Group Identity as a Behavioral Mechanism in the Field

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Motivations: Public Goods Provision

- Public goods provision: solutions to the free-rider problem
- When there is a central authority to enforce taxes and subsidies
  - Dominant strategy: Vickrey-Clarke-Groves
  - Nash: Groves and Ledyard (1977)
  - Bayesian Nash: Ledyard and Palfrey (1994)
- No central authority: e.g., online communities
  - Voluntary participation
  - Voluntary contributions

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Motivations: Identity

- Identity as a **behavioral mechanism** when monetary incentives are limited:
  - Akerlof and Kranton (2000, 2008, 2010)
  - Oyserman (2015): identity-based motivation
- Social identity: A person's sense of self derived from group membership
- Can we create groups in organizations?
  - Causal inference: group membership and behavior
  - Computation: recommender system for teams

Identity and Economic Decision Making

- ## Identity and cooperation
  - Eckel and Grossman (2005)
  - Charness et al (2007)

- ## Identity and coordination
  - Feri, Irlenbusch, and Sutter (2010)
  - Chen and Chen (2011)

- ## Identity and trust
  - Hargreaves Heap and Zizzo (2009)
  - Fehrler and Kosfeld (2013)

- ## Field: Team competition and pro-social behavior
  - Erev, Bornstein and Galili (1993)

Recommending Teams Promotes Pro-Social Lending: Evidence from Online Microfinance

Wei Ai[1], Roy Chen[2], Yan Chen[1], Qiaozhu Mei[1], Webb Phillips[3]

1. University of Michigan

2. National University of Singapore

3.Kiva.org

KIVA

Lend   Zip [New]   About   Teams   Updates   Login ▶ Portfolio

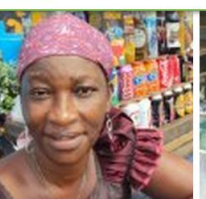**Empower people around the world with a $25 loan**   How it works »

Jackline

🇺🇬 Uganda

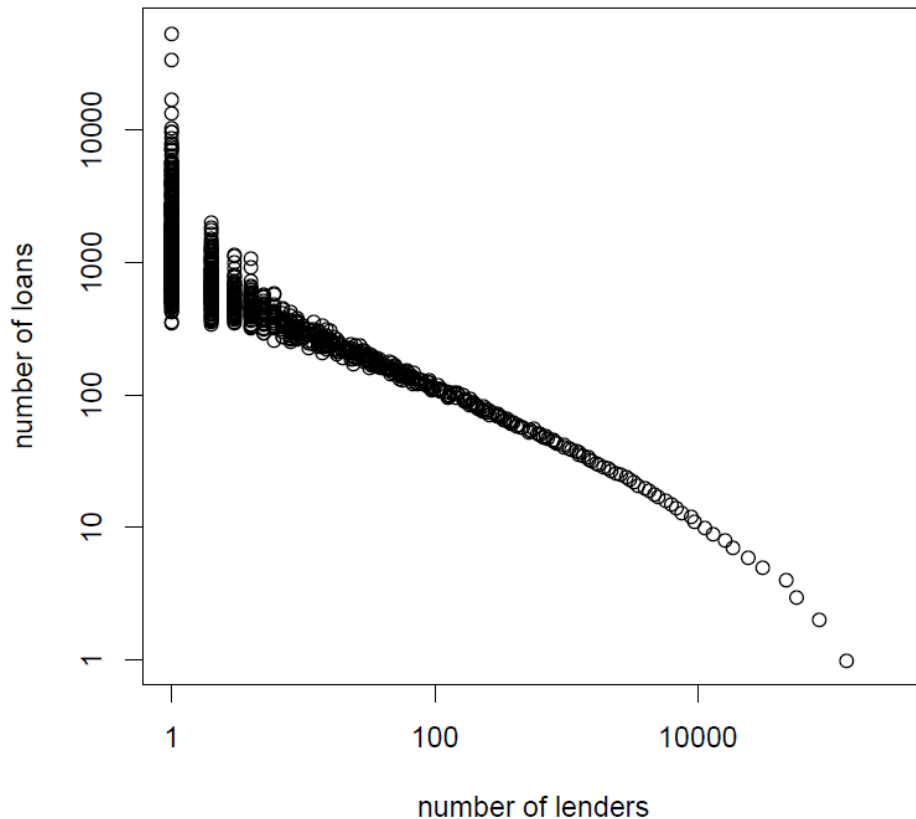A loan of $1,175 helps Jackline to buy building materials.

Read their story>

Lend Now   or   **Browse all loans**

- $25 or up per loan (zero interest)
- $850 million loaned in total
- 1.5 million borrowers from 84 countries,
- 1.4 million lenders across 208 countries
- Repayment rate > 98%

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Kiva's Challenge

- Lending Frequency
  - Few lenders made many loans;
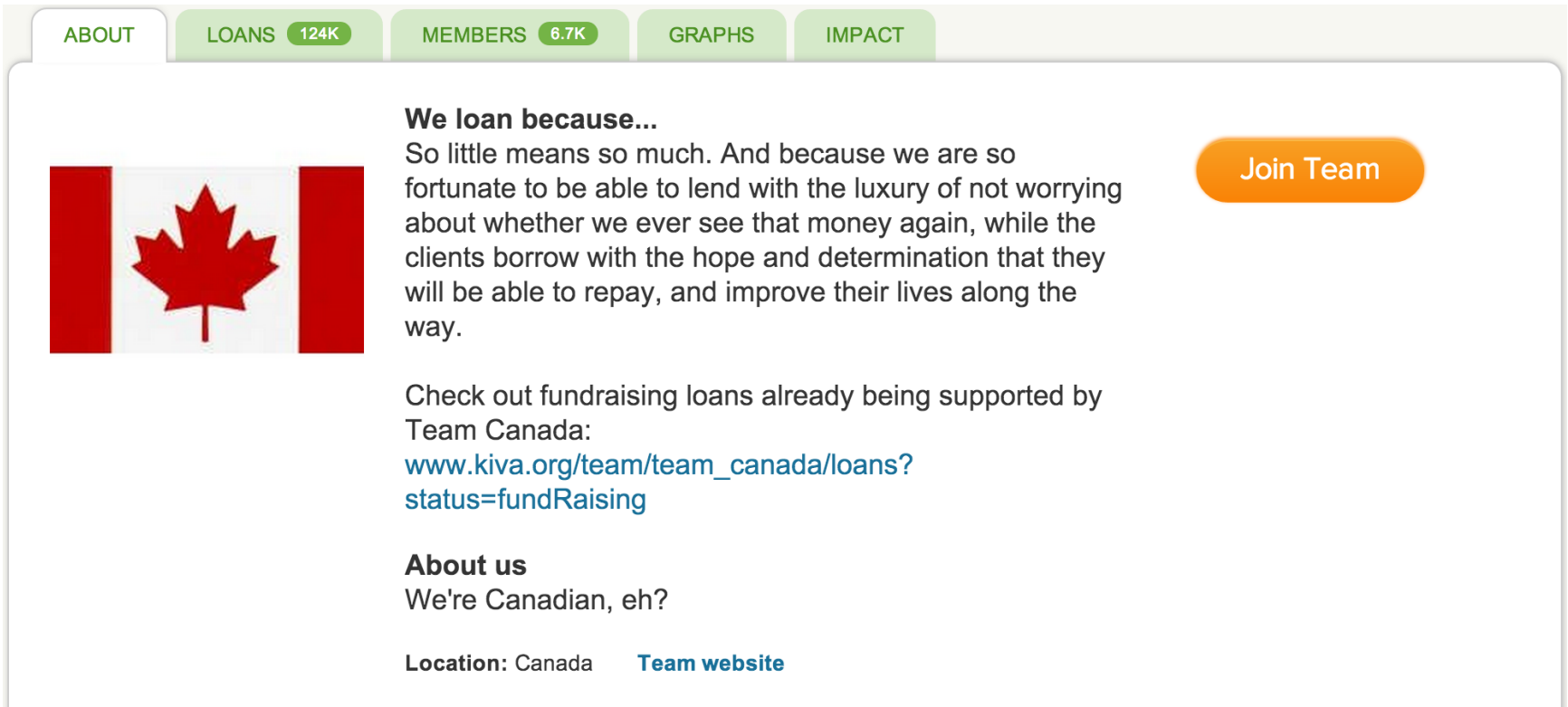 - Many lenders made few loans;
  - One-third of users never made a loan

How do we increase lender participation?

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Kiva Lending Teams

- Why lending teams?
  - Premal Shah: make Kiva "as fun and compelling as possible"
  - Atheist team captain: "The whole idea of teams in the Kiva context implies there should be competition."

- Lending teams created in August 2008
  - 37,000+ lending teams
  - Heterogeneity among teams

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Teams as Social Groups
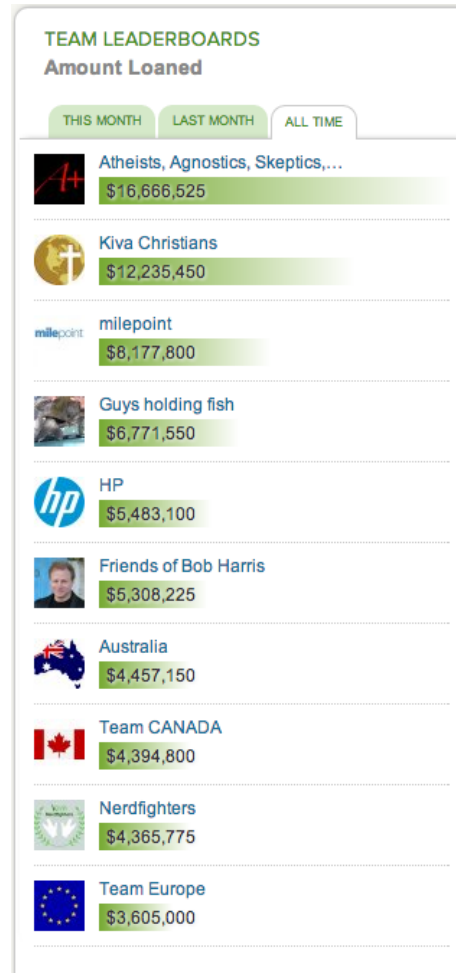

Share a common statement: "We loan because …"

Intergroup competition: Kiva leaderboard

Communication: dedicated forum

Team Competition: Leaderboards

Kiva Lending Team: Atheists, Agnostics, Skeptics, Freethinkers, Secular Humanists and the Non-Religious

A Common Interest team on Kiva.org since Aug 28, 2008

Summary · Loans · Members · Goals^{beta} · Graphs^{beta}

Join Team

Location:	Earth
Category:	Common Interest
Team URL:	http://www.kiva.org/team/atheists
We loan because:	We care about the suffering of human beings.
About us:	Those of us who know we are one human family.
	**New to the team? Read this: is.gd/51mxq
	** FriendFeed: friendfeed.com/rooms/aasfshnr
	** Facebook Group: is.gd/IzMJ
Check out:	http://atheist-monkey.blogspot.com/
Team Since:	Aug 28, 2008

Kiva Lending Team: Kiva Christians

A Friends team on Kiva.org since Aug 31, 2008

Summary · Loans · Members · Goals^{beta} · Graphs^{beta}

Join Team

|	
Location:	Worldwide
Category:	Friends
Team URL:	http://www.kiva.org/team/christians
We loan because:	Pure and undefiled religion before God the Father is this: to care for orphans and widows in their misfortune and to keep oneself unstained by the world. (Jam. 1:27)
	Link to information regarding Christian partners www.gerv.net/info/christian-field-partners
About us:	A group of believers in Jesus Christ, brought together through a common purpose: to help those in need around the world.
Check out:	http://whoisjesus-really.com/
Team Since:	Aug 31, 2008

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Research Questions

Observation: many Kiva lending teams are identity-based teams

- Does joining a team increase lending?
  - Field experiment 1
  - *Proceedings of the National Academy of Science,* (December 2016)
- If so, why? What makes some teams effective?
  - Theoretical analysis
  - Field experiment 2
  - *GEB* (2017)

Does joining a team increase lending?

Loans per Person vs **Month**
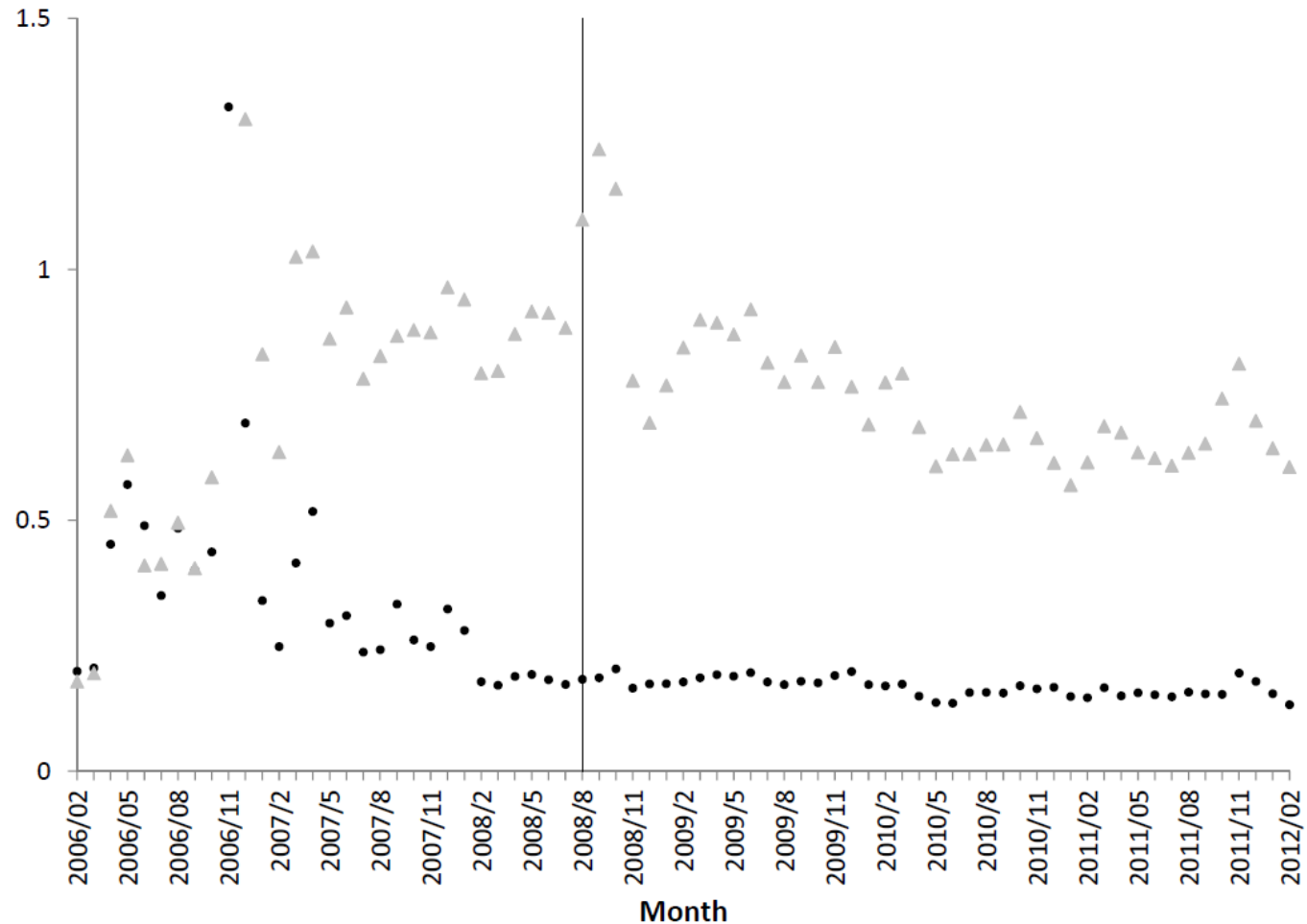
Hypotheses

- Lenders will be more likely to join teams if we make "good" recommendations

  What's a "good" recommendation?
  - Location similarity: homophily (Kaggle competition)
  - Loan history similarity: homophily
  - Leaderboard positions: status

- Users will lend more after they join teams
  - 82% Kiva users do not belong to any team

Experiment Design: Sample Selection

- Field experiment: May 2014

- Sample selection criteria (from Kiva):
  - Haven't joined any team
  - Have location information in their profile
  - Allow marketing email, set their pages public
  - Have made at least 2 loans in the past 6 months

- 69,845 users met these criteria

Experiment Design: 3 x 2 factorial

		Explanation	
		Explanation	No Explanation
Algorithm	Location	Location-Explanation	Location-NoExplanation
	Loan History	History-Explanation	History-NoExplanation
	Leaderboard	Leaderboard-Explanation	Leaderboard-NoExplanation
Control		No Contact	
		Teams Exist	

"Teams Exist" Email

"Team Recommendation" Emails

- Other lenders who live near you enjoy being a part of these teams
- Based on your past lending, people who have made similar loans enjoy being a part of these teams
- Some of the most popular teams are

- Here are a few teams you may want to check out

Team Recommendation Summary

Experimental Conditions	Emails Sent	Emails Opened	Joined Team	Joined Recommended
No-Contact	n/a	n/a	41	n/a
Team-Exist	8076	2977	63	n/a
Location-Exp	8037	2914	103	74
Location-NoExp	8028	2931	79	49
History-Exp	8070	2890	83	37
History-NoExp	8048	2930	77	29
Leaderboard-Exp	8036	2922	75	34
Leaderboard-NoExp	8072	2911	79	33

Intent to treat   treated

Proportion Joining a Team
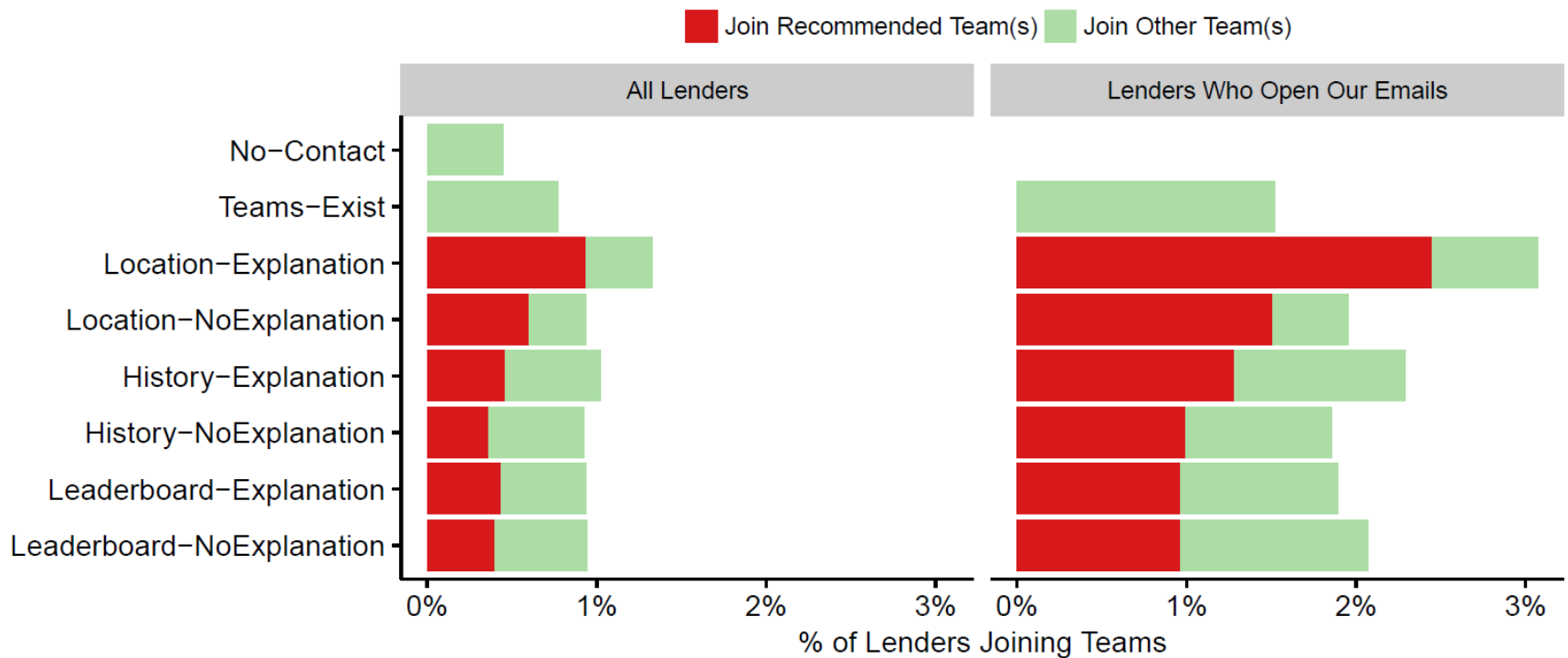
Treatment Effect on Joining Teams (probit)

Dependent Variable: Whether a user has joined a team or not (binary)			
	(1)	(2)	(3)
	All Users	All Users	Opened
Team-exist	0.0040*		
	(0.002)		
Location-Explanation	0.0118***	0.0060***	0.0177***
	(0.003)	(0.002)	(0.006)
Location-NoExplanation	0.0072***	0.0025	0.0072
	(0.002)	(0.002)	(0.005)
History-Explanation	0.0082***	0.0032*	0.0112**
	(0.003)	(0.002)	(0.005)
History-NoExplanation	0.0072***	0.0024	0.0038
	(0.002)	(0.002)	(0.004)
Leaderboard-Explanation	0.0068***	0.0022	0.0052
	(0.002)	(0.002)	(0.005)
Leaderboard-NoExplanation	0.0066***	0.0020	0.0074
	(0.002)	(0.002)	(0.005)
Receiving Email		0.0031**	
		(0.001)	
Observations	65,653	65,653	20,453
Significant at the: * 10%, ** 5%, and *** 1% levels.			

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Treatment Effect on Joining Teams

- Every treatment except "Teams-Exist" did significantly better than the control.

- Location with explanation has the largest effect.

- Among those who opened email,
  two treatments did significantly better than the team-exist treatment:

  - Location-explanation (survives MHT correction)
  - History-explanation (insignificant after MHT correction)

Effect of Team Membership on Lending Amount

Table 3. Difference-in-Differences Regressions of Average Daily Lending Amount (2SLS).

	IV 1st Stage	IV 2nd Stage: Average Amount		
	(1)	(2) 1-Day	(3) 7-Day	(4) 30-Day
Email	0.0053***			
	(0.001)			
Join Team		298.5579***	55.9145***	10.2310
		(72.283)	(21.058)	(7.318)
Constant	0.0045***	-2.6593***	-0.9359***	-0.2357***
	(0.001)	(0.670)	(0.195)	(0.068)
Observations	64,800	64,800	64,800	64,800

First stage: F-statistics=23.55; Second stage: exclusion restriction

Effect of Team Membership on Lending Amount
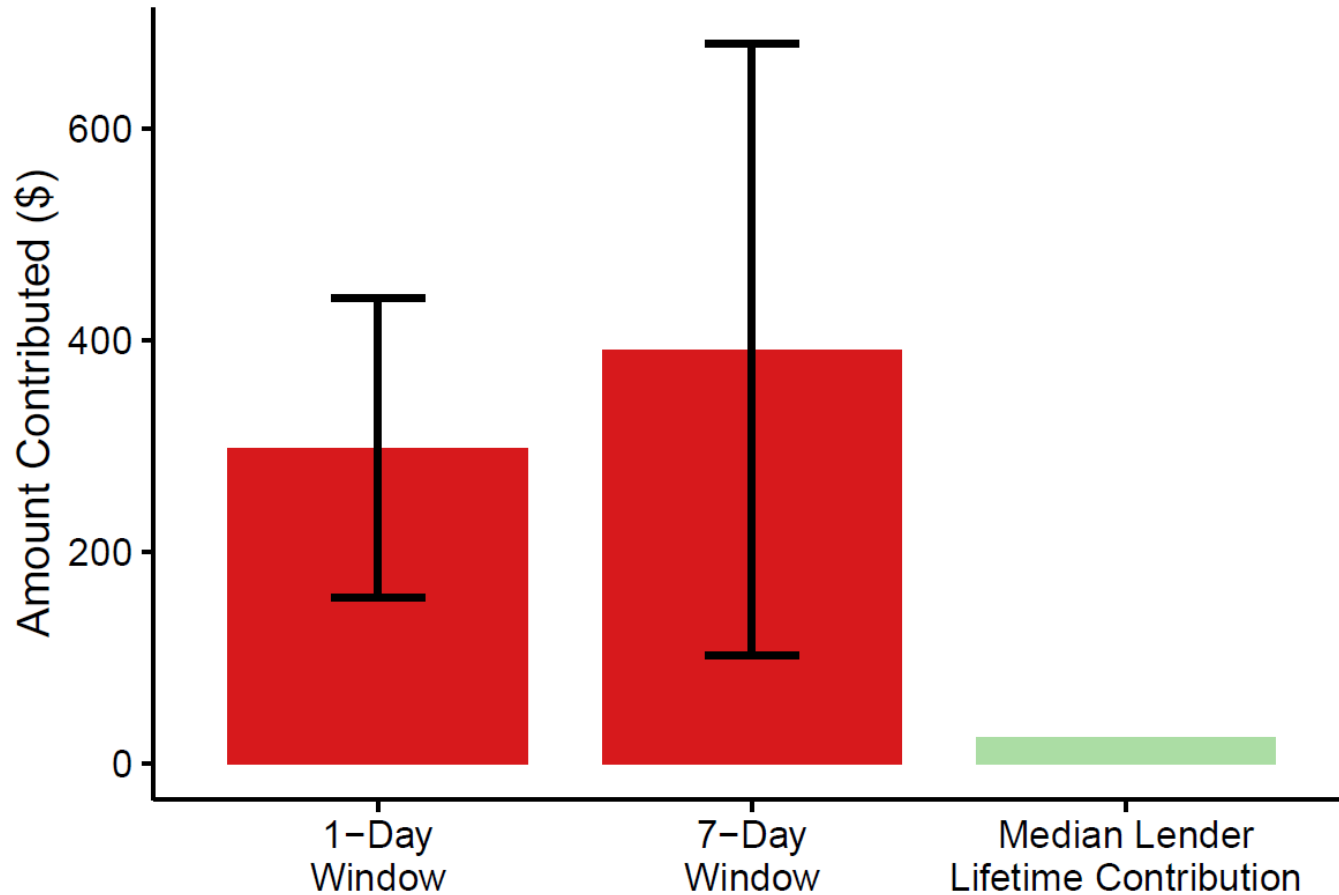
Summary

- Team recommendation emails significantly increase the likelihood a lender joins a team compared to the control
  - Location + explanation has the largest effect
  - Homophily vs. status

- For those who joined a team, their average lending amount increased by
  - **$299** in the one-day window
  - **$392** in the 7-day window

- Support team membership as an effective mechanism for promoting pro-social behavior

Research Questions

Observation: many Kiva lending teams are identity-based teams

- Does joining a team increase lending?
  - Field experiment 1
- If so, why? What makes some teams effective?
  - Theoretical analysis
  - Field experiment 2

Theoretical Framework

- Related to the dynamic contributions to public goods literature
  - Varian (1994)
  - Marx and Matthews (2000)
  - Vesterlund (2003)
  - Andreoni (2006)
  - Andreoni, Serra-Garcia and Koessler (2015)

- Incorporating features of online microfinance into the model

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Assumptions

- Lender i's search cost, k_i, (opportunity cost of time): an i.i.d. draw from a continuous distribution, F, with bounded support
- $\theta_i \in [0, \overline{\theta}]$: match quality
- $c_i > 0$: lender i's opportunity cost of making a loan
- g_i: i's loan amount
- J: the set of lenders who loan to borrow j
- Total loan amount to borrower j, $G_j = \sum_{i \in J} g_i$
- Only one borrower is a lender's best match
- Utility function: separable between private and public goods

If a lender does not belong to a team …

Quasilinear : $U(x_i, G^0, \theta) = \theta v(G^0) + \omega_i - cg^0 - k_i$

Second stage: $\max_{g^0} \theta v(G^0) + \omega_i - cg^0 - k_i$

$$G^0 = v'^{-1}\left(\frac{c}{\theta|J|}\right), \; g^0 = \frac{G^0}{|J|}.$$

First stage: search if

$$k_i \leq \theta[v(G^0) - v(G^0_{-i})] - cg^0 \equiv k_i^0$$

If a lender belongs to a team …

Assume members within a team have identical preferences w.r.t. public goods, $\theta_i = \theta_j = \theta_t, \forall i, j \in T$

Example: $U(x_i, G^t, \theta_t) = \theta_t v(G^t) + \omega_i - cg^t - k_i + \textcolor{red}{\gamma R(G^t)}$

Second stage: $\max_{g^t} U(x_i, G^t, \theta_t)$

$$G^t = v'^{-1}\left(\frac{c}{\theta|J|} - \frac{\gamma}{\theta|J|} R'(G^t)\right) \geq G^0, \ g^t = \frac{G^t}{|J|} \geq g^0.$$

First stage: search if

$$k_i \leq \theta[v(G^t) - v(G^t_{-i})] + \gamma[R(G^t) - R(G^t_{-i})] - cg^t \equiv k_i^t$$

If a lender belongs to a team …

When $\gamma \geq \dfrac{\theta[\Delta v(G^0) - \Delta v(G^t)] + c(g^t - g^0)}{\Delta R(G^t)}$,

a team member's search threshold is higher: $k_i^t \geq k_i^0$.

Proposition 1 (Team Competition) – When a lender cares sufficiently about the total amount of loans provided by her team, she is more likely to search and to make more loans than a lender who does not belong to any team.

Team Coordination

- **Proposition 2 (Team Coordination)** – A lender who belongs to a lending team where members recommend loans to each other will be more likely to make loans than a lender who does not belong to any team.

- Note:
  - Search stage: multiple asymmetric Nash equilibria, characterized by one lender conducting search

Kiva Data

- API: public Kiva data (2012)
  - Categorization: coders hired to code gender/group type, occupation, motivation for lending
  - Locations: country from API, city and state/province from free text
  - Used for empirical analysis

- Data dump (2013, 2015)
  - De-identified, no demographic information
  - Used for experimental analysis

- Aside: how to collaborate with an online community?

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Why does joining a team lead to more lending?

- **Heterogeneity among teams**
- **Forums**: we explore various aspects of team forums and how they relate to lending
  - Coordination (URL pointers)
- **Leaderboard:** we explore whether teams whose rankings are threatened lend more
  - Competition

Field Experiment

- Randomly selected 2,000 open teams
- Drop teams with fewer than 5 members: 550 teams (final: 536 teams)
- Randomly assign these teams (stratified) to 4 treatments and 1 control
- At time of assignment, average team size in our sample was 46.7 members
- Total number of lenders in our experiment: n = 22,233

Experimental Design

- 2*2 Factorial: coordination vs. competition

	No Link	Link
No Goal	New member introduction (109 teams)	New Member Introduction + Link to a loan (107 teams)
Goal	New member introduction + Goal (107 teams)	New Member Introduction + Link to a loan + Goal (108 teams)

- Control: No forum messages (109 teams)

New Lender Identities

- Create 50 new lender identities
  - Names: top 25 most popular male and female first names, top 50 most popular last names based on 1990 US census.
  - Location: capital city of each state
  - No occupation information or pictures
  - Randomly match names and locations
- Each lender joins 11 teams
- Each makes a loan assigned to each team
- Total amount loaned by experimenters: $13,725
- Protocol approved by Kiva in August 2012

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Experimental Conditions

- **Control:** join team, make a $25 loan credited to the team.
- **NoGoal-NoLink:** control actions + an introductory forum message:

    "Hi, I am [LenderName], and I am new to the team. I just credited my first loan to the team."

- **NoGoal-Link:** introduction + a link to a specific loan:

    "I loaned to [BorrowerName] from [BorrowerLocation].

    [He/She] requested a loan of [LoanAmount] to [LoanReason].

    Here is the url to [his/her] request: [url]"

- **Goal-NoLink:** introduction + a goal for the team:

    "If each of us make a $25 loan in the next month, we will improve our rank."

- **Goal-Link:** combination of NoGoal-Link and Goal-NoLink messages.

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Example: Goal-Link Treatment

- **Us (10/18):**
"Hi, I am Paul, and I am new to the team. I just credited my first loan to the team. I loaned to Sandra from Colombia. Sandra is asking for a loan of $1,400 in order to buy decorative items and aromatherapy products. Here is the url to her request: www.kiva.org/lend/483106. If each of us make a $25 loan in the next month, we will improve our rank."

- **Lender 1 (10/19):** *"Welcome Paul. I added $25 more to Sandra as well."*
- **Lender 2 (10/19):** *"Good call Paul. Thanks for sending out the message. I'm in! "*
- **Lender 3 (10/19):** *"Another thanks for sending out the message. I'm in! "*
- **Lender 4 (10/22):** *"My 10-year old daughter and I just added some loans to the pool. Let's keep going! "*
- **Lender 5 (10/23):** *"I'm in for $25"*

Combined Treatment Effects
(Inactive Teams)
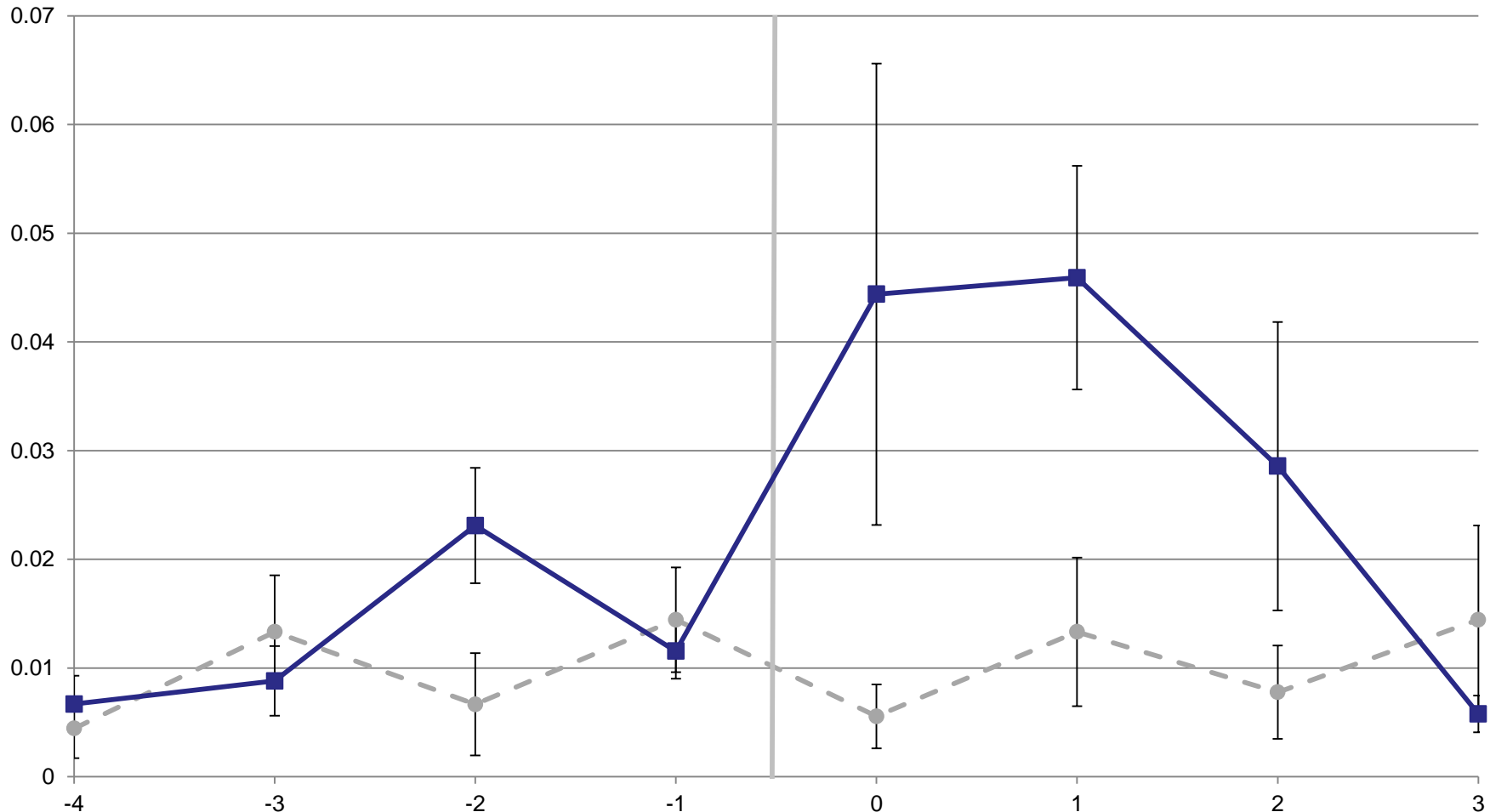
Diff-in-Diff Regression Results

Diff-in-Diff Regressions of Number of Loans on Treatments

(Lenders Not Exposed to Forum Messages in Past Year)

	1-Day	4-Day	7-Day	10-Day	30-Day
NoGoal-NoLink	0.0767	0.0229	0.0103	0.0129*	0.0048
	(0.052)	(0.014)	(0.009)	(0.007)	(0.004)
NoGoal-Link	0.0226	0.0185	0.0059	0.0119	0.0051
	(0.058)	(0.017)	(0.010)	(0.008)	(0.004)
Goal-NoLink	0.0533	0.0329**	0.0161*	0.0149**	0.0080**
	(0.051)	(0.014)	(0.009)	(0.007)	(0.003)
Goal-Link	0.0303	0.0342**	0.0167	0.0182**	0.0091**
	(0.059)	(0.017)	(0.011)	(0.008)	(0.004)
Constant	-0.0330	0.0219	0.0164	0.1051***	0.0190
	(0.101)	(0.035)	(0.024)	(0.022)	(0.019)
Observations	8,378	33,512	58,646	83,780	251,340
R^2	0.502	0.150	0.091	0.067	0.040

Notes: 1) Significant at the: * 10%, ** 5%, and *** 1% levels.

2) Full set of day and lender dummies included.

Compared to the control, each lender in the Goal-NoLink treatment lends 0.03 more loans per day in the four-day window compared to the control.

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Experimental Results

- Compared to the control, each lender in the "Goal" (Goal-NoLink and Goal-Link) treatments lends 0.03 more loans per day in the four-day window;

- Each lender makes on average 0.24 more loans in a 30 day window

- This effect is significant for lenders from inactive teams

- Given average team size (16.4 for inactive teams), this is about
  4 more loans per "inactive" team per month

Our Messages vs. Naturally-Occurring Messages

- Links: in active teams, messages with links often include 1-2 paragraph biographies of the borrowers.

- Goals: in active teams, goal messages have competitive and are specific to the team. A member from Nerdfighters said,

  "Guuuuuyys! We've beat both the Trolltech Foundation AND The Church of the Flying Spaghetti Monster in the past weeks! We're now number 17 on the most lended list! Next up, India!"

- Effect of our (neutral) messages: lower bounds

Summary: Team Membership and Pro-Social Lending

- Does joining a team increase lending?
  - **Yes**, 1.2 loans per lender per month (API data)
  - **Yes**, $392 in a week (field experiment 1)

- Why?
  - Team forums:
    - Coordination: sharing borrower URLs
    - Competition: goal setting
  - Field experiment using forum messages

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Ongoing Work on Wikipedia

- Does joining a WikiProject increase editing activities?
  - most active 9,134 registered WP editors
- Positive effect on an editors' contributions
  - 80% increase in size of edits
  - 40% increase in number of edits
- Persist for at least 6 month
  - 140% increase in size of edits
  - 60% increase in number of edits
- Behavioral mechanism design
  - reduce search cost

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