Building Business Networks to Strengthen Refugee Economic and Social Integration

Re:Build Wave 2

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Pre-analysis plan

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Abstract: *The Immigration Policy Lab at Stanford University and the Georgetown University Initiative on Innovation, Development and Evaluation collaborate with the International Rescue Committee in Kenya and Uganda to implement business groups that build up intensive and extensive networks between refugee and host micro-entrepreneurs in Kampala and Nairobi alongside business grants to support their entrepreneurial activities. This document describes the program and associated randomized controlled trial to evaluate the economic and social impacts of this program intervention.*

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1 Research motivation

More than half of the world's population of forcibly displaced persons lives in urban areas (UNHCR and World Bank 2021), predominantly in developing countries. These urban labor markets are characterized by microenterprises and self-employment as dominant forms of business enterprises (Gollin 2008). Although refugees generally face significant challenges integrating into host country labor markets – typically performing worse than locals or other migrants (Brell, Dustmann, and Preston 2020; Connor 2010; Ruiz and Vargas-Silva 2018) – urban markets in developing countries are particularly challenging because refugees lack the personal and professional networks to establish and sustain micro-enterprises or engage in entrepreneurial activities. For example, only 42 percent of working-age refugees in Kenyan cities are self- or wage employed (UNHCR and World Bank 2021). These local markets rely heavily on interpersonal relationships and trust and are characterized by various forms of informal exchange, meaning that economic activities are deeply embedded in – and shaped by – local networks, which refugees often struggle to access.

Business and social networks that provide information, facilitate collaboration, and provide social capital in the form of business advice and informal finance and contracts can improve business success (Ashraf, Delfino, and Glaeser 2019; Asiedu et al. 2023; Blattman et al. 2016; Cai and Szeidl 2018), facilitate labor market integration (Martén, Hainmueller, and Hangartner 2019) and enable self-reliance among displaced population (Humphrey, Krishnan, and Krystalli 2019). Networks can also help refugees confront and solve community problems (Masterson 2023) and can forge social cohesion between displaced and host populations (Betts et al. 2023).

We conduct a randomized controlled trial (RCT) in Nairobi, Kenya, and Kampala, Uganda, to build strong and weak network ties within and across nationality groups of refugee and host entrepreneurs through repeated and infrequent interactions with other entrepreneurs. The overall aim of exogenously connecting different entrepreneurs is to support self-employment, business formation, and social cohesion. Our key research questions are:

1. How can interventions support the development of business networks for refugees and nationals in urban markets of developing countries?

2. Are these interventions effective at improving livelihood outcomes and social inclusion?
3. What kinds of networks are more or less impactful at improving business and social outcomes?

2 Project design

We conduct an RCT with approximately 8,000 refugee and host entrepreneurs in Nairobi and Kampala (~4,000 in each city) in collaboration with the International Rescue Committee (IRC).[1] All female and male entrepreneurs receive a business grant and are randomly allocated to different business network groups that vary in their nationality composition and intensity of meeting the same individuals. The economic and social conditions of the RCT participants are studied before the intervention, six months after the intervention, and a year after the intervention.

2.1 Context

Kenya and Uganda have a long history of hosting refugees from neighboring countries, including Somalia, South Sudan, the Democratic Republic of Congo (DRC) and Ethiopia. While Kenya hosts almost 589,000 refugees and asylum seekers (UNHCR 2024a), Uganda is currently the largest refugee-hosting country in Sub-Saharan Africa, hosting close to 1.6 million refugees (UNHCR 2024b). Globally, these two countries are among the top refugee-hosting countries in the world.

In Kenya, around 16 percent of all refugees live in Nairobi, mostly from the DRC, Somalia and Ethiopia. The policy environment in Kenya became more restrictive for refugees in the 1990s in the wake of large arrivals from Somalia and South Sudan (Betts et al. 2018; Wagacha and Guiney 2008). In 2021, Kenya passed a new Refugee Act, which is expected to improve the employment and movement rights of refugees. With respect to work rights, refugees are legally able to work in the formal sector if they have a work permit or if they live in the Kalobeyei settlement (Betts et al. 2018). Despite *de facto* rights to work and employment, they are almost always prevented from doing so because of the logistical and administrative obstacles to

[1] This project received IRB approvals from Stanford University, Georgetown University. It is approved by the Ugandan National Council for Science and Technology and the Kenyan National Scientific and Ethics Committee.

securing a work permit (Vuni and Iragi 2023; Zetter and Ruaudel 2016). In Nairobi, most refugees are working in the informal sector (Betts et al. 2018; UNHCR and World Bank 2021; Zetter and Ruaudel 2016). Experiences of, and perceptions towards, various refugee nationalities differ in Kenya (Betts et al. 2018; Omata 2021; Zetter and Ruaudel 2016). Somali refugees in particular face a unique set of challenges and advantages (Lambo 2012). While Somali refugees have strong ethnic and religious bonds with Kenyan Somalis (Betts et al. 2018; Lindley 2011) and strong business networks within the Dadaab camps and the neighborhood of Eastleigh in Nairobi (Carrier and Kochore 2019), they also face hostility, discrimination, and abuse by authorities (Bader 2016).

In Uganda, about six percent of all urban refugees reside in the five divisions of Kampala. Many refugees have stayed for two to five years or more. The situation tends to be increasingly protracted (Zhou, Grossman, and Ge 2023). Uganda's policy and regulatory framework for refugees, guided majorly by the Refugee Act of 2006 and the 2010 Refugee Regulations, is widely considered 'generous.' Refugees have the right to work, own businesses, access health care and education, and have freedom of movement (d'Errico, Winters, and Romano 2024). The Refugee Act (2006) also articulates the right to non-discrimination based on race, religion, sex, nationality, ethnic identity, social group, or political affiliation. In reality, refugees continue to face discrimination. Uganda's refugee policy hinges on ensuring refugee self-reliance and social development (Clements, Shoffner, and Zamore 2016; d'Errico, Winters, and Romano 2024). The Refugees Act (2006) allows refugees to engage in any activity or business that generates income and in employment if their qualifications are recognized by a competent authority. Research shows that about 40% of Ugandans in Kampala are employed by refugees, and refugees are more likely than hosts to start a business (Clements, Shoffner, and Zamore 2016). Hosts and refugees co-exist, although incidences of tensions have occurred (d'Errico, Winters, and Romano 2024).

Both cities are characterized by important variation in legal rights to work and move freely as refugees, in access to employment, work and finances, and in discrimination against refugees. At the same time, multiple refugee nationalities reside in both cities with different pre-existing networks and ties to the host community.

2.2 Sample size and inclusion criteria

We recruited 11,563 aspiring micro-entrepreneurs in Kampala and Nairobi following a nationality-based quota.[2] The population includes refugees and host community members, men and women, and entrepreneurs that are already active business owners and those without a business. To be eligible for the study, the participants had to register their interest and meet the following inclusion criteria:

1) Between 18 and 45 years;
2) Conversationally speak Luganda (Kampala only), Swahili (Nairobi only) or English
3) Be an urban resident in Kampala and Nairobi
4) Possess an up-to-date refugee ID or proof of registration as urban refugee or a national ID card
5) Be interested in starting a business, operate a business or have previous business/entrepreneurial experience
6) Be able to commit to attend 2 hrs of weekly sessions

As Figure 1 shows, a total of 1,146 registered entrepreneurs of 11,563 were excluded as not eligible (9.91%). This exclusion was mostly necessary because registered persons did not speak Luganda, Swahili or English at a conversational level - a requirement needed to have meaningful interactions during the intervention. We exclude registered individuals that own a business with more than 3 employees to ensure that all participants are either business starters or run a small business. Finally, we also randomly select one person if multiple people per household have registered and we exclude a small subset that served as pilot study participants. The remaining registered entrepreneurs are selected into a sample of 8,105 possible respondents and program participants. 3,777 registered persons do not enter the RCT but serve as replacements if respondents cannot be reached at baseline and study enrollment.

[2] The recruitment was an open recruitment in which interested individuals could register in person at local IRC offices. The grant opportunity was advertised in public through posters, through social media, and by contacting community leaders. The IRC monitored the proportion of women, refugees and nationalities while the registration was ongoing. Following UNHCR registration data on the proportion of the main refugee populations in both cities, targeted outreach to specific nationality communities was done to fill the registration pool in line with existing knowledge on nationality prevalence.

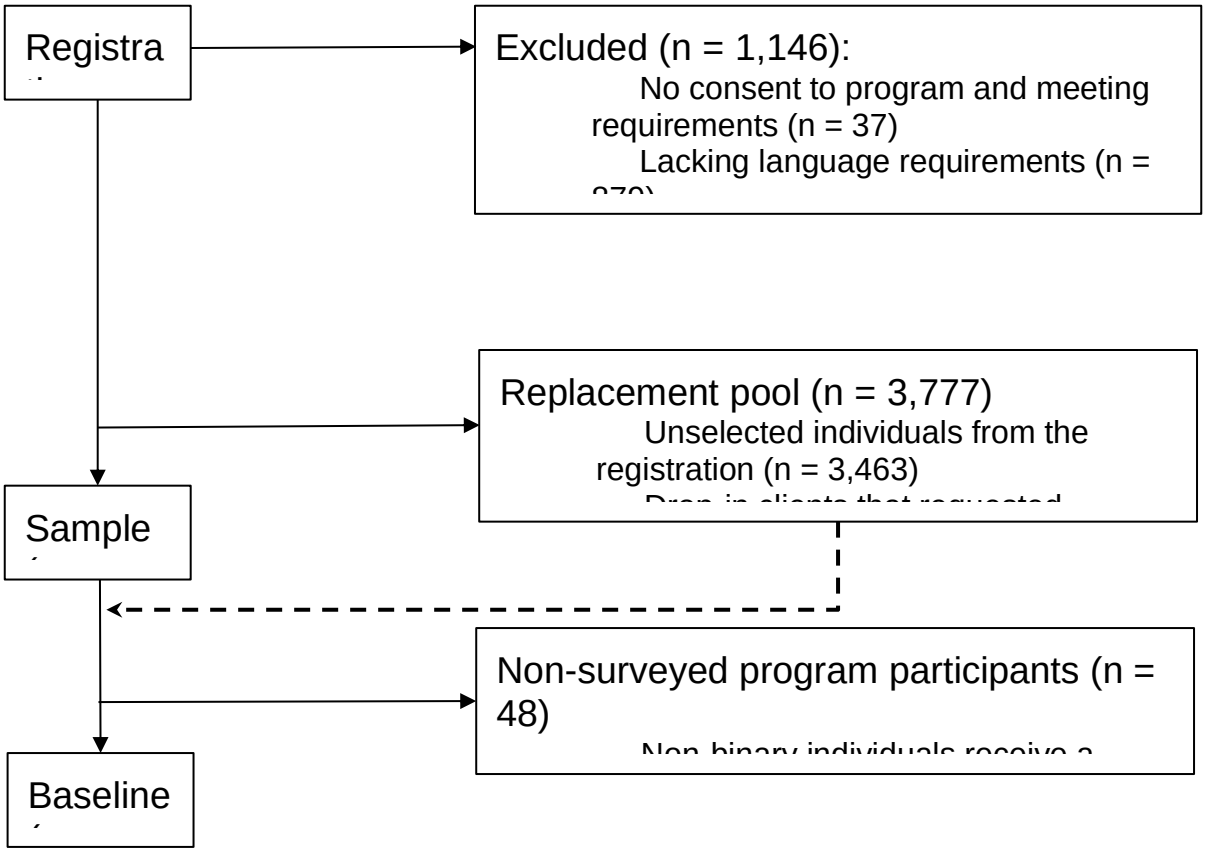

Figure 1: Consort diagram of sampling process

2.3 Replacement

From July to August 2024, we conducted an in-person baseline survey to establish the final program and study sample. The selected respondents were contacted for an in-person baseline interview, using phone numbers they provided at registration and physical outreach in the communities to find respondents that did not pick up the phone. The surveys were conducted in English, Swahili, Luganda, Somali and French and a written consent was obtained.[3] If respondents could not be found, called or did not fulfill the eligibility criteria, we replaced them from the replacement pool, amounting to a total of 533 replacements in Uganda and 156 replacements in Kenya. The main reasons for replacement were:

1. Respondents cannot be reached through phone calls/ did not attend at least 3 scheduled interviews

[3] Respondents with hearing impairment are interviewed using a sign language translator. Written consent is replaced by verbal consent for blind respondents.

2. Respondents relocated/ resettled to another country or moved outside of Nairobi or Kampala since registration
3. Respondents are too ill to participate in the training or are deceased
4. Respondents cannot complete the survey in any of the survey languages and hence do not fulfill the program eligibility criteria
5. Respondents refuse participation in the survey and program
6. Respondents are in full-time education

Where possible, we conducted exact replacements from our replacement pools: For each respondent that required replacement, we replaced with a person with the same nationality, same gender, and from the same treatment zone. The final sample size after replacements consists of 8,006 respondents at baseline: 3,971 in Kampala and 4,035 in Nairobi. An additional 48 individuals take part in the program to fill groups and receive a grant but are not part of the research.[4]

2.4 Intervention design

The study participants are randomly assigned to four treatment groups and two control groups. All groups, including the control groups, receive a business grant of around 435 USD.[5] All treatment groups participate in a business group that complement the grant and meet weekly for a duration of 10 weeks. Figure 3 and Table 2 outline the treatment arms and sample sizes. The grant is paid out for all groups except for the "pure control group" after week 7 of the intervention. The "pure control" group receives the same business grant but the payment is delayed until after the endline.

We vary two key dimensions of networks for participants in the four treatment groups: the *interaction intensity* and the *nationality composition* of the network. We hold the gender constant within all groups (all group members are either male or female). We also hold constant the content of the business networking groups and the frequency of meetings (10 meetings for

[4] Registered clients that are non-binary are excluded from the study sample but are automatically enrolled to receive a cash grant as they cannot be clearly placed in gender-specific groups and may fear discrimination from the other participants.

[5] All participants additionally receive a transportation stipend in the first week that covers travel within the city for all subsequent weeks. The stipend ranges from around 37 USD (Nairobi) to 54 USD (Kampala). Individuals with children under 3 years receive a child care stipend (2 USD per child in Kenya; 1.5 USD per child in Uganda).

everyone). All individuals assigned to the same group come from the same area in the city to reduce travel time.[6] The business groups are organized either in English or Swahili (in Nairobi)/Luganda (in Kampala) depending on the language skills of the participants.

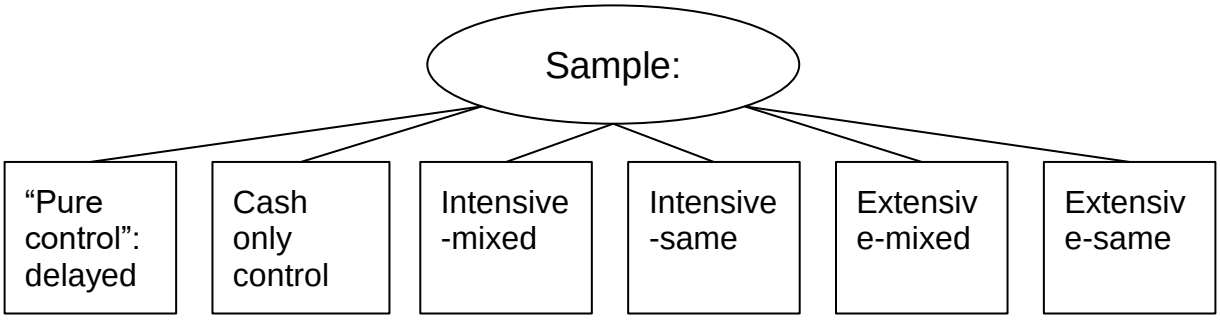

Figure 2: Treatment arms in the study

2.4.1 Treatment I and II: repeated intensive interaction

Around 1,350 participants in each city are grouped into 170 intensive business groups. These groups are 8 members that always meet in the same group. 85 of these groups are same nationality groups and the other 85 groups combine participants from different nationalities, including refugees and hosts. Due to the random assignment into intensive business groups, the heterogeneity of the mixed groups varies but all mixed groups have at least two nationalities. The intention for these intensive business groups is to build up strong network ties between the participants, in the same and across nationalities.

2.4.2 Treatment III and IV: rotating extensive interaction

Around 1,430 participants in each city are invited to attend extensive business groups. These groups consist of 60 participants that are randomly split into 3 changing groups of 20 participants each week. Over the course of the 10 weeks, an individual participant will hence meet 59 other participants but not always the same individuals each week. In the 12 same nationality groups per city, all 60 participants are from the same nationality. Participants in the 12 mixed nationality groups come from various refugee nationalities and from the host community. Each week, due to the random splitting up into 3 parallel groups of 20 participants, the nationality composition varies. The intention for the extensive interactions in these business

[6] In Kenya, we divide the city into the areas: Eastlands, Eastleigh, Kawangware, Kitengela, Ongata Rongai, Thika Road. In Kampala, we use the divisions: Central, Kawempe, Makindye, Nakawa, Rubaga.

groups is to build up a weaker but larger network amongst entrepreneurs, in the same and across nationalities.

Table 3: Summary of RCT arms by interaction intensity and composition of the network

Interaction → Composition ↓	**Intensive interaction**	**Extensive interaction**
Same nationality	**Treatment I:** Business groups of the same 8 individuals, composed of the same nationality (repeated interaction with same group) Individual business grant	**Treatment III:** Business groups of 60 that are split into 3 changing meetings of 20 individuals, composed of the same nationality (interaction with multiple individuals over time) Individual business grant
Mixed nationality	**Treatment II:** Business groups of the same 8 individuals, composed of varying nationalities (repeated interaction with same group) Individual business grant	**Treatment IV:** Business groups of 60 that are split into 3 changing meetings of 20 individuals each week, composed of varying nationalities (interaction with multiple individuals over time) Individual business grant
Control group I: Individual business grant only		
Control group II: Delayed business grant after the endline		

2.4.3 Content for business groups

While all groups are facilitated by a trained facilitator, the core idea is not to train skills but to provide a forum to get to know other people in a meaningful way, to solve problems together, to learn how important social capital and networks are, and to map and identify concrete opportunities to expand one's networks and improve their businesses through cooperation, collaboration, and information-sharing. All business groups are structured into 10 substantive session, all of which involve group discussions, interactive exercises, and information exchanges rather than a taught syllabus. For example, two weeks are dedicated to visiting the businesses of fellow participants in the training (in the intensive treatment arm) and to participating in a business fair that showcases group members' businesses (in the extensive treatment arm). The discussion and group exercises follow as closely as possible a similar

structure across treatment arms to hold the session content constant and identify the effects of the network instead. The following general topics are covered in the 10 weeks in which the business groups are organized:

0. Introduction and logistics
1. Value of networking
2. Business set-up and growth
3. Identifying suppliers, creditors and capital
4. Customers and marketing
5. Field visit/ business fair
6. Planning for the business grant and savings
7. Crisis management and problem solving
8. Field visit/ business fair
9. Stress management
10. Next steps/future planning

2.5 Sampling and randomization

Based on our baseline survey of 8,006 study participants and additional program participants, we randomize study participants into treatment arms. The intervention, as detailed below, relies on grouping respondents into business groups of varying size and nationality composition.

All groups are gender-separated and bring together individuals from one geographical area within the city. Due to these grouping constraints, individuals have different probabilities of being assigned to treatment arms conditional on the groups that we form and the availability of other respondents in the sample. Key demographic and other variables may hence not be balanced in any given random sample. We solve this problem by carrying out repeated randomizations with 10,000 draws in each city. We draw our final sample randomly from a subset of draws that are balanced in terms of the distribution of women, refugees, business owners and household size. Imbalance may still exist for other variables (measured and unmeasured).

2.5.1 Drawing one possible sample

To allocate all study and program participants to treatment arms, we required 194 different groupings in each city with different grouping constraints:

- 12 groups of 60 individuals that have the same nationality
- 12 groups of 60 individuals that have different nationalities
- 85 groups of 8 individuals that have the same nationality
- 85 groups of 8 individuals that have different nationalities

The algorithmic process – outlined in Table 1 – randomizes in what order the 194 different groupings in each city are filled (First random component). Starting with the first type of group that should be filled (e.g. a pool of 60 clients that have the same gender, come from the same area in the city, and have the same nationality), the algorithm lists all theoretically possible groups with these constraints in the registration pool. From this pool of all possible groups, the algorithm randomly selects one group (e.g. a pool of Somali women in Eastleigh) (Second random component). The algorithm then lists all individuals in the registration data that have the characteristics that match with the selected group. Conditional on fulfilling the grouping criteria (see Table A.1. for detailed grouping criteria), the algorithm randomly selects group members to fill the group (Third random component). To move on, the algorithm removes the individuals that have just been grouped from the registration data. Because the registration pool reduces over time, the available possible groups change as the algorithm proceeds. The algorithm continues filling the next group with new criteria until all 194 groups are filled.

Table 1: Algorithmic process to select the random sample

For each city (Nairobi/Kampala), …		
1	Randomize the order in which the 194 different groups are filled. (First random component) Example: Start with a same-nationality pool of 60 people, …	
2	Iterate through the list of 194 groups:	
	2.1	Using all (remaining) respondents, make a list of all groups that can (still) be theoretically formed to meet the grouping criteria. See grouping criteria in Table A.1. Example: List all nationalities in which you have 60 or more registered clients

		of the same gender, location, and nationality.
	2.2	Randomly select one of the theoretically possible groups. (Second random component, conditional on available groups) Example: Somali group of women in Eastleigh (100 registered with these criteria)
	2.3	Randomly select participants conditionally on fitting the group criteria (N = 8 for treatment I + II, 60 for treatment III + IV) (Third random component, conditional on group characteristics) Example: Select 60 Somali women in Eastleigh from the 100 registered
	2.4	Remove the grouped individuals in 2.3. from the list of available participants Example: Remove the selected 60 Somali women from the stock
	2.5	Return to 2 and repeat until all 194 groups are filled
Repeat steps 1 + 2 for 10,000 times in each city		
Reduce draws according to truncation criteria		
Randomly select one sample from the remaining draws		

2.5.2 Repeating the sample draws

We repeat this algorithmic process to fill all groups in a draw 10,000 times in each city. After obtaining 10,000 draws, we reduce the draws in Nairobi and Kampala according to the following operational and balance criteria:

1. **Sample size:** The draws must achieve the sample size of 4,000.
2. **Gender representation:** The draws must have at least 40% women and not more than 60% women in the treatment arms.
3. **Refugee representation:** The draws must have at least 35% refugees and not more than 75% refugees in the treatment arms.
4. **Treatment compliance:** All mixed-nationality groups must have at least two nationalities in a draw. No more than 12 mixed-nationality groups should have a dominant group that makes up 75% or more of the group. No more than 12 of the small

mixed-nationality groups (for treatment I + II) should have a dominant group that makes up 75% or more of the group.

5. **Covariate balance:** The total variation distance between all treatment groups and the control group, and between treatment arms should be less than 0.45. For pairwise comparisons between two pooled arms, the total variation distance should be less than 0.5. Covariates to calculate the total variation distance are the refugee-host status, gender, household size, and business ownership.

2.5.3 Select the sample

Based on these exclusion criteria, 798 draws remained in Uganda and 1,248 draws in Kenya. From these draws, we selected our final sample draw in a simple random choice.

2.6 Final sample characteristics

Our final sample consists of 3,971 respondents in Kampala and 4,034 respondents in Nairobi. The sample is composed of 56.5% women, 57.46% refugees and 52.45% respondents that report owning a business in the baseline (see Table 2).

Table 2: Descriptive statistics on the final sample

City	% women	% refugees	% business owners
Kampala	54.5	64.3	47.3
Nairobi	58.5	50.7	57.5
Total	56.5	57.5	52.5

The probability to be assigned to a specific treatment arm varies for each individual in the registration data and is not the same across treatment arms. Focusing on the balanced draws, Figure 2 displays the distribution of the empirical assignment probability of being allocated to

the realized treatment arm in our sample. The mean empirical probability for a respondent to be assigned to their realized treatment is 0.216.[7]

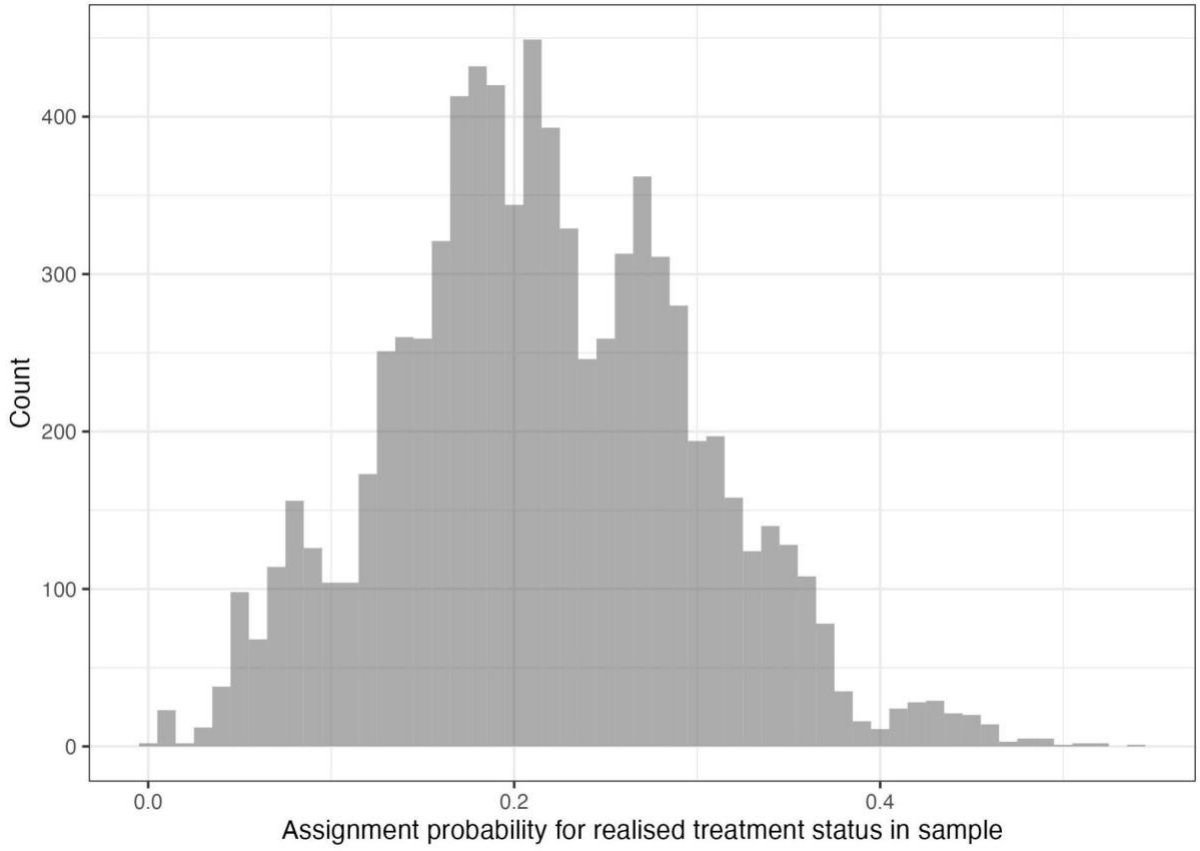

Figure 2: Empirical probability of treatment assignment

2.7 Timeline and measurement points

The main implementation period is from September 2024 to November 2024. There will be three critical points of data collection for the study. A baseline survey took place in July 2024, before the participants were invited to business groups. We conduct the above outlined experiment-in-experiment four weeks after the intervention ends. Six months after the intervention ends (after the last training), a midline survey will record key business and social outcomes. An endline a year after the intervention will measure a full social network again as

[7] The respondent with the highest assignment probability to their treatment arm has a probability of 0.536. The respondent with the lowest assignment probability to their treatment status has a probability of 0.004.

well as all central outcomes of interest. All surveys take place in person. Respondents are compensated for the time they spend completing surveys.

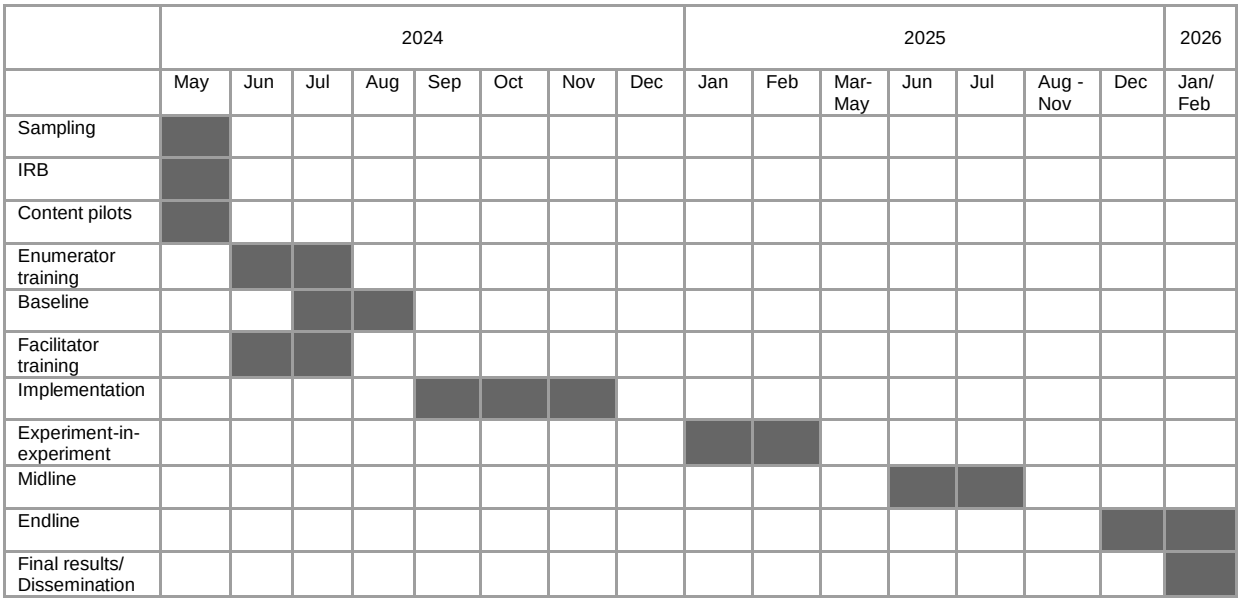

Figure 3: Overall study timeline

3 Hypotheses and measurement of outcomes

The following sections operationalise the key outcomes for this study. We focus on four domains of outcomes: economic performance, social cohesion, psychological well-being, and network expansion. In all outcome domains, we provide primary and secondary measurements. In addition to our main outcomes, we will descriptively explore if our intervention centered around business networks improves information asymmetries and encourages collaboration. Unless otherwise specified, we record all outcomes at baseline, midline and endline.

3.1 Economic performance

Our primary outcomes for economic performance are business profits and ownership. Secondary outcomes include customer size, the value of productive assets, hours spent in business and the diversity of customers.

- Primary outcomes:
    1. **Business profits** (continuous): Self-reported business profits in the past 30 days, converted to USD and winsorized at the 1st and 99th percentile. We compare the directly reported business profits to a constructed measure of profits from a revenue estimate and itemized costs[8] in the past 30 days. We focus on profits across all of a respondent's business.
    2. **Business ownership** (binary): Binary indicator indicating if the respondent (co-) owned any open business in the past 30 days (=1).

- Secondary outcomes:
    1. **Customer base** (continuous): Winsorized number of individual customers in the last 30 days in respondent's business.
    2. **Value of productive assets** (continuous): Self-reported value of productive assets owned across all businesses in the household. We use a fixed asset list to measure the value of productive assets.[9] We convert the sum of reported values to USD and winsorize at the 1st and 99th percentile.
    3. **Hours spent in business** (continuous): Number of hours spent working in a self-employed activity or the respondent's own microenterprise.
    4. **Non-entrepreneurial income** (continuous): Self-reported total value of compensation received for any other employment or economic activities in the last 30 days. We expect some crowding out of income from businesses on other economic activities. We convert the reported compensation to USD and winsorize at the 1st and 99th percentile.
    5. ***Customer diversity*** *(continuous): Proportion of customers of a different nationality reported in 6 brackets (0%, <=25%, 25-50%, 60-75%, 75-95%, 100%). We use the numeric midpoint of the brackets as an indicator. For host respondents, we record the percentage of other nationalities. For refugees, we record the percentage of host and other nationalities.*

[8] We record costs for rent, for salary and wages, for licenses and taxes, for electricity and water, for insurance, for purchases of wares and goods for resale, for capital, goods, equipment or machinery, and for purchases of inputs and raw materials, as well as other costs.
[9] We ask for the following assets: 1) tables, desks, chairs, 2) business stalls, 3) motorcycles and bicycles, 4) vehicles and cars, 5) machinery and tools, 6) generators, 7) livestock, 8) other assets.

This domain will be tested as a joint equality of all treatment arms. Our secondary test is a pooled test comparing treatment arms with intensive business groups to extensive business groups. For customer diversity (in italics), our secondary test is a pooled test between same and mixed nationality arms.

3.2 Psychological well-being

Our primary measures to capture psychological well-being are general life satisfaction and self-efficacy.

- Primary outcomes:
    1. **Life satisfaction** (binary): Question on life satisfaction on a Likert-Scale from 0 (worst possible life) to 10 (best possible life). We dichotomize this indicator by splitting the measure around the median response.
    2. **Self-efficacy** (continuous): Index of 5 questions that capture self-efficacy on a scale from 1 (Strongly disagree) to 5 (Strongly agree). We construct the index by taking the average of all non-missing values and standardizing the final index by the pure control group mean and standard deviation.

This domain will be tested as a joint equality of all treatment arms. Our secondary test is a pooled test comparing treatment arms with intensive business groups to extensive business groups.

3.3 Social cohesion

To measure social cohesion our primary measures focus on trust in different nationality groups as well as interactions with the outgroup. Our secondary measure of social cohesion focuses on the approval of progressive refugee policies.

- Primary outcomes:
    1. ***Trust in ingroup vs outgroup nationalities*** *(continuous): Index of trust outgroup nationality groups: We record the trust in Kenyans/Ugandans, Somalis, Congolese, Ethiopians, South Sudanese on a scale from 1 (do not trust at all) to 5 (trust very much). We construct an index of trust in the*

respondent's outgroup nationalities by taking the average of all nationalities that are not the respondent's own nationality. We use only non-missing values and standardize the final index by the pure control group mean and standard deviation. As an additional sensitivity check, we calculate the difference between in-group nationalities (same nationality as respondent) and out-group nationalities (any other nationalities) for all respondents that are asked about at least one in- and out-group. We calculate the average trust in all outgroup nationalities minus the trust in the ingroup nationality and standardize this indicator.

2. ***Outgroup interactions*** *(binary): Survey item that indicates how often the respondent has engaged in social activity together with another nationality on a scale from 1 (Never) to 7 (Several times a day). For hosts, we ask for social interactions with any other refugee nationality, for refugees we ask for social interactions with the host nationality. We dichotomize the indicator by splitting at the median.*

- Secondary outcomes:
    1. ***Support for progressive refugee policies*** *(continuous): Index of support for 3 different policies that indicate an expansion of rights for refugees. This measure is only collected for hosts. We construct an index by averaging over all non-missing values and standardizing the index with the pure control group mean and standard deviation.*

This domain will be tested as a joint equality of all treatment arms. Our secondary test is a pooled test comparing treatment arms with same nationality groups and mixed nationality groups.

3.4 Network expansion

The intervention focuses on networks as mechanisms to improve other social and economic outcomes. We hence measure the effects of the intervention on network expansion. We conduct an egocentric business network module measuring direct and secondary ties (2-degrees network). We ask participants to report the number of business partners, suppliers, buyers, creditors, mentors, authorities, and other business contacts. For each of these network

ties, we acquire additional individual information on the nationality, gender, and interaction frequency with these business contacts for up to 3 individual contacts in each category.[10] We construct egocentric business networks by also asking about the interconnectedness between contacts reported by the respondent and the secondary ties of reported contacts. We use this network data to measure the network size, diversity and composition. Outcomes for this domain are only measured at baseline and endline. A full justification and detailed explanation for these network outcomes can be found in the appendix.

- Primary outcomes:
    1. **Degree centrality** (continuous)**:** Network size or the number of direct connections that the respondent has in their business network. This node-level measure captures the general overall size of the eco-centric business network. Note that we focus on 1st degree contacts only. As a sensitivity check, we will weight the degree centrality of the respondent by the number of days that the respondent has interacted with their contacts in the past 30 days.
    2. ***Network diversity*** *(continuous)**: Nationality heterogeneity of ties across a respondent's direct ties in their egocentric network using a Gini-Simpson Index that takes the value 0 when there is no nationality diversity. Higher values indicate more diversity (different nationalities that are unevenly distributed across the network). This node-level measure captures whether the intervention shapes the nationality composition and diversity of the respondent's business environment.*

- Secondary outcomes:
    1. **Clustering coefficient** (continuous)**:** Density of ties amongst all direct business ties when the main respondent is removed. The clustering coefficient is a network-level measure of transitivity or triadic closure in an ego-centric network and gives an indication of the amount of 'strong ties' in a network. The clustering coefficient takes a value from 0 (no possible ties between the business contacts of the respondent are realized) to 1 (all possible ties between the business contacts of the respondent are realized).

[10] For "Other business contacts", we do not record tie-level information and only record the number of other business contacts.

2. **Local bridges** (continuous)**:** Number of local bridges in the respondent's 2-degree network, that is the number of business ties in the egocentric network that lead to a split of the network when the tie is removed. This dyad-level measure is calculated with the full 2-degree network except for the respondent and takes high values if many business contacts are local bridges and 0 if no business contacts are local bridges. We measure 'weak ties' in a network with this definition.

This domain will be tested as a joint equality of all treatment arms. Our secondary test is a pooled test comparing treatment arms with intensive business groups to extensive business groups. For network diversity (in italics), our secondary test is a pooled test between same and mixed nationality arms. This domain will not be recorded at midline.

3.5 Mechanisms: information and collaboration

To understand the mechanisms through which the intervention improves other outcomes, we focus on information and collaboration gains of the study participants. We aim to understand if respondents participating in a network intervention gather more/new information from their new network ties and develop more collaborative behavior. We measure information by recording their learning of business practices and testing their behavioral ability to name persons that could provide help in the community. As a secondary measure, we record behaviourally whether respondents favor co-national markets and we collect information on the number of referrals about business experiences they have received and given. As measures of collaboration, we record self-reported business collaborations and conduct an experiment before midline to capture collaborative behavior directly. We record the perceived connectedness to other entrepreneurs and their diversity of business collaborators in the experiment as secondary measures.

3.5.1 Information

- Primary measures:

1. **Knowledge of business practices** (continuous)**:** Index of learnt business practices constructed from 6 items.[11] We construct an index by averaging over all non-missing values and standardizing the index with the pure control group mean and standard deviation. This index is only measured for business owners.

- Secondary measures:
    1. **Information exchange** (continuous)**:** Number of received and provided referrals about new business opportunities in the last 30 days. We add the number of provided and received referrals up (ranging from 0 to 60 at maximum).
    2. **Viability of the collaboration plan**: Based on our experiment-in-experiment (see Section 2.5), a team of IRC livelihood specialists will rank the viability of the proposed collaboration projects. They will judge the soundness of the proposed budget, the ability of the proposal to generate business profits and growth, the use of business networks in the city and the ability to fill a market gap. This indicator will only be measured at one post-intervention time point.

3.5.2 Collaboration

- Primary measures:
    1. **Self-reported collaborative behavior** (continuous): Index of 6 collaborative behaviors[12] that the respondents have engaged in. All behaviors are recorded on a scale from 1 (never) to 5 (always). We construct an index by averaging over all non-missing values and standardizing the index with the pure control group mean and standard deviation.
    2. **Experimental business collaborations** (binary): Based on our experiment-in-experiment, we record whether respondents are part of a submission for a business collaboration (=1) or not. As a sensitivity check, we code an additional continuous indicator whether respondents have proposed a collaborative project that suggests high risk sharing and in-depth collaboration or not,

[11] We record inquiring about lost customers, making a special price offer, negotiating for lower prices on suppliers, bookkeeping, branching out to new suppliers, and advertisement.
[12] We record how often the respondents engage in sharing of materials, tools or supplies, developing joint business ideas, co-marketing, sharing of loans or savings, sharing information on business practices and setting up businesses together.

following the ranking provided in the appendix. We record this depth of collaboration that they are willing to engage in on a 1 to 8 scale. These indicators will only be measured at one post-intervention time point.

- Secondary measures:
    1. ***Diversity of business collaborators*** *(continuous): Using the experiment-in-experiment, we record the diversity of the applying team in terms of nationality, gender, refugee status and Re:Build participation status (whether a group member is a Re:Build participant or not). We calculate the nationality, gender, refugee status and Re:Build participation heterogeneity of ties across a respondent's co-applicants using a Gini-Simpson Index that takes the value 0 when there is no nationality, gender, refugee or participation status. Higher values indicate more diversity.*

We do not conduct formal tests of the effect of the intervention on these mechanisms and do not pre-specify hypotheses. The analysis is descriptive and exploratory in nature to better understand how the business network intervention induces change.

3.6 Behavioral measure: collaboration grant competition

With the aim to measure collaborative behavior, we conduct an experiment within the overall RCT design. We invite Re:Build participants to propose collaboration ideas with other entrepreneurs to IRC. Eligible collaboration proposals enter a lottery for an additional grant of up to $1,150, which includes a baseline amount and an amount that IRC will match based on participants' own contributions.

This "collaboration grant lottery" takes place after the intervention, and participants in all treatment and control arms are eligible to participate. 6 weeks after the last session of the business groups, Re:Build participants are informed through phone calls and text messages about this grant opportunity. Participants then have up to one month to apply in teams of 3-8, including non-ReBuild participants (but no members of the household or relatives).

In their proposal, participants must describe a joint collaborative business idea that benefits all businesses on the proposal. They are able to select from a list of types of collaboration that

vary in the depth of collaboration that they entail. Ideas include the joint acquisition/renting of business tools or spaces, a joint participation in specific skills training that cost money, and the joint acquisition of raw materials or products to resell. All participants will commit to contributing their own funds to the collaborative business idea, which they will outline in the application budget. Winning teams will receive a baseline amount (proportionate to the team size, maximum $230) with IRC matching 2:1 any contribution that an individual makes (total group cap of $920). 10 winning teams will be selected in each city via a random lottery after excluding any teams that do not meet the eligibility criteria or who did not fully complete the form. Applicant teams are informed that IRC will monitor whether the winning teams implement their collaborative business ideas in a post-distribution monitoring exercise.

There are three dependent variables of interest with this experiment-in-experiment. Our key outcome of interest is to measure whether the intervention has increased the willingness of participants to engage in deep and risk-sharing collaborative behavior. We understand deep collaboration as activities that involve considerable risk-sharing (e.g. joint profits) and that require repeated interaction and coordination as opposed to one-time interaction. Participants will select from a list of activities which will have been pre-coded as low, medium, or high collaboration. Second, we are interested in the nationality and gender diversity of the team, i.e. whether the intervention affects who participants collaborate with (particularly whether the mixed nationality groups lead to more diverse teams). Third, we are interested in whether the intervention increases the quality and viability of the collaborative business idea that participants propose. We expect that the intervention will increase the information available to business entrepreneurs and enable them, through learning and coordination, to propose ‘more viable’ collaboration ideas.

3 Data processing

Prior to any analysis, we construct the indices and variables as outlined above. We generally do not impute missing values for outcome variables. We impute missing values for control variables using the baseline mean and/or by using multiple imputation. The data processing will take place for each study site individually. In other words, when using summary statistics such as the standard deviation or mean to construct indices or dichotomize variables, we focus on the within-country distribution. The following general data processing rules apply:

- *For index construction:* If needed, we will redirect individual index elements so that higher values correspond with a positive outcome. We also standardize indices as specified in the list of relevant outcomes. In general, we standardize based on the distribution among the pure control group in each study site. For index construction, we use the average of non-missing values. We do not impute missing values for outcome variables.
- *For all single-question outcomes:* For all indicators based on one indicator coded as a Likert scale or other categorical measure, we will transform the variable into a binary measure by splitting around the median response. The median will be resolved toward the smaller group. We do not impute missing values for outcome variables.
- *For all continuous measures:* Monetary and continuous measures, such as profit, revenue, assets and network counts, will be winsorized at the 1st and 99th percentile within base-, mid- and endline and treatment arm (I, II, III, IV, cash only, pure control). Nominal values will be converted to real values using the CPI from the Uganda Bureau of Statistics and the Kenya National Bureau of Statistics. We convert values reported in Kenyan Shilling and Ugandan Shilling to USD. For individuals that are not operating a business, values of profit, revenue and assets is set to 0.

4 Statistical analysis

4.1 Weighting

Our sampling approach relies on selecting one random draw from a population of possible samplings and randomizations. Because this draw may not be perfectly balanced across treatment arms, with individuals having varying assignment probabilities to each treatment arm, we weight the regressions that we use as main analysis. Specifically, for each participant in the sample, we calculate the empirical frequency of being assigned to one of the treatment arms, the cash arm or the pure control arm across all truncated draws that are more balanced. We construct a weight for the respondent by taking the inverse of the assignment frequency for their realized assignment condition. This re-weights the respondents so that people that are assigned with a higher probability to their realized arm are weighted less in the analysis.

4.2 Estimation

We estimate intent-to-treat effects using the following ANCOVA specification for all metric and binary outcomes:

$$y_{it} = \beta_t D_i + \gamma X_i + \delta y_{i0} + \eta_t + \theta_b + \epsilon_{it} \quad (1)$$

where y_{it} is an outcome for individual i at time t with $t = 0$ at baseline (pre-treatment) and then indexing survey rounds. D_i is a vector of treatment dummies for our treatment arms, including cash and the four network arms, and β_t is the corresponding vector of (time-period-specific) treatment effects. X_i is a vector of baseline controls (outlined below). y_{i0} denotes baseline outcomes to increase power (McKenzie 2012). η_t are survey round fixed effects, θ_b describes the city-level fixed effects and ϵ_{it} is an error term. We use robust standard errors clustered on the individual level, which is the unit of treatment assignment. As indicated above, we weight our regression using the empirical probability of assignment to the realized arm conditional on appearing in the sample.

Where outcomes are weakly greater than zero and unbounded, we use the analogous Poisson Quasi-Maximum Likelihood Estimate:[13]

$$E[y_{it}] = exp\{\beta_t D_i + \gamma X_i + \delta y_{i0} + \eta_t + \theta_b + \epsilon_{it}\} \quad (2)$$

4.3 Selection of covariates

For each outcome domain, we select baseline covariates (X_i) using post-double lasso from a set of candidate covariates. As a set of candidate covariates for the lasso selection, we use two types of covariates: First, we focus on covariates that have been directly used in the treatment assignment mechanism, which together with the use of regression weights adds a layer of "double robustness" to any imbalance introduced by the assignment procedure. Second, we include a set of covariates as candidates that are predictors of core outcomes to reduce the residual variance. We impute missing values of any baseline covariates at their

[13] This specifically refers to the outcomes: value of productive assets, non-entrepreneurial income, and local bridges.

mean or by using multiple imputation. We hence also include an indicator whether any covariates had to be imputed or not in the candidate pool. In the feature selection process, we allow interactions between the variable *refugee status* and other covariates and the variable *gender* and other covariates. We also use logistic regression

Lasso regressions are undertaken with regression weights applied, as defined in Section 4.1, and we residualize outcomes with non-penalized inclusion of baseline values of the primary outcome in the given domain, survey-round fixed effects (for outcome regressions), and city (for all regressions) fixed effects, analogously to estimation of Equations (1) and (2). Given the multiple-valued treatment vector, when using lasso to select covariates predictive of treatments, we do so by regressing an indicator for each individual treatment in turn, relative to all other treatments pooled. We also use logistic regression to understand if participant characteristics predict missingness, with y = 1 for missing and y = 0 for nonmissing and x being a selection of demographic characteristics including gender, language, and nationality.

The following list are our candidate covariates:

- **Covariates to account for the process of treatment assignment :**
    - *Gender*: binary with female =1 and male = 0 [Interaction allowed]
    - *Country of origin/nationality*: categorical including Burundian, Eritrean, Kenyan, Somali, Sudanese, Congolese, Ethiopian, Rwandese, South-Sudanese and Ugandan
    - *Refugee status*: binary indicator whether a respondent is a refugee (1) or not (0). [Interaction allowed]
    - *Language fluency in English:* numeric value from none (0), basic knowledge (1), conversational (2) to fluent (4)
    - *Language fluency in local language*: numeric value from none (0), basic knowledge (1), conversational (2) to fluent (4). We use Lugandan in Kampala and Swahili in Nairobi.
    - *Treatment area*: categorical including the 6 treatment areas in Nairobi and the 5 treatment areas in Kampala

- **Covariates to predict outcomes and reduce residual variance**:
    - *Age:* continuous

- *Children under 5:* binary indicator whether children under 5 are present in the household = 1 or not = 0
- *Disability:* binary indicator whether respondent self-reported difficulties related to disabilities = 1 or not = 0. Note that this is information collected at registration and not during the baseline survey.
- *Marital status:* categorical including married, single, widowed, cohabitation, separated/divorced
- *Length of living in the city:* numeric in month
- *Education:* categorical including no formal education, some or completed primary school, some or completed secondary school, some or completed tertiary and adult education
- *Literacy:* binary whether respondent is able to read and write =1 or not =0
- Housing: binary indicator whether respondent has apartment or house = 1 or lives without shelter, in a makeshift shelter or is temporarily hosted = 0
- *Business training:* binary indicator whether respondent has previously received some business training or not

- **Other covariates:**
  - *Imputation of covariates:* binary indicator that indicates whether any baseline covariate had to be imputed =1 or not = 0.

5 Inferential approach

For primary hypothesis tests of joint equality between all study arms, we conduct two-sided tests of the joint equality between multiple treatment arms, based on an F statistic.

For our pairwise comparisons between two (sets of) treatment arms (i.e. a comparison between intensive and extensive treatment arms and a comparison between mixed and same nationality treatment arms), hypothesis testing is based on a t statistic (for outcomes observed in only one period) or analogous F test of equality within each round. Let $D_i = [{D_i}^1, {D_i}^2, {D_i}^3, {D_i}^4, {D_i}^5]$ be the vector of treatment indicators for individual i, with $\beta_t = [{\beta_t}^1, \ldots, {\beta_t}^5]$ the corresponding vector of treatment effects for period *t*. Then for a hypothesis comparing, say, treatments indexed by 1 and 2, when these outcomes are observed in both post-intervention periods, our

default test is an F test of the null that ${\beta_1}^1 = {\beta_1}^2$ *and* ${\beta_2}^1 = {\beta_2}^2$, i.e., that equality holds in both periods (but not necessarily between them). For a hypothesis that compares sets of treatments across one dimension, e.g., comparing networking interventions, we use an F test to test the null that all relevant contrasts are zero (but we do not imply that other contrasts, such as mixed vs same-nationality groupings, are zero). We therefore might test, e.g., that ${\beta_t}^2 = {\beta^4}_t$ and ${\beta_t}^3 = {\beta^5}_t$, for all relevant time periods *t*.

5.2 Multiple hypotheses testing

As our primary hypotheses concern distinct domains and are of independent interest, we present unadjusted p-values for the top-level tests in each domain. We adjust for multiple hypothesis testing in two ways. First, we control the False Discovery Rate (FDR) among the set of stated secondary outcome measures within a given outcome domain. Second, we control the FDR across the set of all reported coefficient values within a given domain. We use Anderson's adaptation of the Benjamini and Hochberg "sharpened" q values (Anderson 2008). The outcomes are all grouped in the different outcome domains and corrections will be made within these groupings.

5.3 Compliance

Compliance here refers to the attendance at business meetings when assigned to the relevant treatment arms as well as the successful transfer of the cash grant to the respondent. The implementing partner will document if and when cash transfers are made as well as attendance throughout all 10 weeks of the intervention. Based on this monitoring information, we can explore if participants that did not fully attend the business groups or did not successfully receive the grant differ in their outcomes. Specifically, we will predict treatment compliance - defined as obtaining the grant and attending at least 9 sessions - based on baseline attributes, using an equivalent lasso regression as specified in equation (1). We then analyze if respondents predicted to be high compliers benefit differentially from the intervention than those predicted to be low compliers.

5.4 Attrition

To deal with attrition in the midline and endline, we start with a test of the differential attrition across treatment groups as a function of treatment assignments and covariates in a simple OLS. Our outcome is a binary measure if a person is included in the sample in the post-treatment period of the survey or not and we use the same covariates and treatment indicators as outlined in equation (1).

If this test for differential attrition is statistically significant at the 5 percent level, we adjust the weights in the estimation equations (1) and (2). More specifically, we multiply the assignment-based weights outlined in section 4.1 with inverse probability weights. To generate these inverse probability weights, we model the probability of staying in the sample in each round as a function of treatment assignment and baseline covariates. We use a lasso model. As additional robustness check in the case of differential attrition, we trim differential attritors using Lee bounds (Lee 2005). If there is no differential attrition (not statistically significant at 5 percent level), we make no adjustments.

5.5 Heterogeneous treatment effects

We explore heterogeneous treatment effects for primary outcomes by:

- Gender (binary: men/ women)
- Refugee vs host status (binary: host/ refugee)
- Length of time living in the city (binary: above median/ below median)
- Baseline business ownership status (binary: owner/ no owner)
- Network size at baseline (binary: above median/ below median)

For the heterogeneous treatment effects, we use the same specification as in equations (1) and (2) but interact the treatment indicator with the variable of interest. Additionally, we adjust the lasso procedure to select covariates and focus on base models without an interaction between gender and refugee status in the feature selection process.

Table 6: Outcomes and tests for primary hypotheses

Domain	Measure	Outcome	Primary test	Secondary test	Round
MAIN OUTCOMES					
Economic outcomes	Primary measures	Business profits	Test of joint equality of all treatment arms (Reference group: Pure control)	Test of the two pooled extensive arms vs the two pooled intensive arms (Reference: intensive arms)	1, 2, 3
		Business ownership			
	Secondary measures	Customer base			
		Value of productive assets			
		Hours spent in business			
		Non-entrepreneurial income			
		Customer diversity	*Test of joint equality of all treatment arms (Reference group: Pure control)*	*Test of the two pooled mixed nationality vs the two pooled same nationality arms (Reference: same nationality arms)*	*1, 2, 3*
Psychological well-being	Primary measures	Life satisfaction	Test of joint equality of all treatment arms (Reference group: Pure control)	Test of the two pooled extensive arms vs the two pooled intensive arms (Reference: intensive arms)	1, 2, 3
		Self-efficacy			
Social cohesion	*Primary measures*	*Trust*	*Test of joint equality of all treatment arms (Reference group: Pure control)*	*Test of the two pooled mixed nationality vs the two pooled same nationality arms (Reference: same nationality arms)*	*1, 2, 3*
		Outgroup interactions			

	Secondary measures	*Policy support for refugees*			
Network	Primary measures	Degree centrality	Test of joint equality of all treatment arms (Reference group: Pure control)	Test of the two pooled extensive arms vs the two pooled intensive arms (Reference: intensive arms)	1, 3
		Network diversity	*Test of joint equality of all treatment arms (Reference group: Pure control)*	*Test of the two pooled mixed nationality vs the two pooled same nationality arms (Reference: same nationality arms)*	*1, 3*
	Secondary measures	Clustering coefficient	Test of joint equality of all treatment arms (Reference group: Pure control)	Test of the two pooled extensive arms vs the two pooled intensive arms (Reference: intensive arms)	1, 3
		Local bridges			
MECHANISMS (Descriptive analysis without formal tests)					
Information	Primary measures	Knowledge of business practices			1, 2, 3
	Secondary measures	Information exchange			1, 2, 3
		Viability of the collaboration plan			2[14]
Collaboration	Primary	Self-reported collaborative behavior			1, 2, 3

[14] Indicators will be collected outside of the data collection rounds but between midline and endline.

	measure	Experimental business collaboration	2[15]
	Secondary measure	Diversity of business collaborators	2[16]

[15] Indicators will be collected outside of the data collection rounds but between midline and endline.
[16] Indicators will be collected outside of the data collection rounds but between midline and endline.

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Appendix

Algorithm criteria to form treatment groups

Table A.1: Algorithm criteria to form treatment groups

I: Mixed-intensive: At least 8 of: - Same gender - Live in same area in the city - Largest group in all possible group members <= 60%	**II: Same-intensive:** At least 8 of - Same gender - Live in same area in the city - Same nationality
III: Mixed-extensive: At least 60 of: - Same gender - Live in same area in the city - Largest group in all possible group members <= 60%	**IV: Same-intensive:** At least 60 of: - Same gender - Live in same area in the city - Same nationality

Detailed description of network outcomes

We collect data on the ego-centric business networks of all participants at baseline and at endline. We use a free recall method to identify business networks and ask respondents to count their business networks in 7 categories: business collaborators, suppliers, bulk buyers, creditors, mentors, authorities, and other business contacts. While we record the number of ties for each category, we only collect detailed information on the ties (how often they meet each other, etc.) for up to 3 contacts in each category. After counting and providing details on their direct business ties, we ask respondents to recall business connections between their direct ties. We also ask respondents to estimate how many other business relations their direct ties have. As a result, our ego-centric network is a 2nd-degree network (see Figure A.1) but is based on the ability of respondents to recall information on their wider network.

From these networks we construct the following outcomes: First, we are interested in the **degree centrality** of each ego-centric network. Degree centrality here refers to the number of direct business ties that a respondent has in their network. In the example network in Figure A.1, this means that the ego has four direct business ties, or a degree centrality of 4. In a sensitivity test, we also weight this degree centrality by the number of days that a respondent has actively engaged with their direct network tie in the past 30 days (ranging from 1 to 30). Note that for this first network indicator, we only focus on the ego and the direct alters (white and light gray entries in Figure A.1). The degree centrality is our main measure of the overall size of a respondent's

business network. In its essence, degree centrality highlights respondents with many social connections.

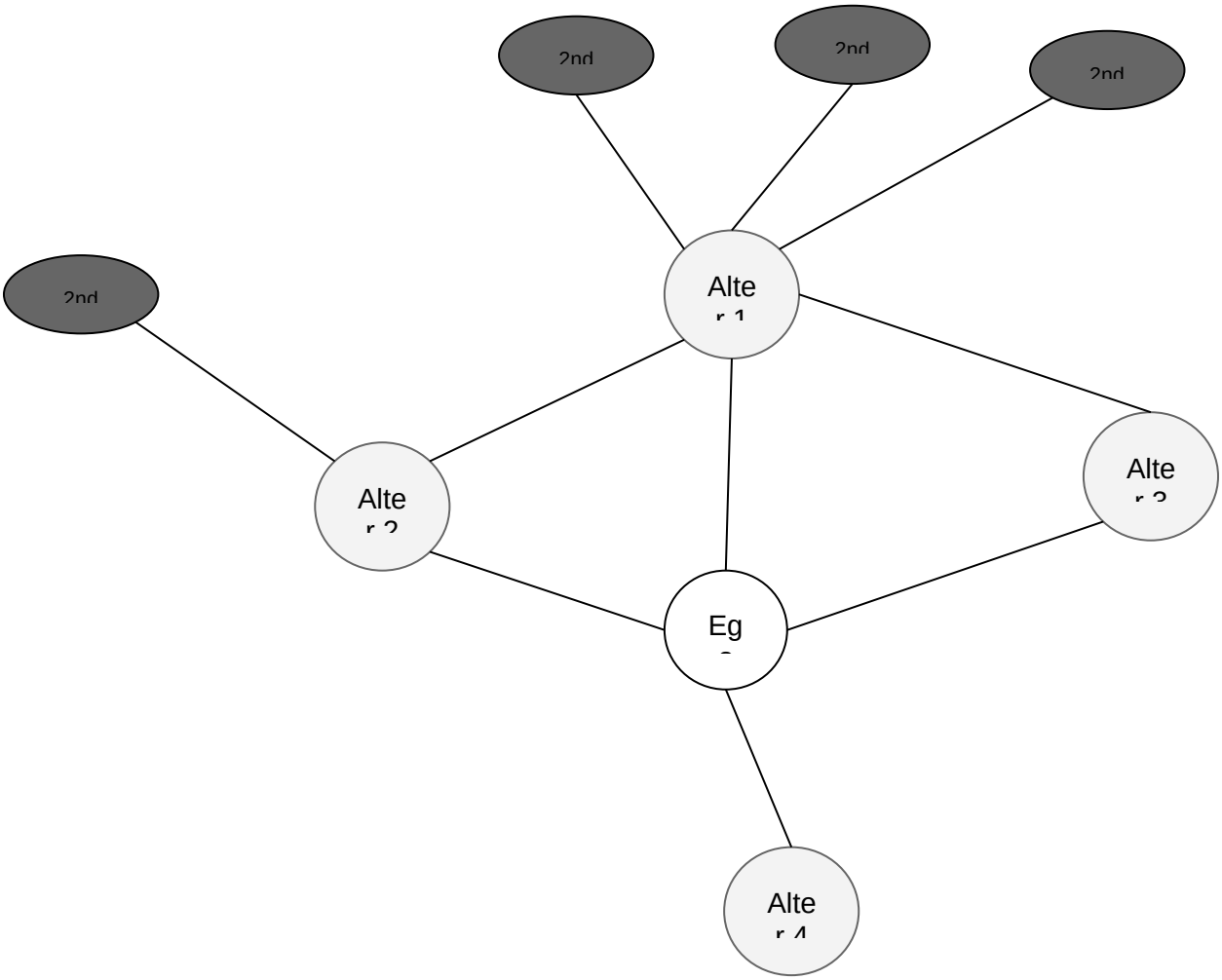

Figure A.1: Example ego-centric network as collected in the study

The second measure we derive is the **network diversity** of an individual's business network. We collect information on the nationality of the respondent's direct business ties in the survey. Using this information, we calculate a Gini-Simpson Index. More specifically, our measure of network diversity is defined as:

$$Network\ diversity\ = 1 - \sum_{i=1}^{k} p_i^2 \quad , \qquad \text{(A.1)}$$

where p_i is the proportion of network members in ith nationality and k is the number of different possible nationalities. The index takes the value 0 if there is no nationality diversity (e.g. the respondent and all the direct ties are the same nationality) and higher values for more diversity, whereby more diversity implies different nationalities that are unevenly distributed. Note that for this statistic, we only use the ego and the direct alters (white and light gray entries in Figure A.1). If a contact's nationality is unknown, we remove this tie from the calculation. This measure of network diversity helps to understand if the intervention influences the nationality composition of respondents's networks, in particular across the mixed and same nationality arms.

Beyond these two main network outcomes, we aim to measure the amount of 'strong' vs 'weak' ties in a network (Granovetter 1973). As a measure of *'strong ties'*, we capture triadic closure (Simmel 1908) or the principle that two individuals that have a common contact are likely to become contacts themselves. Triadic closures can be seen as strong ties because they allow communication, trust, norm enforcement and sanctioning within the triad of ties that know each other. To capture this in our ego-centric networks, we calculate the **clustering coefficient**. This coefficient describes the density of all ties amongst the direct business ties when the main respondent is removed. In Figure A.1, we focus on all light gray ties and remove the ego and all second degree ties from the network. Focusing only on the alters, we calculate the clustering coefficient as:

$$Clustering\ coefficient\ = \frac{m}{\frac{n(n-1)}{2}} \quad , \qquad \text{(A.2)}$$

where m is the number of realized ties and n is the number of alters. The clustering coefficient equals 0 when there are no connections between the alters and 1 if all alters are connected to each other. In Figure A.1, the clustering coefficient is 0.33. In other words, 33.3% of all possible ties amongst the business contacts in this network exist.

Lastly, we measure the amount of *'weak ties'* in respondents' business networks - or the looser connections that help connect respondents to new networks but are not strongly interconnected with their own network. We measure 'weak ties' as **local bridges** in a respondent's 2nd degree network (all nodes in Figure A.1) once the ego is removed. A local bridge is defined as a link between two nodes if the two individuals are not connected to any common node. In other words, a local bridge is a business tie that - if removed - splits the network into parts. We identify bridges

in the network by looping through all the nodes in the network and deleting them one at a time to identify how often we split the network. In the example in Figure A.1, there are two bridges (alter 2 to 2nd degree, alter 2 to 2nd degree) if we do not consider the ego itself.

Ranking of collaboration proposals

Participants in the collaboration grant competition are asked to classify their collaboration idea into the following categories. These categories are ranked by intensity of collaboration. Collaborations that involve considerable amounts of joint risk sharing (e.g. joint profits or debts) are ranked higher in intensity than collaborations without a risk sharing aspect. Secondly, collaborations that require repeated interaction and joint usage of a good are ranked higher than one-time collaborations. The ranking is as followed:

Low collaboration:

1. Buying goods in bulk and then separating them between the teams
2. Employment of one team member as part of another business
3. Paying to attend a training together

Medium collaboration:

4. Co-marketing, i.e. advertising your businesses together
5. Joint acquisition of equipment and machinery to share across businesses
6. Renting a shared business space

High collaboration:

7. Sharing profits, loans and savings
8. Starting a business together