluding remarks (1 of 2)

- We document that individuals engage in harmful traditional practices at least partly out of public image concerns.
- Simple alternative signals decrease the signaling value of harmful traditions – consistent with a new pooling equilbrium – and reduce favorable attitudes towards child marriage and sexual initiation rituals by 20-30%.
- We extend the literature on the drivers of social norms by providing evidence for a new mechanism. Incidentally, this might help explain the puzzle of why the prevalence for harmful traditions has been falling at fast paces worldwide (from DHS surveys): the rise of urbanization and higher density in Africa has been presumably accompanied by the emergence of institutions that make such societies less trust-intensive.

Concluding remarks (2 of 2)

- Our findings inform interventions that should be cross-cutting across multiple norms – rather than norm-specific, as in the case of edu-tainment or informational treatments –, similar to the effects of education or CCTs, but presumably much cheaper and easy-to-scale.

- We also show that social signaling interventions (e.g. Karing, 2018; Karing and Karim, 2018) can have effects above and beyond the specific domain that they target.

- Last, our findings qualify the role of local elites in mediating those effects, shedding light on the conditions under which those should be targeted as facilitators to avoid the risk that the intervention backfires.

Appendix

Literature: mechanisms for adherence to social norms

Intrinsic motivations: Vogt et al. (2016): FGM/C in Sudan; La Ferrara, Chong and Duryea (2012): family size in Brazil; Kearney and Levine (2015): early pregnancy in the US.

Extrinsic motivations: Vogt et al. (2016): FGM/C in Sudan; Corno and Voena (2016), Corno, Hildebrandt and Voena (2017), Ashraf, Bau, Nunn and Voena (2019): child marriage in Tanzania, India, Africa and Indonesia.

Beliefs: Mackie and LeJeune (2009): coordination game, basis for UNICEF's public declarations; Bursztyn, Gonzalez, and Yanagizawa-Drott (2018): pluralistic ignorance about female labor market participation in Saudi Arabia.

- Interventions based on those mechanisms are domain-specific: each practice must to be targeted separately.

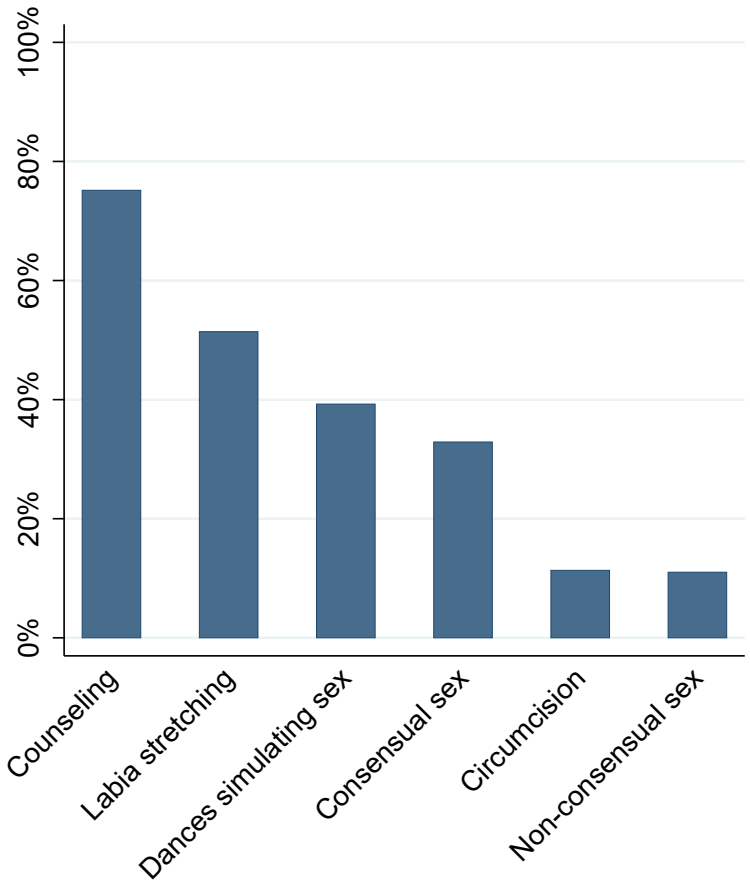
Signaling: (Bénabou and Tirole, 2006): model of investment in public goods to build up public image, not explored in the context of harmful social norms; Burztyn et al. (2018): platinum card in the US; Karing (2018): bracelets to boost immunization.

- If signaling to build up public image is an additional mechanism, providing alternative strategies to signal may cut across domains.

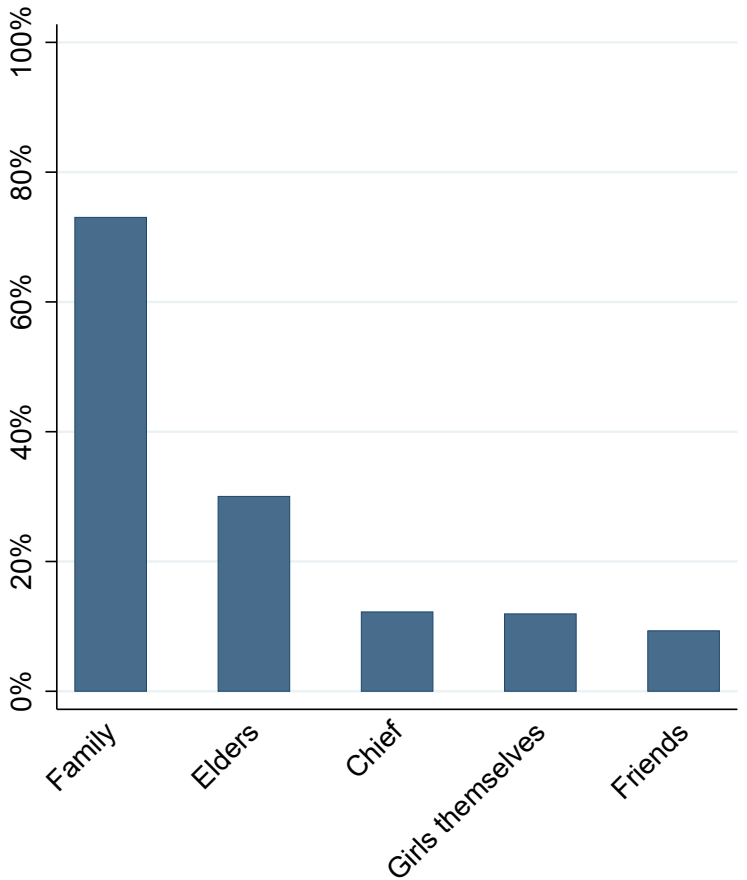
Back

Girls' sexual initiation rituals

Activities



Decision-makers



Back

Imperfect Compliance

Village-level RCT (5 weeks prior): Availability of lower-cost signaling strategy

		Box: Yes	Box: No
Bracelets	Yes	89%	87%
	No	92%	96%

- Focus on Intention to Treat (ITT) and Instrumental Variable (IV) estimates.

Individual-level survey experiment: Adoption of different signaling strategies

		Supports child marriage: Yes	Supports child marriage: No
Wears bracelet	Yes	100%	100%
	No	100%	100%

Back

Balance Tests: RCT

Variable	B&B	Box	Bracelets	Control
Urban	0.184	0.195	0.187	0.185
	(0.388)	(0.397)	(0.390)	(0.388)
Village size	115.394	116.723	115.619	116.593
	(31.996)	(30.304)	(32.133)	(30.468)
Number of surveyed HH	18.414	18.550	18.438	18.160
	(1.552)	(1.497)	(1.854)	(2.133)
Distance to neighbor	0.024	0.024	0.025	0.021
	(0.016)	(0.017)	(0.022)	(0.016)
Female	0.589	0.587	0.568	0.589
	(0.492)	(0.492)	(0.495)	(0.492)
Age	37.712	37.621	37.896	37.721
	(16.071)	(16.298)	(16.703)	(16.010)
Food spending*	3.663	3.767	3.724	3.875
	(2.586)	(2.667)	(2.580)	(2.605)
Non-food spending†	2.480	2.443	2.501	2.388
	(2.402)	(2.274)	(2.327)	(2.240)
Household size	5.079	5.142	4.969	5.099
	(2.138)	(2.046)	(1.967)	(2.120)
Observations	5,052	5,197	3,802	3,722

Balance Tests: Survey Experiments

Variable	Child marriage	Control
Female	0.585	0.590
	(0.493)	(0.492)
Age	34.658	35.129
	(16.668)	(16.705)
Food spending	3.726	3.786
	(2.592)	(2.648)
Non-food spending‡	2.430	2.468
	(2.264)	(2.320)
Household size§	5.031	5.047
	(2.012)	(2.095)
Observations	4,019	3,990

Back

Details of the intervention

- **Box and bracelets:** bracelets are distributed to the top-10 households most likely to support others in need (according to the chief). For all others, bracelets can be obtained in exchange for 2kg of maize (to be donated to the poorest in the village).
- **Only Box:** same as above, but no bracelets are distributed.
- **Only Bracelets:** Top-10 households most likely to support others in need are listed but bracelets are distributed at random to 10 households. For all others, bracelets are sold for a price equivalent to 2kg of maize (the money is pocketed by a local villager managing bracelets).
- **Pure Control:** Top-10 households most likely to support others in need are listed.

Back

Details of the survey experiment

- Art produced by Malawian talent, and widely recognized in focus groups as evidence of favorable attitudes to child marriage (Harmful John) or against child marriage (Harmless John).
- Each scene is accompanied by a short story, read by the enumerator:

"I would now like to introduce John to you. John is a farmer. He has been married for a long time to his wife Melina. Together, they have 4 children - 3 boys and 1 girl. The family lives in a small house that they built themselves. The girl is now 14 years old. Last year, after she had her first period, the family decided that she would [not] attend the initiation ceremonies in her village. [John does not think his daughter is ready to get married yet but would prefer if she waited for some more years. On this picture you can see John, next to his daughter, eating together.] John now considers her a grown up woman and encourages her to get married soon. On this picture you can see John, next to his daughter, when she gets married."

Back

Estimation: Is Harming a Signal?

Since social norms vary across villages, we allow treatment effects to vary by support to child marriage:

$$\begin{aligned} Y_{ihv}^{k} = \; & \alpha + \beta \text{HarmfulJohn}_h \times \text{Support}_v \\ & + \gamma \text{HarmfulJohn}_h + \; \delta \text{Support}_v + \epsilon_{ihv} \end{aligned}$$

- i: individual; h: household; v: village
- Y_{ihv}^{k}: dimension of John's public image
- Z_{ihv}: summary measure; $Z_{ihv} = \sum_k \left(\frac{Y_{ihv}^{k} - \overline{Y^k}}{\sigma_{Y^k}} \right)$

- Standard errors are clustered at the village level
- We are interested in testing $\beta = 0$

Back

Estimation: New Signaling Strategy ▶ Weakens the Signal?

We estimate the following equation separately for each cell, T:

$$\begin{aligned} Y^k_{ihvt} = \; & \alpha^T + \beta^T \text{HarmfulJohn}_h \times \text{Support}_v \times \text{Bracelet}_t \\ & + \gamma^T \text{HarmfulJohn}_h \times \text{Bracelet}_t + \delta^T \text{Support}_v \times \text{Bracelet}_t \\ & + \eta^T \text{HarmfulJohn}_h \times \text{Support}_v + \mu^T \text{HarmfulJohn}_h \\ & + \zeta^T \text{Bracelet}_t + \epsilon^T_{ihvt} \end{aligned}$$

- i: individual; h: household; v: village; $t = 1$ when John wears bracelet, and 0 otherwise
- $T \in$ B&B, Box, Bracelet, Control
- Y^k_{ihv}: dimension of John's public image
- Z_{ihv}: summary measure; $Z_{ihv} = \sum_k \left(\frac{Y^k_{ihv} - \overline{Y^k}}{\sigma_{Y^k}} \right)$

▶ Standard errors clustered at the village level

▶ We are interested in testing $\gamma^{B\&B} > \gamma^{T'}$ and $\beta^{B\&B} < \beta^{T'}$, for $T' \neq B\&B$

Estimation: New Signaling Strategy ▶ Changes Attitudes?

$$Y_{ihv}^{k} = \alpha + \beta \text{B\&B}_{v} + \gamma \text{Box}_{v} + \delta \text{Bracelet}_{v} + \epsilon_{ihv}$$

- i: individual; h: household; v: village
- Y_{ihv}^{k}: favorable attitudes towards harmful practice (child marriage or sexual initiation)

- Standard errors clustered at the village level
- We are interested in testing $\beta = 0$ and $\beta \leq \gamma, \delta$

Does Supporting Child Marriage Improve Public Image?

Dependent variable:	Summary Measure	Altruism	Negative Reciprocity	Positive Reciprocity	Trustworth.
Harmful John × Share	0.871***	1.028**	-0.529	0.945*	2.041***
	(0.302)	(0.494)	(0.444)	(0.507)	(0.491)
Harmful John	-0.403***	-0.474***	0.200***	-0.415***	-0.921***
	(0.0239)	(0.0354)	(0.0335)	(0.0375)	(0.0368)
Observations	8,006	8,006	8,006	8,006	8,006
Clusters	412	412	412	412	412
Village Fixed Effects	✓	✓	✓	✓	✓

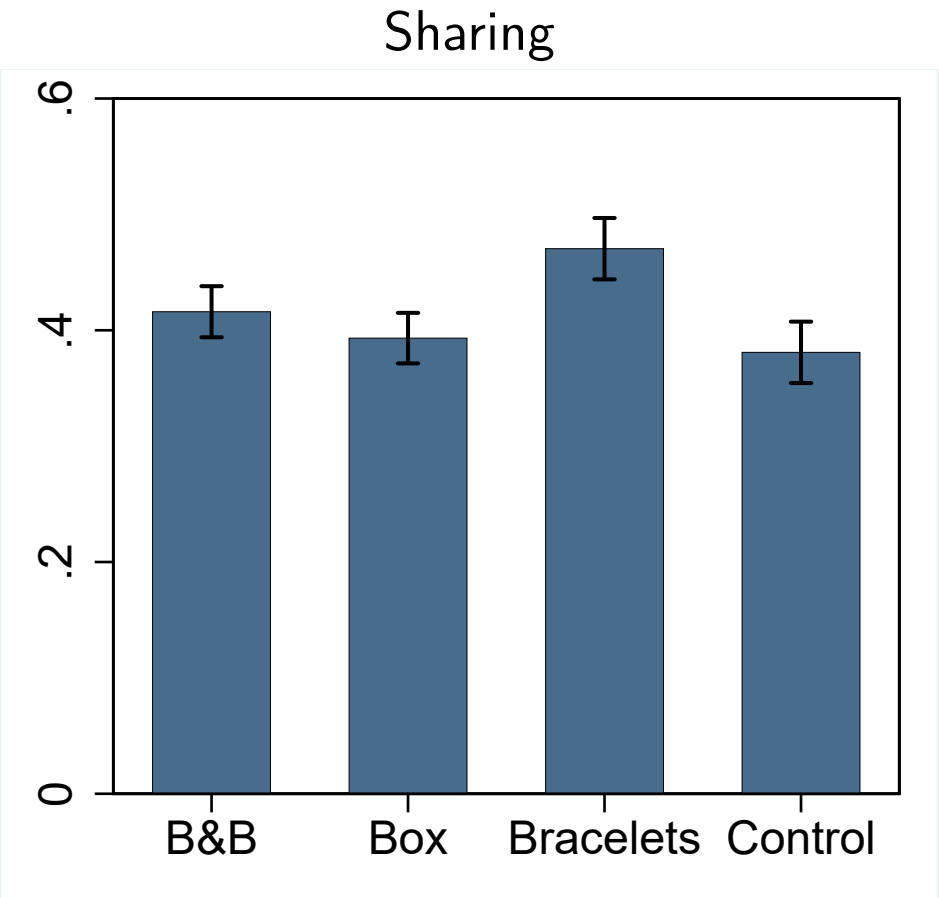
Standard errors clustered at the village level in parentheses

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

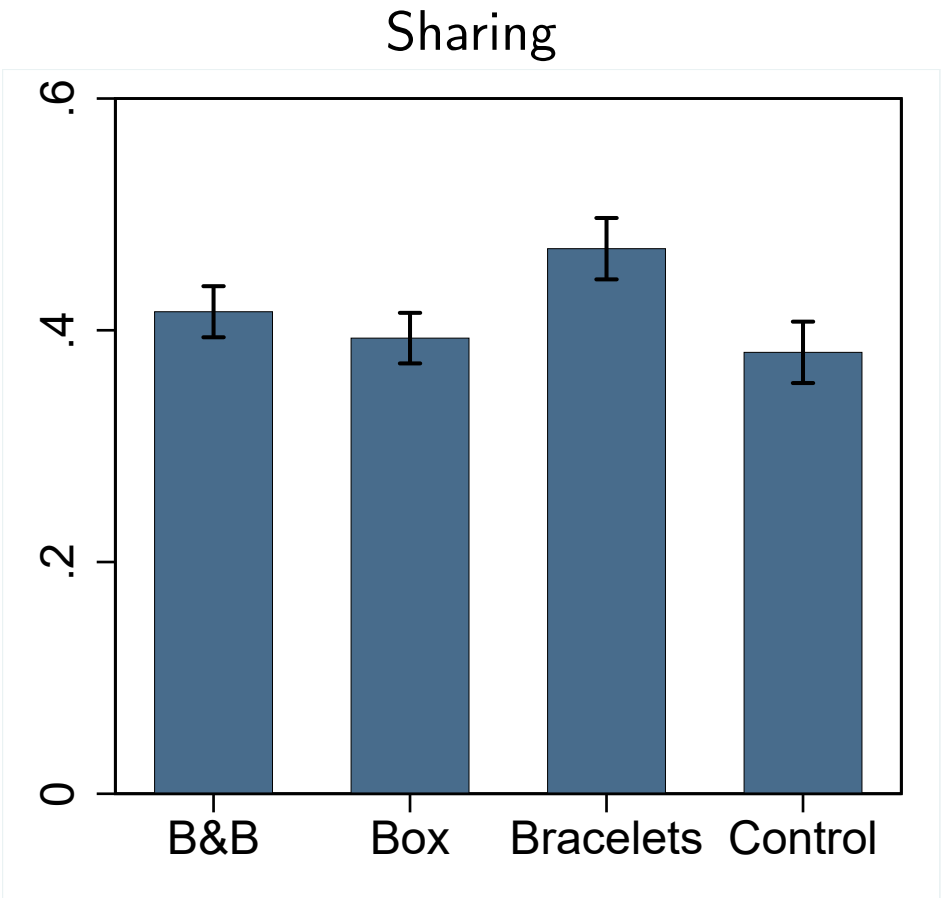
Back

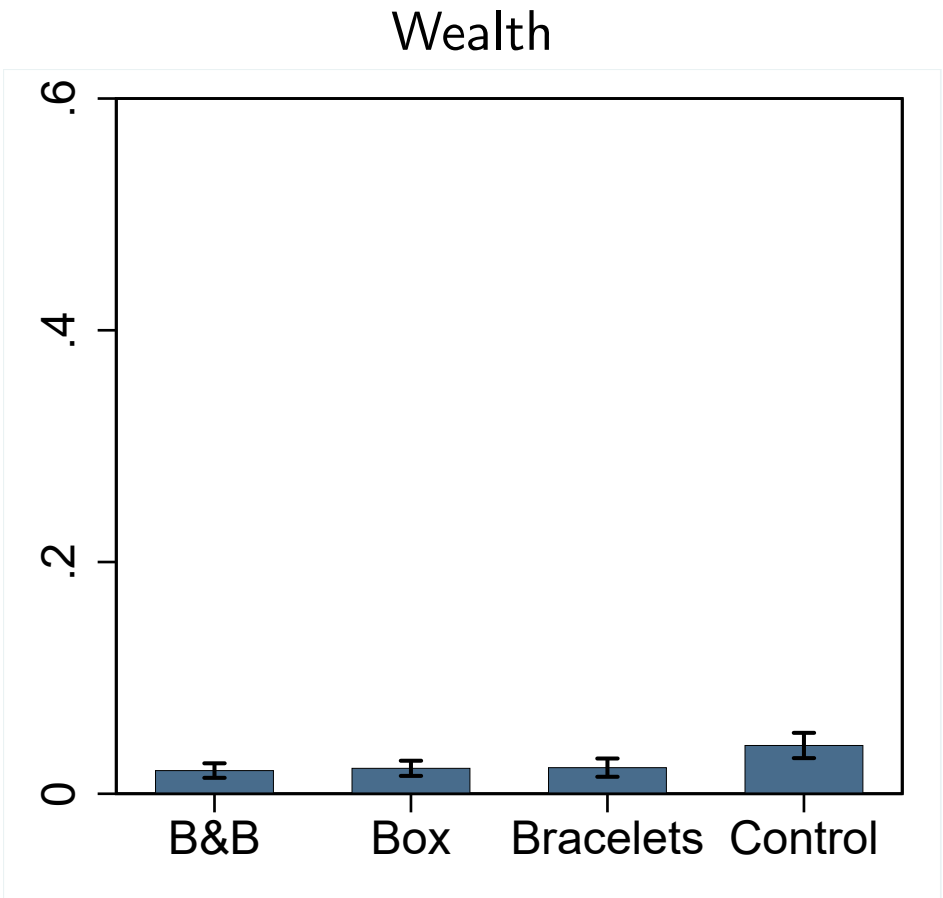
Manipulation check: what do food collections stand for?

Manipulation check: what do food collections stand for?



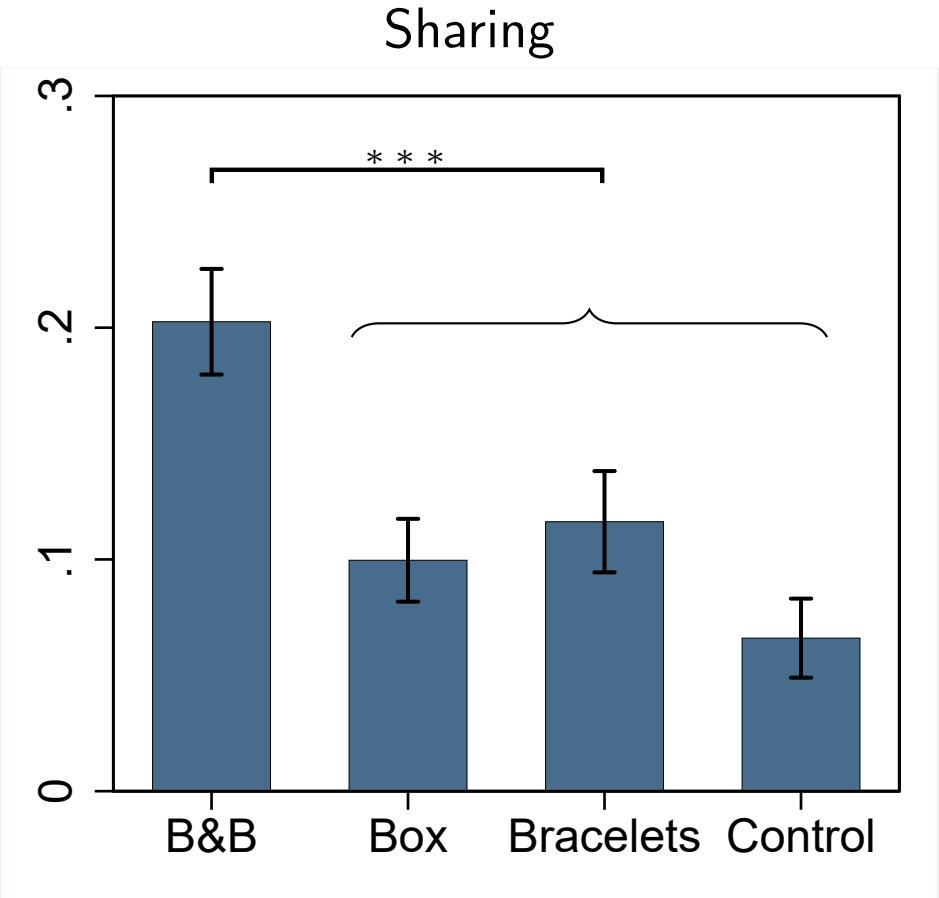
Manipulation check: what do food collections stand for?





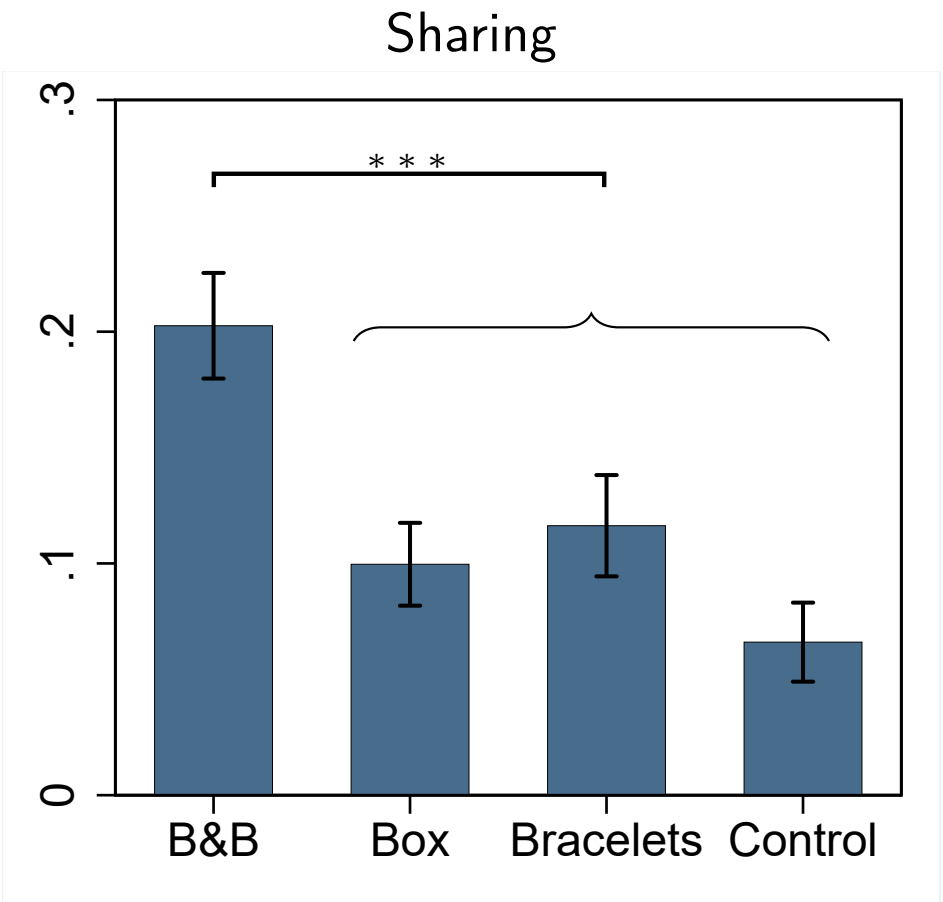
Manipulation check: what do rubber bracelets stand for?

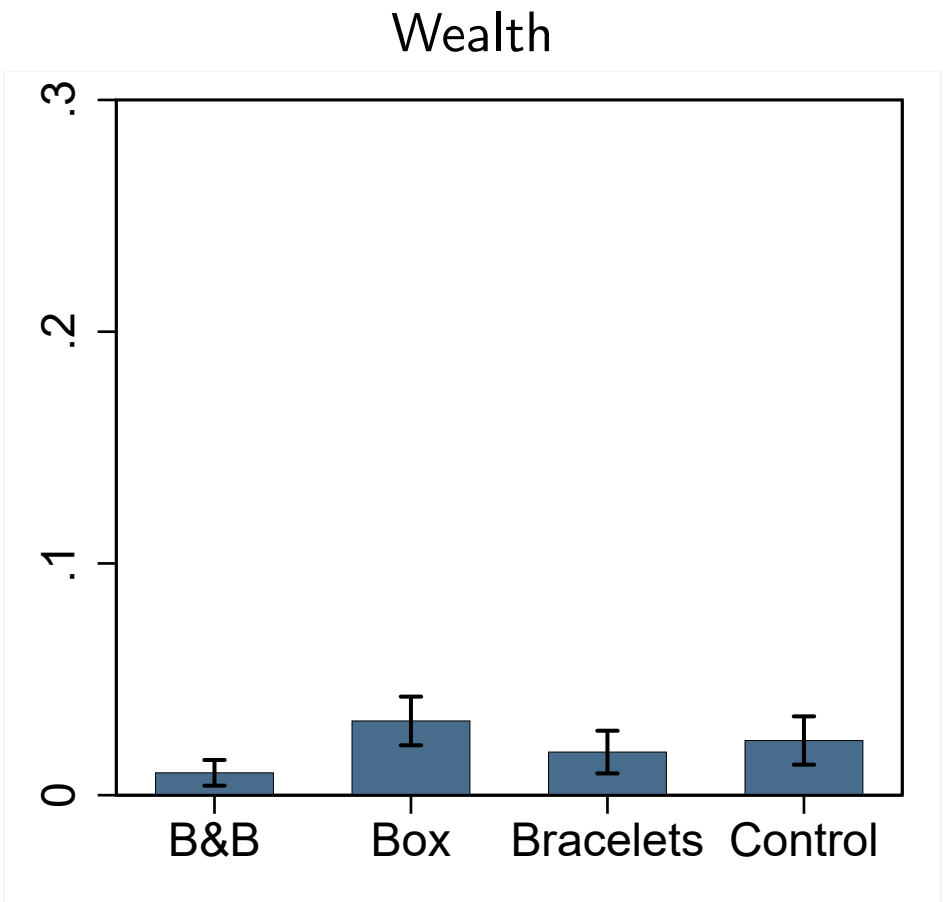
Manipulation check: what do rubber bracelets stand for?



Back

Manipulation check: what do rubber bracelets stand for?





Back

Does a New Signaling Strategy Weaken the Signal?

$$
\begin{aligned}
Y_{ihvt} = \alpha_i &+ \eta_1 \text{John}_h \times \text{Share\_childmarriage}_v \times \text{Bracelet}_t \\
&+ \eta_2 \text{John}_h \times \text{Bracelet}_t + \eta_3 \text{Share\_childmarriage}_v \times \text{Bracelet}_t \\
&+ \eta_4 \text{Bracelet}_t + \epsilon_{ihvt},
\end{aligned}
$$

Results are robust to:

- Replacing $\text{Share\_childmarriage}_v$ with Support_v (favorable attitudes towards child marraige).

Does a New Signaling Strategy Weaken the Signal?

Dependent variable: Perceived reputation of John (joint measure)	(i) B&B	(ii) Box	(iii) Bracelets	(iv) Control
John supports child marriage × Share married < 15 × Bracelet	-2.469*** (0.835)	-0.847 (0.808)	1.180 (0.714)	0.253 (0.562)
John supports child marriage × Bracelet	0.270*** (0.0502)	0.0798** (0.0376)	0.0371 (0.0412)	0.0754* (0.0419)
Share married < 15 × Bracelet	0.126 (0.538)	0.378 (0.621)	-0.702 (0.478)	0.0986 (0.477)
Bracelet	0.00995 (0.0283)	-0.0360 (0.0274)	0.0549* (0.0320)	-0.0228 (0.0318)
Observations	4,626	4,680	3,400	3,300
Clusters	117	118	88	89
Individual Fixed Effects	✓	✓	✓	✓

Standard errors clustered at the village level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Note that this analysis exploits the within subject design, absorbing individual fixed effects and consequently does not rely on further individual and village-level controls, thus explaining the larger sample size.

Back

Pre-determination of child marriage share in village

Dependent variable:	(i) Share married < 15
B&B	-0.00482
	(0.00803)
Box	-0.00953
	(0.00773)
Bracelets	-0.00544
	(0.00867)
Constant	0.0568***
	(0.00637)
F-test B&B=Box	0.513
p-value	0.474
Observations	8,009
Clusters	412

Standard errors clustered at the village level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Back

Effect of Intervention on Chief's Prediction Accuracy

We estimate the following linear regression model in order to compare prediction accuracy between arms of the signaling treatment:

$$Z_{ihv} = \beta_0 + \beta_1 \mathsf{C}_{ihv} \times \mathsf{Donation}_v + \beta_2 \mathsf{C}_{ihv} + \beta_3 \mathsf{Donation}_v + \epsilon_{ihv}$$

- i: individual; h: household; v: village
- Z_{ihv}: Individual's self-reported summary measure; $Z_{ihv} = \sum_k \left(\frac{Y^k_{ihv} - \overline{Y^k}}{\sigma_{Y^k}} \right)$
- C_{ihv}: Chief's prediction of summary measure; $C_{ihv} = \sum_k \left(\frac{X^k_{ihv} - \overline{X^k}}{\sigma_{X^k}} \right)$

- Standard errors are clustered at the village level
- We are interested in testing $\beta_1 = 0$

Effect of Intervention on Chief's Prediction Accuracy

	Summary measure by Individual	Summary measure by Individual
Chief summary measure × Donation	-0.0192	-0.0137
	(0.0878)	(0.0872)
Chief summary measure	-0.0174	-0.0277
	(0.0714)	(0.0724)
Donation	-0.0755	-0.0766
	(0.0754)	(0.0793)
Constant	0.0444	0.0772
	(0.0565)	(0.157)
Observations	802	802
Chief controls		✓

Standard errors clustered at the village level
Reference group: pure control
$^{*}\ p < 0.1,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$

Back

Estimation: New Signaling Strategy ▶ Changes Attitudes?

$$Y_{ihv}^{k} = \alpha + \beta \text{B\&B}_v + \gamma \text{Box}_v + \delta \text{Bracelet}_v + \epsilon_{ihv}$$

- We pre-registered that we would pool the two lower-cost signaling strategies for this analysis:

$$Y_{ihv}^{k} = \alpha + \beta \text{Donation}_v + \epsilon_{ihv}$$

- $\text{Donation}_v = 1$ if $\text{B\&B}_v = 1$ or $\text{Box}_v = 1$, and 0 otherwise
- We are interested in testing $\beta = 0$

Estimation: Average Treatment Effects (on the Treated)

ITT: $Y_{iv} = \alpha_0 + \alpha_1 \text{Donation}_v + \alpha_2 \text{X}_i + \alpha_3 \text{Z}_v + \epsilon_{iv}$

IV:

1^{st} stage:

$\text{Lower-Cost}_v = \beta_0 + \beta_1 \text{Donation}_v + \beta_2 \text{X}_i + \beta_3 Z_v + \zeta_{iv}$

2^{nd} stage:

$Y_{iv} = \gamma_0 + \gamma_1 \widehat{\text{Lower-Cost}_v} + \gamma_2 \text{X}_i + \gamma_3 \text{Z}_v + \xi_{iv}$

- Standard errors clustered at the village level
- i: individual; v: village
- Y: Favorable attitude towards harmful traditional practice
- Donation_v: Village assigned to $B\&B_v$ or Box_v
- Lower-Cost_v: Village actually served by $B\&B_v$ or Box_v
- X_i: Individual controls (Gender and Age)
- Z_v: Village-level controls (Urban, Village size and Population density)

Does a New Signaling Strategy Change Attitudes?

	(1) Child Marriage	(2) Child Marriage (IV)	(3) Initiation	(4) Initiation (IV)
Donation	-0.0131***	-0.0161***	-0.0124	-0.0156*
	(0.00492)	(0.00583)	(0.00796)	(0.00945)
Control mean	0.054		0.077	
Chi^2-test Donation jointly=0, (p)		7.916 (0.0191)		
IV: Chi^2-test Donation jointly=0, (p)		8.539 (0.0140)		
Observations	11,578	11,123	7,523	7,243
Clusters	412	412	412	412
Individual controls	✓	✓	✓	✓
Village-level controls	✓	✓	✓	✓

Standard errors clustered at the village level in parentheses

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

Probit regressions Placebo regressions

Effect of Donation Intervention on Support for Child Marriage/Sexual Initiation (Marginal Effects from Probit)

	(1) Child Marriage	(2) Child Marriage (IV)	(3) Initiation	(4) Initiation (IV)
Donation	-0.0127***	-0.0156***	-0.0126	-0.0159*
	(0.00475)	(0.00570)	(0.00777)	(0.00926)
Control mean	0.054		0.077	
Chi^2-test Donation jointly=0, (p)	8.203 (0.0165)			
IV: Chi^2-test Donation jointly=0, (p)	8.880 (0.0118)			
Observations	12,008	11,553	7,849	7,551
Clusters	412	412	412	412
Individual controls	✓	✓	✓	✓
Village-level controls	✓	✓	✓	✓

Standard errors clustered at the village level in parentheses

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

Back

Donation Intervention (Placebo)

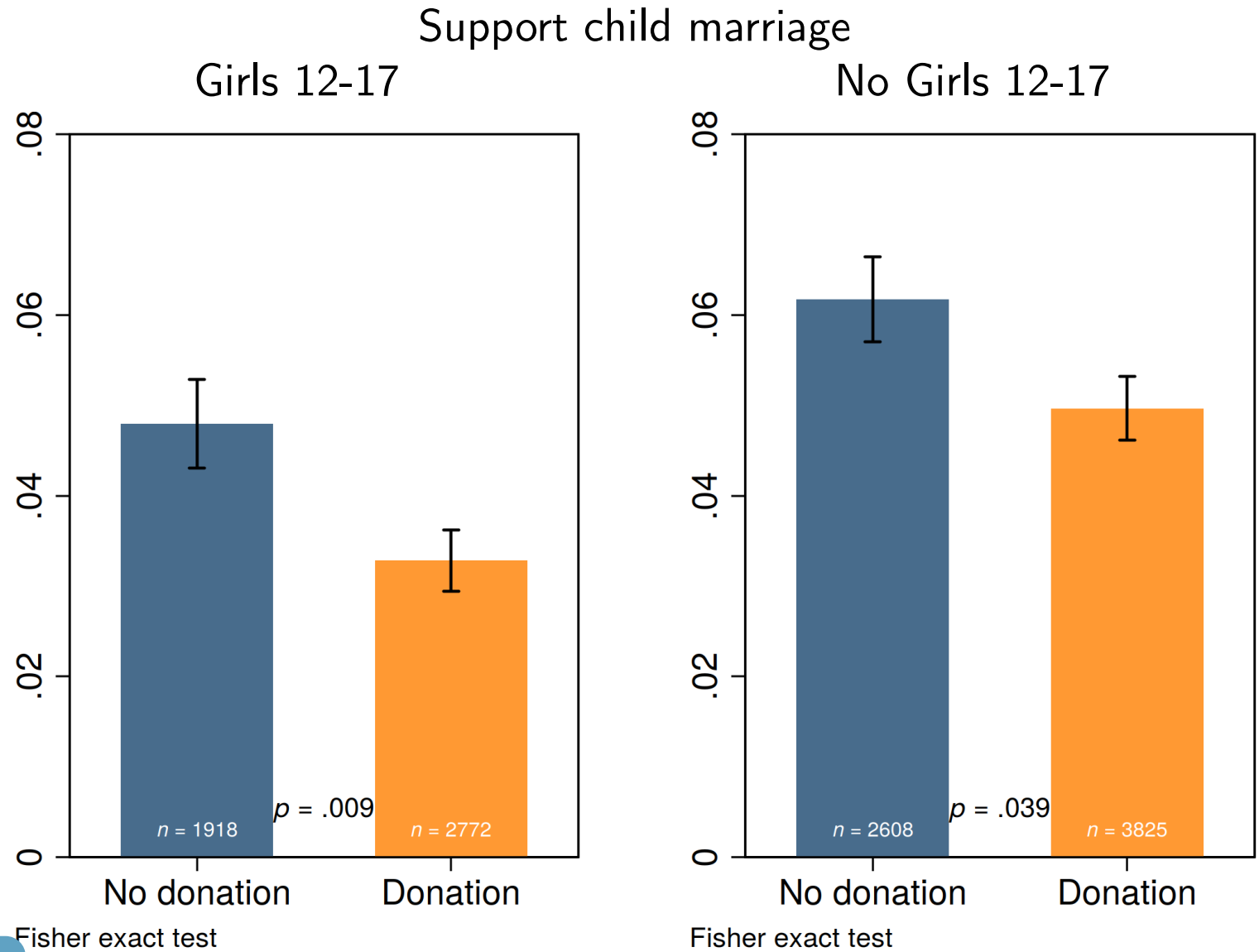
	(1) Child Marriage	(2) Child Marriage (IV)	(3) Initiation	(4) Initiation (IV)
Donation	-0.00877	-0.0108	-0.00112	-0.00118
	(0.0108)	(0.0127)	(0.00156)	(0.00179)
Control mean	0.30		0.27	
Chi^2-test Donation jointly=0, (p)		1.222 (0.543)		
IV: Chi^2-test Donation jointly=0, (p)		1.227 (0.541)		
Observations	8,891	8,534	5,392	5,238
Clusters	412	412	412	412
Individual controls	✓	✓	✓	✓
Village-level controls	✓	✓	✓	✓

Standard errors clustered at the village level in parentheses

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

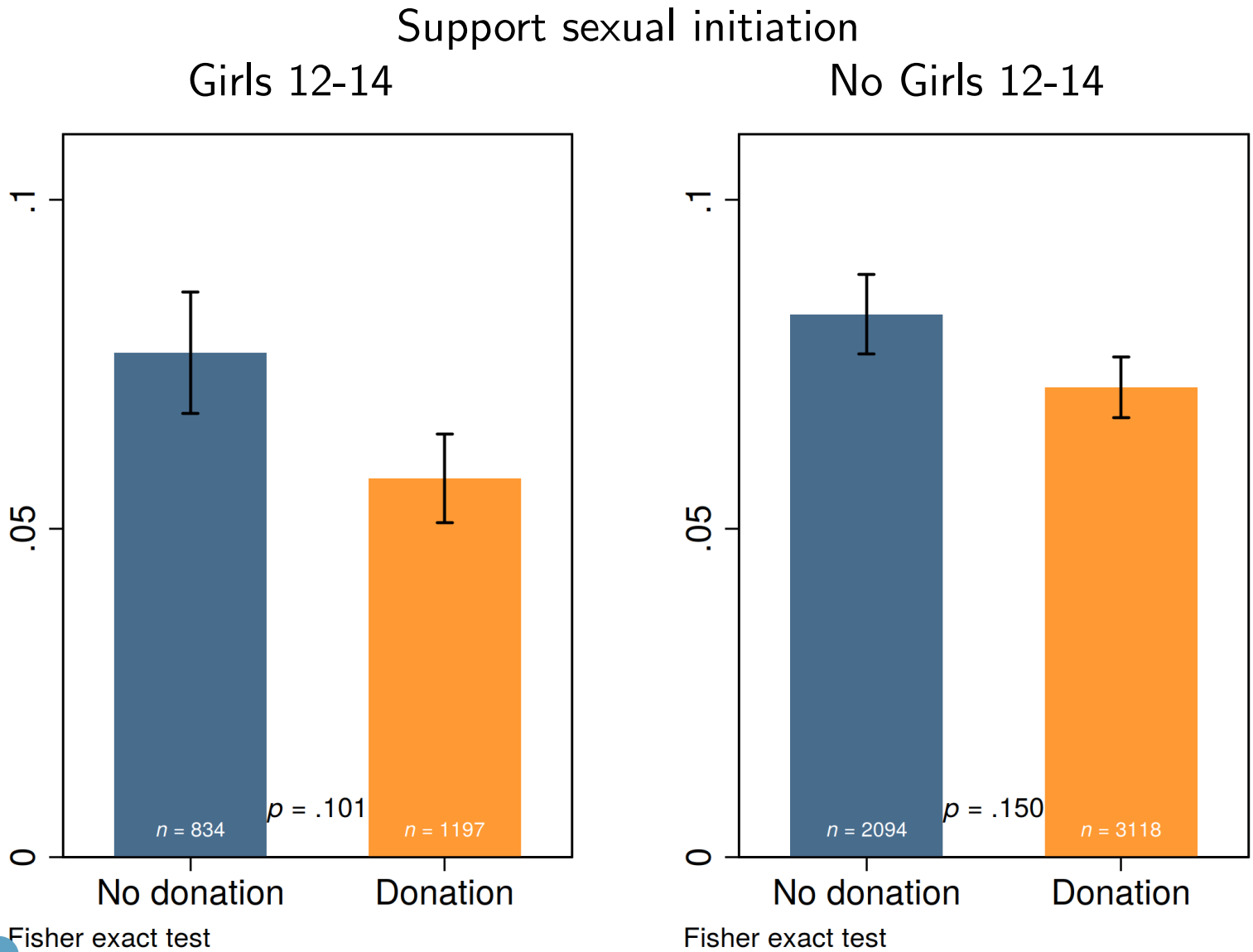
Back

Households with girls: attitudes towards child marriage



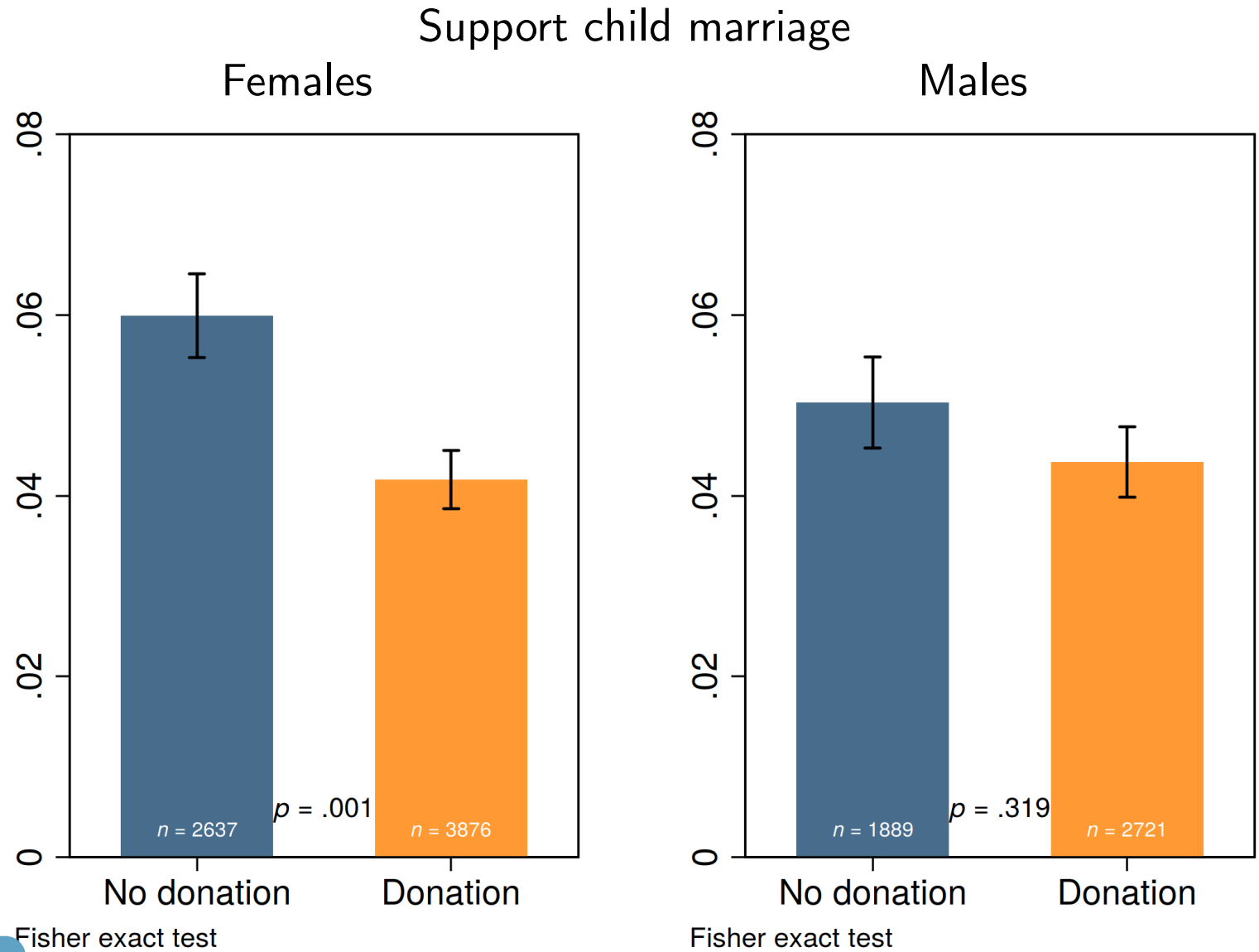
Back

Households with girls: attitudes towards sex. initiation



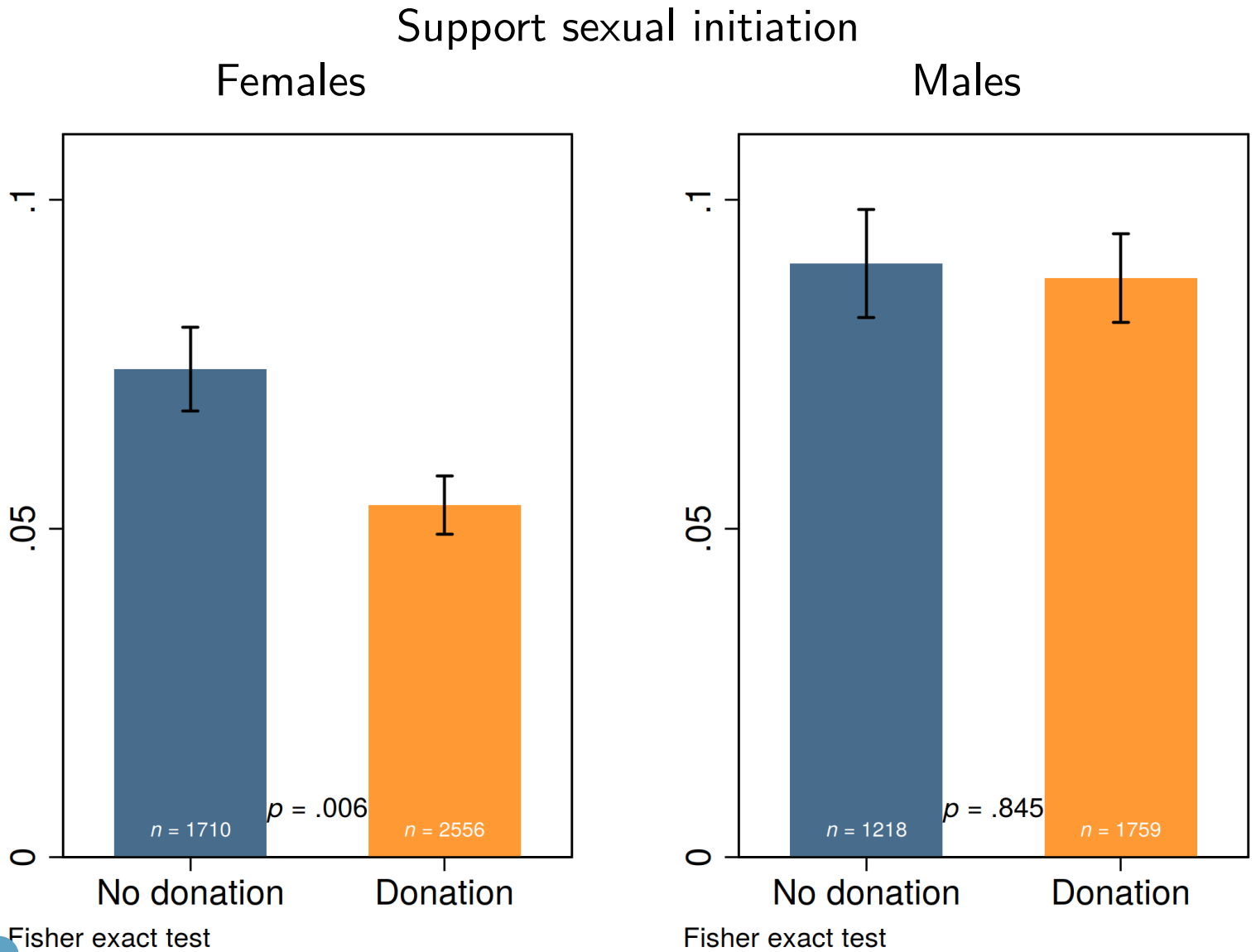
Back

Gender differences: attitudes towards child marriage



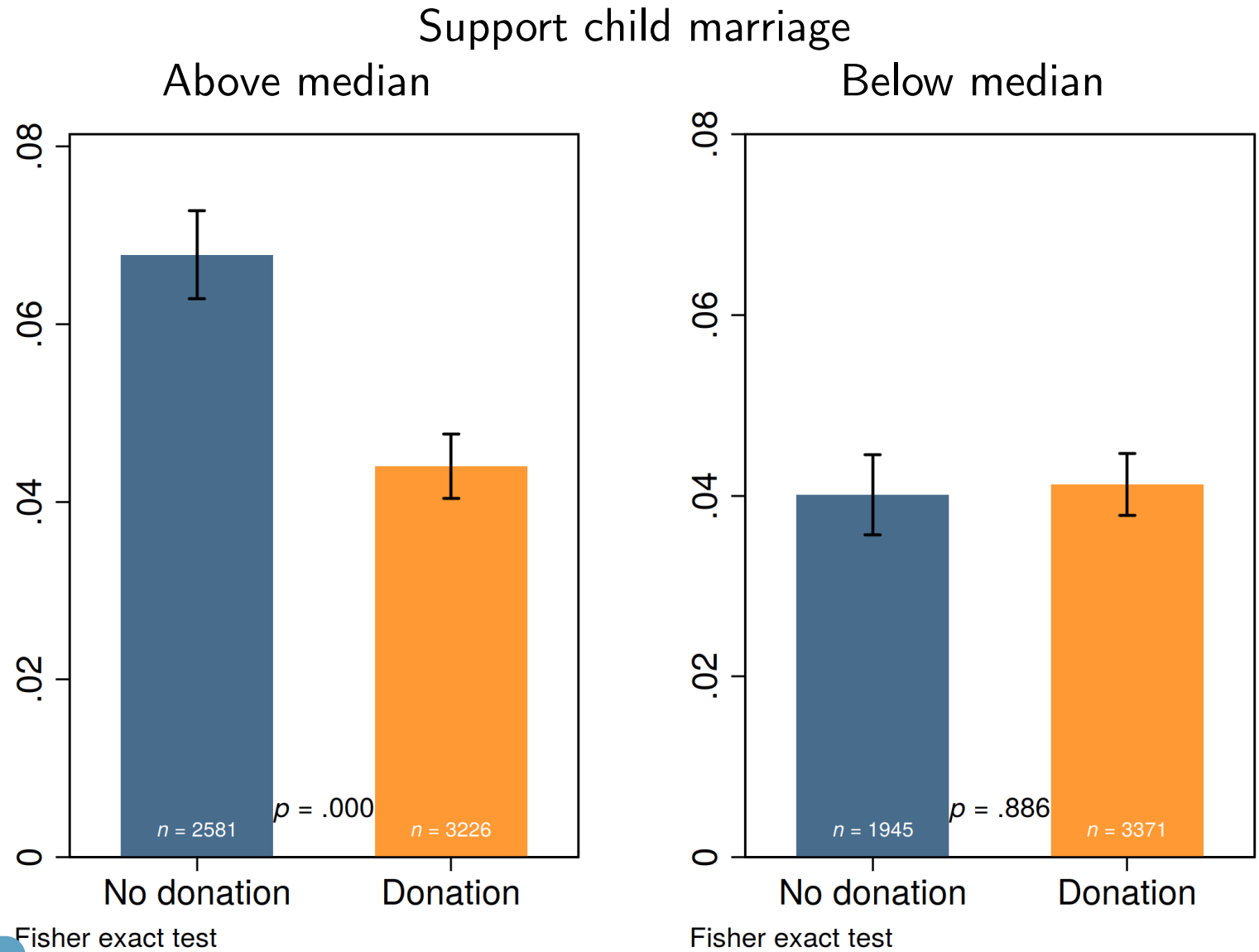
Back

Gender differences: attitudes towards sex. initiation



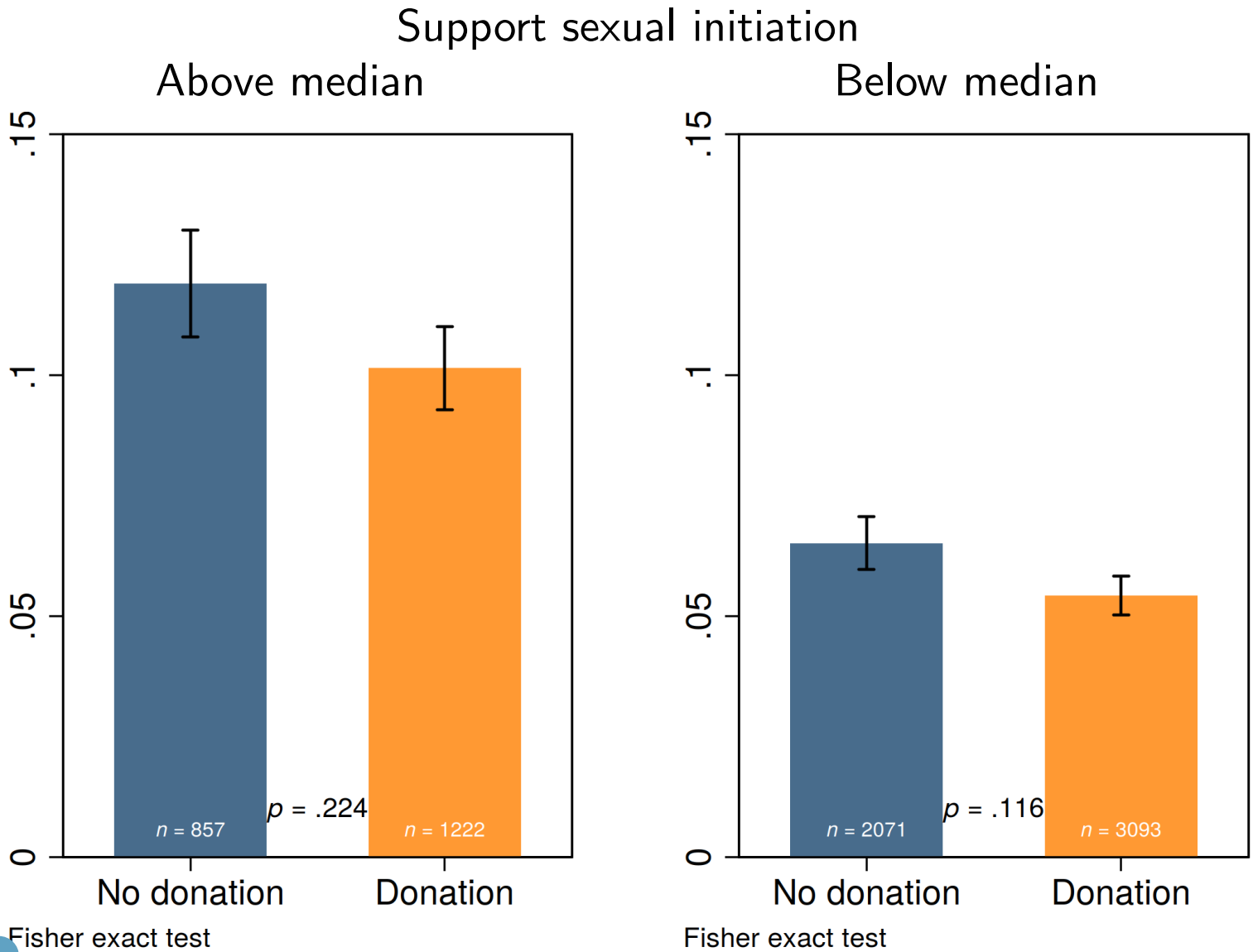
Back

By prevalence: attitudes towards child marriage



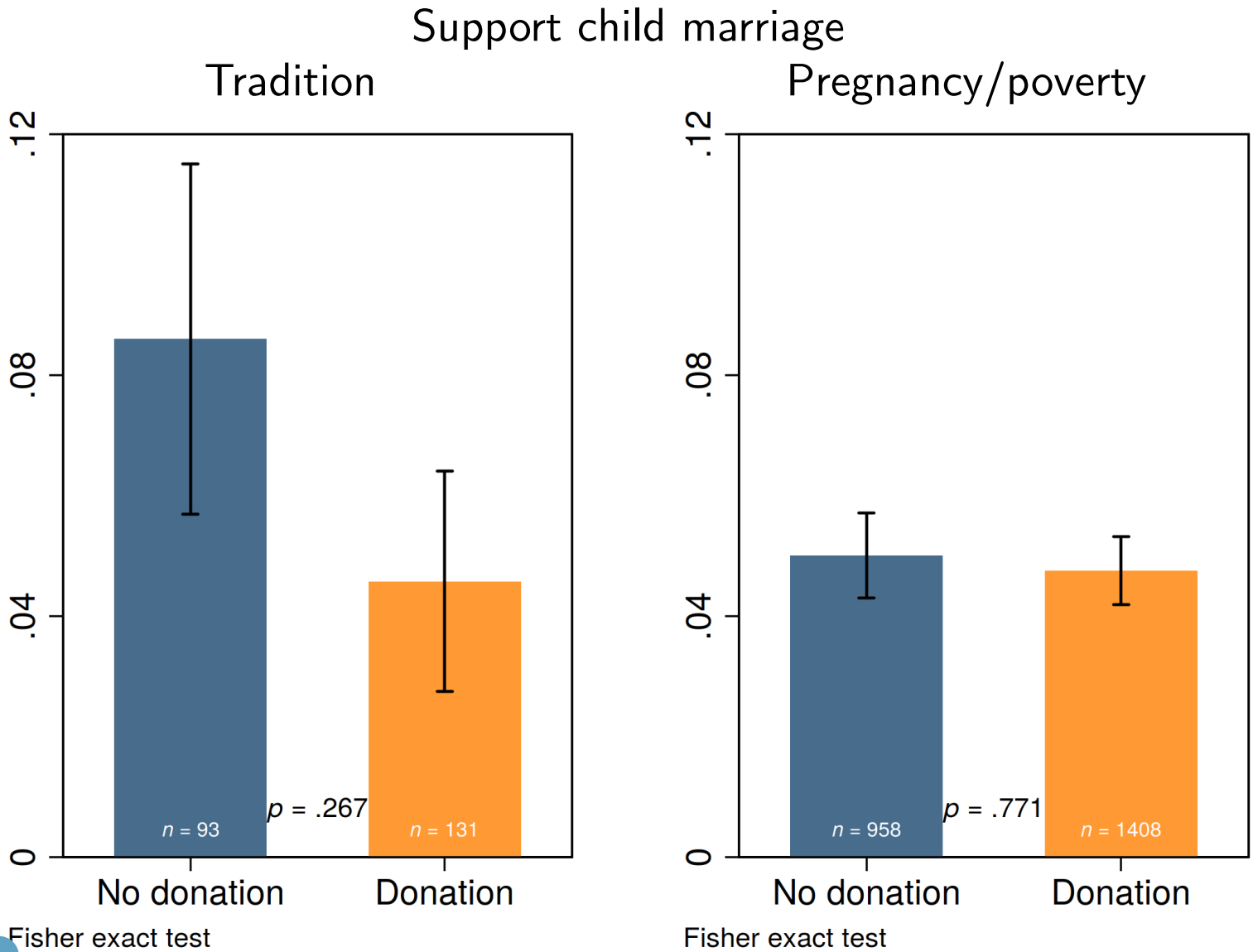
Back

By prevalence: attitudes towards sex. initiation



Back

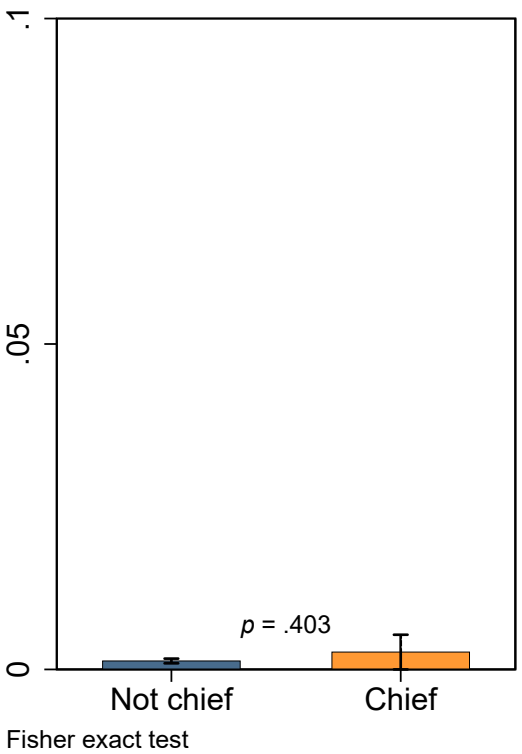
Reason for own marriage: attitudes towards child marriage



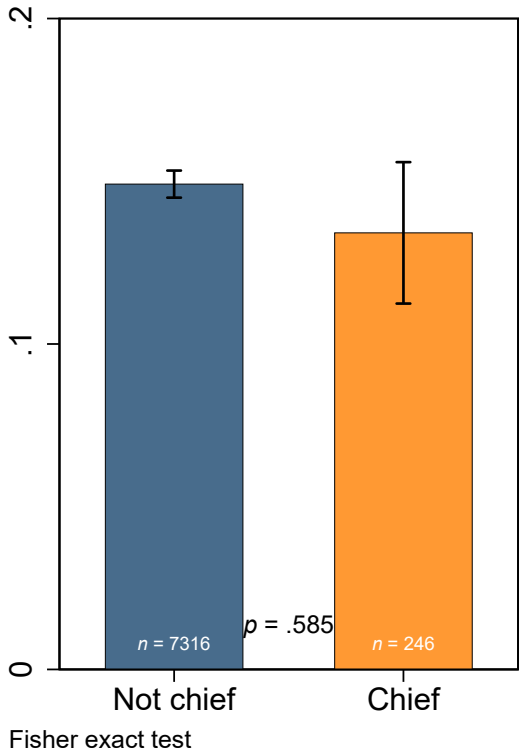
Back

Main decision-makers behind traditions

(A) "Chief is main decision-maker behind child marriage"



(B) "Chief is main decision-maker behind initiation rituals"

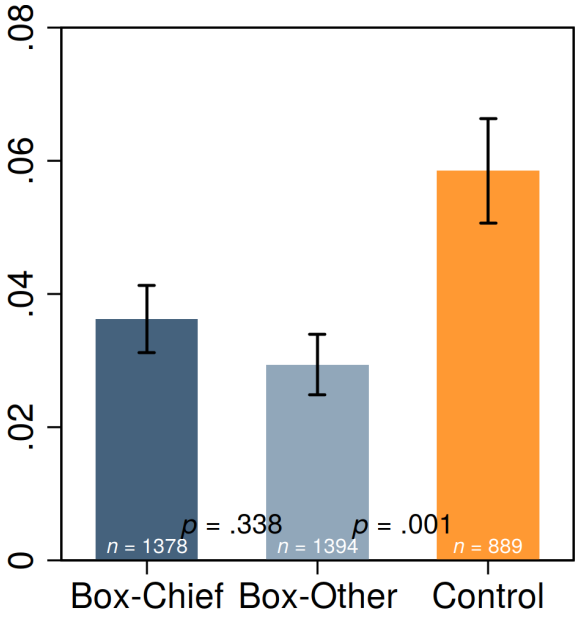


Notes: Share of chiefs (orange bars) and other villagers (blue bars) stating that chiefs are main decision-makers when it comes to child marriage (Panel A) and sexual initiation rituals (Panel B).

Back

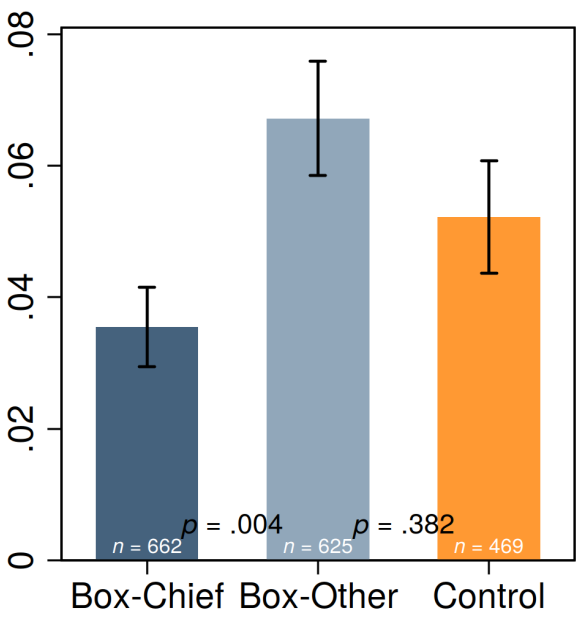
Who is in charge matters

(A) Favorable attitudes towards child marriage



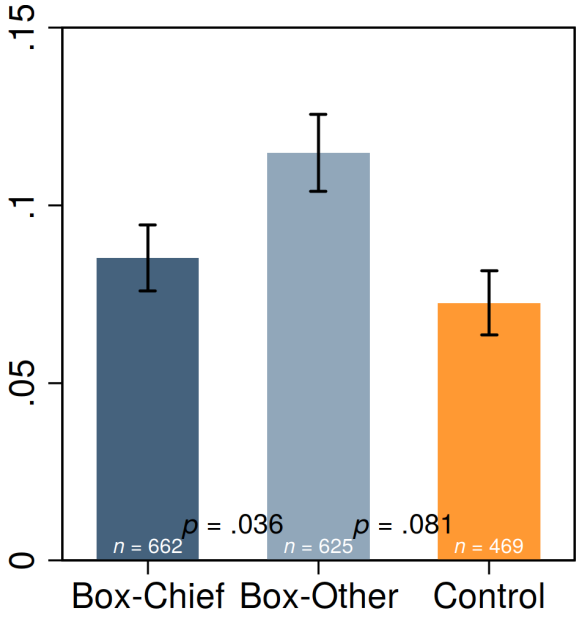
Fisher exact test

(B) Favorable attitudes towards sexual initiations



Asymptotic Wilcoxon rank-sum test

(C) Sexual initiations are not harmful



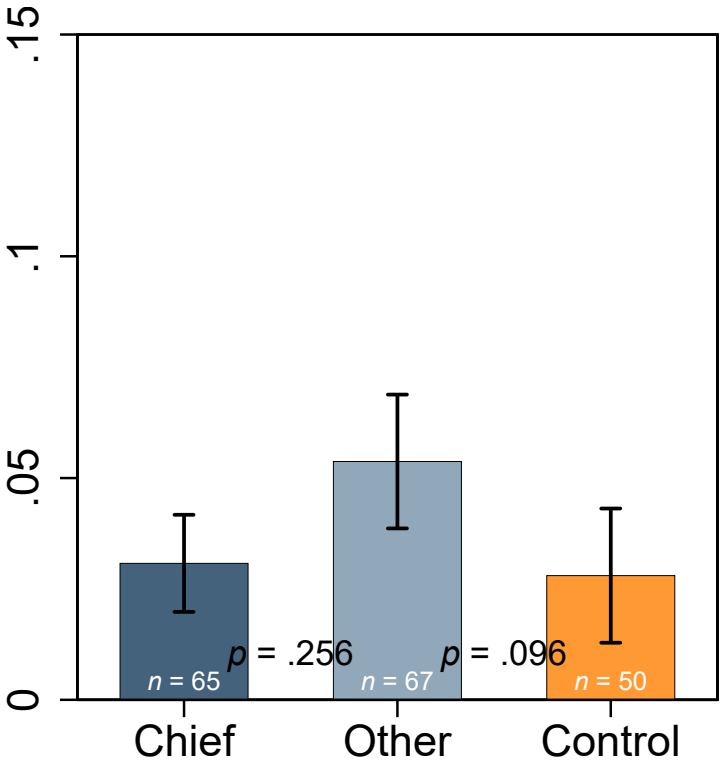
Asymptotic Wilcoxon rank-sum test

Back

Chiefs' self-esteem priming

Chiefs not primed on SE

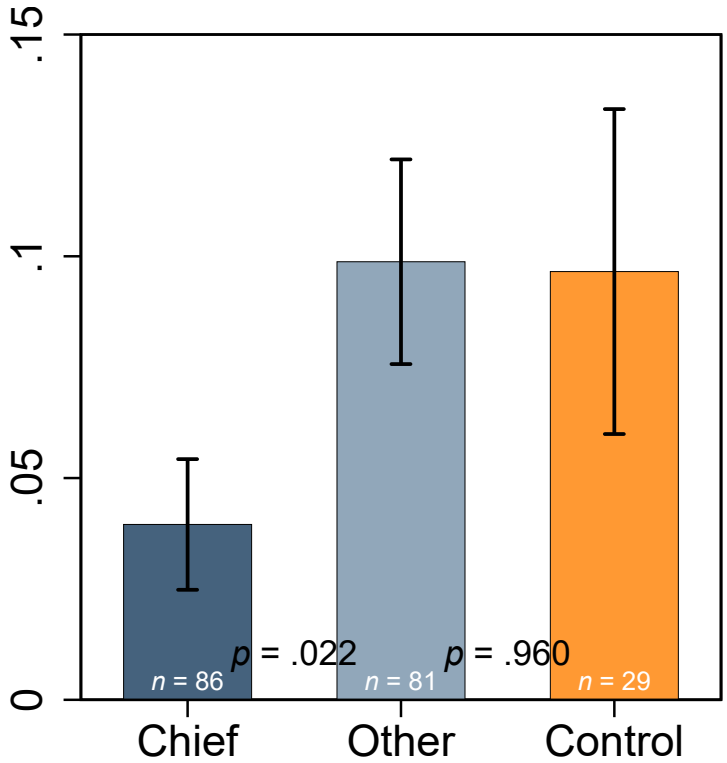
Favorable attitudes towards sexual initiation rituals



Asymptotic Wilcoxon rank-sum test

Chiefs primed on SE

Favorable attitudes towards sexual initiation rituals



Asymptotic Wilcoxon rank-sum test

Back