
Can hope elevate microfinance? Evidence from Oaxaca, Mexico

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Abstract

Recent evidence suggests that the average effects of microfinance on borrowers is more modest than previously claimed. We carry out an experiment to test whether an intervention designed to increase aspirational hope among borrowers can elevate microfinance impacts. In collaboration with a microfinance lender in Mexico, we produced a documentary featuring successful borrowers within the organization and designed and implemented a hope curriculum rooted in positive psychology (Snyder, 1994), which conceptualizes hope as aspirations, agency, and pathways. Bank officers incorporated this curriculum into their regular weekly meetings with a randomly treated half of 52 women's savings and credit groups with 733 women over the course of one year. We find that the intervention modestly increased indices measuring both aspirational hope and microenterprise performance over this time period. The intervention significantly increased employment and plans to hire new employees. Increases in microenterprise sales and profits were positive but statistically insignificant.

JEL classifications: D91, O12

1. Introduction

The material conditions and external constraints that characterize persistent poverty are often easier to identify than the internal constraints of the poor. These layers of constraints interact in complex and dynamic ways, often with important interdependencies and feedback loops that perpetuate poverty (Barrett and Swallow, 2006). Based on a perceived locus of control that attributes causality to factors outside their control, the poor often develop internal constraints that may reduce input levels and effort by artificially restricting what is considered to be possible (Sen, 1999; Bernard *et al.*, 2014; Dalton *et al.*, 2016; Lybbert and Wydick, 2018; Banerjee *et al.*, 2020). In this paper, we implement a randomized controlled

trial (RCT) with female microentrepreneurs in Oaxaca, Mexico to understand whether explicitly addressing internal constraints can amplify the impact of microfinance.

We study the impact of an aspirational hope treatment on microenterprise performance among a population of women actively involved in a microfinance program. The opportunity to design and conduct this research emerged because our microfinance partner in Oaxaca, Mexico, *Fuentes Libres* (hereafter *Fuentes*), had observed heterogeneous impacts from joining a community bank. In collaboration with *Fuentes*, we designed and tested an intervention to evaluate whether *hope*, operationalized in the field of psychology by Snyder (1994, 2002), can relax internal constraints and thereby magnify the impacts of microfinance.

Dramatic narratives in literature, philosophy, and religious tradition often highlight internal human struggles in which hope plays a leading role in confronting adversity. Snyder's (1994, 2002) seminal work in hope theory provides the conceptual framework for our intervention, where he understands the necessary components of hope as (i) aspirations (goals) for the future related to achievements, accomplishments, or states of being, (ii) pathways by which one envisions realistic progress towards these aspirations, and (iii) agency to act along pathways in pursuit of these aspirations. Snyder and others have developed and tested self-reported hope scales to assess each of these dimensions empirically and construct comparable composite hope measures that can be used to understand the relationship between hope and individual outcomes. We utilize this framework as the basis for a simple economic model to guide our empirical work, for our hope intervention, and for measurement and evaluation of hope changes induced by this intervention.

Fuentes lends to women who operate microenterprises and are part of its network of savings and credit groups (SCGs) that essentially function as small community banks. Together we designed a hope intervention that consisted of (a) the screening of a commissioned 25-minute documentary that featured four successful borrowers from our study area, (b) goal-setting exercises focused on the microenterprises of these women, and (c) a 'hope curriculum' and periodic follow-up messages related to the three components of hope implemented over the next 12 months. Our randomization involved 733 members of 52 SCGs formed into matched pairs, where we randomly assigned one SCG from each pair to receive the hope treatment. To track outcomes, including self-reported hope measures and business performance, we conducted surveys at baseline, then two follow-up surveys at one month and 12 months after treatment began. We also use *Fuentes* administrative data from these groups to track savings and loan demand as outcome variables.

Several findings emerge from our study. First, before exploiting exogenous variation in exposure to the hope curriculum, we find baseline and endline measures of hope to be strongly correlated with endline business performance. This suggests that endogenous differences in hope among these microentrepreneurs are positively correlated with—and a predictor of—microenterprise outcomes. Second, exploiting our randomization, we find that the intervention increased aspirational hope among treated borrowers. At one month, the strongest effects on hope come from increased aspirations, but at 12 months the strongest effects come from increased agency and conceptualization of pathways, suggesting that hope components are malleable but may activate at different time steps. Third, we find that the intervention modestly improved microenterprise outcomes as captured by a composite index of business performance. Effects on individual components of this index are more mixed: Demand for internal loans, employees (a small and marginally significant increase

from a very low baseline), and plans to hire new employees increase significantly, but microenterprise sales and profits show only small increases that are statistically insignificant after one year of the intervention. Finally, administrative data also shows that treated groups are more likely to continue into future lending cycles, although increases in savings and loan demand within these groups are not statistically significant.

Our work both builds on and contrasts with [Bernard *et al.*'s \(2014\)](#) work in Ethiopia. While their intervention focuses on the development of aspirations specifically, ours focuses on hope more generally, where aspirations along with pathways and agency are integral components of hope. They focus on a rural population of subsistence farmers, whereas we focus on a mainly urban and peri-urban sample of microenterprise owners. While we find the overall impacts from the hope intervention on the microenterprises in our study to be modest, similarly to the intervention of [Bernard *et al.* \(2014\)](#), our work provides some evidence that interventions focusing on internal constraints may be an effective complement to microfinance lending and other interventions.

We describe our model of hope in Section 2. In Section 3 we describe our Oaxacan hope experiment, and in Section 4, we discuss our data and empirical strategy, including the measurement of hope and other outcomes. We present, interpret, and discuss our results in Section 5, which differentiates between results from those contained in our registered pre-analysis plan (PAP)¹ and exploratory results that we believe offer interesting insights but were not pre-specified in this plan. We conclude in Section 6 with a discussion of what this research and these results contribute to our understanding of how addressing internal constraints may help us to address the issues of heterogeneous impacts in microfinance and other poverty interventions.

2. A model of hope

[Snyder's \(1994\)](#) three components of hope—aspirations, agency, and pathways—each play a distinct role in this simple economic model, which provides a framework for our experiment. As an extension of prospect theory ([Kahneman and Tversky, 1979](#)), aspirations enter the model as a reference point in the utility function such that marginal utility is increasing in outcomes up to an exogenously given aspiration, A , and diminishing thereafter, or

$$u(Y|A) = A \left(\frac{Y}{A} \right)^{\frac{1}{1-\alpha}} \cdot 1(Y < A) + A \left(\frac{Y}{A} \right)^{1-\alpha} \cdot 1(Y \geq A) \quad (1)$$

with $\alpha \in [0, 1]$. The sharpness of the discontinuity at A is determined by the importance of aspirations, α . Two extreme cases are linear utility when $\alpha = 0$ and a (lexicographic) step function when $\alpha = 1$. In [Appendix B](#) we provide an empirical test to see if our data on sales is consistent with a utility function of this type. Individuals with aspiration-dependent utility choose a costly effort e at time t to maximize the level of outcome Y at $t + 1$ subject to the cost of effort,

$$\max_{\{e_t\}} U_{t+1} = E(u_{t+1}) - c(e_t) \quad (2)$$

1 Our pre-analysis plan is available at: <https://www.socialscienceregistry.org/trials/721/history/4332>.

$$\text{s.t. } Y_{t+1} = \pi e_t + \pi_v v_{t+1} \quad (3)$$

where $c(\cdot)$ indicates the cost of effort such that $c(0) = 0$, $c'(\cdot) > 0$ and $c''(\cdot) > 0$, $v_{t+1} \sim N(0, \sigma^2)$, and $\pi \bar{e} = \bar{Y}$. The realized outcome is a function of both effort and an idiosyncratic shock v , where the mapping of effort into expected outcome reflects the agency component of the model. Equation (3) defines outcomes at $t + 1$, determined by the random shock v_{t+1} and effort e_t , and where π and π_v represent the marginal productivity of effort (agency) and the contribution of the random shock to the outcome. Pathways are introduced as an outcome constraint \bar{Y} such that the marginal product of effort is zero for outcomes beyond a given pathways constraint:

$$E(Y_{t+1}) = \begin{cases} \pi e_t & \text{if } e_t < \bar{e} \\ \bar{Y} & \text{if } e_t \geq \bar{e} \end{cases} \quad (4)$$

A particular version of this model allows us to introduce our hope intervention through simultaneously incorporating both *actual* and *perceived* agency and pathways. Consider the case where the individual systematically under-perceives both agency and pathways such that

$$\tilde{\pi} = \begin{cases} \pi & \text{if } e_t < e^0 \\ \rho_\pi \pi & \text{if } e_t \geq e^0 \end{cases} \quad (5)$$

and

$$\tilde{\bar{Y}} = \rho_{\bar{Y}} \bar{Y} \quad (6)$$

with $\rho_\pi < 1$ and $\rho_{\bar{Y}} < 1$.² Our intervention aims to increase hope by 1) increasing aspirations ($A \uparrow$), 2) by aligning perceptions of agency with true agency ($\rho_\pi \rightarrow 1$), and by helping subjects to remove only perceived constraints to pathways out of poverty ($\rho_{\bar{Y}} \rightarrow 1$).

3. The Oaxaca hope project

Our model suggests that individuals will increase effort as their aspirations grow, their ability to identify pathways out of poverty sharpens, and the perception of their own agency becomes heightened. If, as we believe to be true in the Oaxacan context, impoverished female entrepreneurs begin with low aspirations and undervalue their own agency and pathways, all these increases in effort should yield higher levels of effort and microenterprise performance. To test these hypotheses, we designed and implemented a field experiment to induce exogenous shifts in aspirations, pathways and agency among this population of subjects.

3.1 Fuentes libres

Fuentes is a faith-based non-profit organization affiliated with the Evangelical Covenant Church that works in two sites of the state of Oaxaca: the Oaxaca City Valley and the Tehuantepec Isthmus. Founded in 1998 to serve low-income indigenous women, *Fuentes* offers financial products to female microentrepreneurs that otherwise may be excluded from the formal financial sector. The organization does little promotion and relies primarily on word-of-mouth: women older than age 18 with a functioning business are invited by

2 A more detailed presentation of this model is given in Lybbert and Wydick (2018).

their peers to join one of *Fuentes*' SCGs. Each SCG is composed of at least 12 women and meets every week for a 16-week loan cycle.³ At the beginning of each cycle, each group member is given an individual *Fuentes* loan to be repaid throughout the cycle in weekly instalments at an interest rate fixed by *Fuentes*. At set weekly meetings, SCG members are encouraged to contribute at least 20 pesos to a SCG savings account,⁴ although this is not a formal requirement. The SCG pool of savings can be used, at the group's discretion, to serve as an additional credit source for the group members at an interest rate decided by the group. The savings and the earned interest are split according to the savings shares of members at the end of each cycle. During the working cycle, a bank officer assigned to each group provides basic financial training, business counselling, and spiritual encouragement to group members. During the time of our fieldwork, three bank officers worked in each of the operation sites. At the end of each 16-week cycle, accounts are fully settled. Barring organizational problems or widespread discontentment among members, the group meets again within two or three weeks to start a new cycle, potentially with new members, as described below.

We worked with 52 SCGs, of which four did not depend on *Fuentes* for credit financing at the time of the study, known as *independent* SCGs. The independent groups, once dependent on *Fuentes* financing and management, are distinct from the other *Fuentes*' groups in at least three characteristics: they have been working for several years, do their own accounting, and, most importantly, they entirely self-finance the credit offered to their group members from group savings. We began collaborating with *Fuentes* in January 2015, launched the project in June 2015 and concluded endline data collection in August 2016. During this period, 21 of the groups operated in the Oaxaca Valley and the remaining 31 operated in the Tehuantepec Isthmus. [Figure 1](#) provides a timeline of the intervention and data collection rounds. The baseline survey was administered from June to September of 2015, followed by a one-month follow-up survey. A 12-month follow-up survey was collected between June and August 2016. For our analysis, we also utilize administrative data on savings and credit disbursement that ranges from six months before the baseline up to six months after the 12-month follow-up.⁵

The *Fuentes* SCGs are not static and their composition can be fluid, which presents some challenges for our study. First, while some groups have been operating for several years, others may dissolve after a few borrowing cycles. Between the baseline and 12-month follow up surveys, 12 SCGs were dissolved. Because group survival to the next loan cycle is an indication of how well the group is serving the needs of its members, we test whether group survival is affected by the treatment using survival analysis. Second, even for continuously functioning groups, a few members can be added at the beginning of each cycle while a few others may leave. Because SCGs are typically located a long distance (many kilometres) from one another, if a new member joins, she routinely joins the group nearest to her home. For this reason, we have little concern about endogeneity in group membership with respect to the treatment even as some women joined groups after the hope treatment

3 Some groups are allowed to function with as few as 6 members under special circumstances.

4 At the time of the study one US dollar was equivalent to around 18 Mexican pesos.

5 [Figure 1](#) also depicts the weekly SCG meetings and the standard 16 week loan cycle of these groups. A particular group's first loan cycle begins with the formation of the group. Since these start dates vary by group, the loan cycles are staggered as shown by the two hypothetical groups depicted at the bottom of [Figure 1](#).

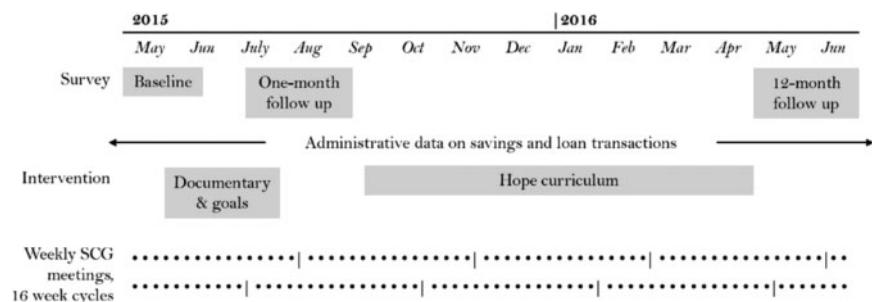


Fig. 1. Timing of intervention and data collection with staggered (hypothetical) SCG meetings and 16 week lending cycles indicated.

began. Moreover, for some of our outcome variables we take group averages as the outcome of interest, which we address in greater detail in the section below.

3.2 Hope intervention

The hope intervention reinforced the three components of hope theory and was rolled out to SCGs in three phases. In the first phase, just after the collection of the baseline data, we presented a mini documentary to the treated SCGs that we specifically commissioned for the project, an approach inspired by Bernard *et al.* (2014). The 25-minute documentary was produced by film students at California State University at Sacramento under the direction of documentary film producer Robert Robert Machoian and Skywalker Studios engineer E.J. Holowicki. The documentary features four actual *Fuentes*' members (two in each operation site) who managed to rise above difficult circumstances and found success in their microenterprise at least partly as a result of the credit and support from their *Fuentes* SCGs.⁶ In this documentary, each woman describes her personal experiences including her economic background, difficulties she faced as child and young adult, and the ways she has learned to achieve goals in her personal life and business. The documentary was structured around an interview guiding these women to discuss aspirations, pathways, and agency based on their experiences. While the women featured in this documentary were chosen because they had achieved a degree of prosperity in their business, they were not exceptional entrepreneurs who possessed resources unavailable to other women belonging to *Fuentes*. Indeed, their backgrounds and daily struggles were familiar to other group members, and successes they described in the interview were consequently within reach for most of their fellow SCG members.

After screening the documentary, a member of our research team guided members of treated SCGs through a discussion of the film and a goal-setting exercise. This consisted of providing to each member of the treated groups a 10x30 cm refrigerator magnet that included three blank fields in which they could record a business sales goal, a savings goal, and another open goal related to their personal lives, families, or businesses. SCG members in the treatment group were asked to place their magnets on their refrigerator as a reminder of their goals.⁷

6 The documentary can be viewed online at <https://www.youtube.com/watch?v=gAidmWKCCD0>.

7 The goal was written with erasable markers and could be reset at any time.

Finally, in a third phase, the bank officers for treated groups followed up with a weekly hope curriculum, which was particularly intensive in the first four weeks, but continued through the year until the 12-month follow-up survey. This hope curriculum consisted of brief weekly discussion topics to help reinforce the role of aspirations, pathways and agency in their business and personal lives.⁸ These sessions included case studies on microenterprise success and stories from successful women inside and outside the group often with a faith-based emphasis. Each week's message was designed to underscore one of the three hope components. It is important to note that this curriculum consisted of a collection of inspirational thoughts, group exercises, and discussions and intentionally excluded teaching hard skills or elements of financial literacy.⁹

3.3 Experimental design

The treatment was randomized at the group level using a matched-pair cluster design. Out of the total 52 SCGs in the study, we created 26 matched pairs based on observable characteristics using a hierarchy of characteristics that officials at *Fuentes* believed to be most influential to group homogeneity and performance. These included, in order of importance, the bank officer, the group size, the experience of the group, the average age of the group members, and the similarity of operated businesses. We created pairs by matching hierarchically based on these ordered criteria. All of the so-formed pairs matched exactly on the first of these criteria and very closely on the second and third, with some heterogeneity in pairs on the remaining the criteria. Within each pair, we then randomly assigned one SCG to treatment and the other to control. This kind of matched-pair cluster randomization tends to improve balance at baseline and increases statistical power (Imai *et al.*, 2009) and is particularly useful with limited numbers of randomization units. As long as the assignment of SCGs to control and treatment groups generated comparison pairs that are more similar to each other than to the other SCGs, controlling for these matched pairs in estimations sharpens the estimated treatment effects of the intervention.

In Fig. 2, we map the two *Fuentes* sites included in the study. Areas A and B correspond to the Oaxaca Valley Site, while areas C, D, and E are those in the Tehuantepec Isthmus site. Although these areas span different municipalities and wider regions, the two sites correspond to the internal administrative division of *Fuentes*. In the Appendix Figure A1, we show the location and pairings of the SCGs in our study.

4. Data and empirical strategy

4.1 Data

Our empirical work utilizes two types of data. First, we use the individual panel survey data collected in the fieldwork stage of the project with baseline in the summer of 2015, a one-month follow-up survey, and a 12-month follow-up survey collected in the summer of

8 Both treatment and control SCGs convene weekly meetings with their bank officer in order to process savings contributions and loan repayments. These standard meetings, which could last up to an hour, typically also include a faith-based message and some discussion of basic financial or microenterprise management. The hope curriculum in treated groups extended these meetings by 15-20 minutes.

9 Curriculum contents can be accessed on the companion website to this paper: <http://oaxacahope-project.weebly.com/hope-curriculum.html>.

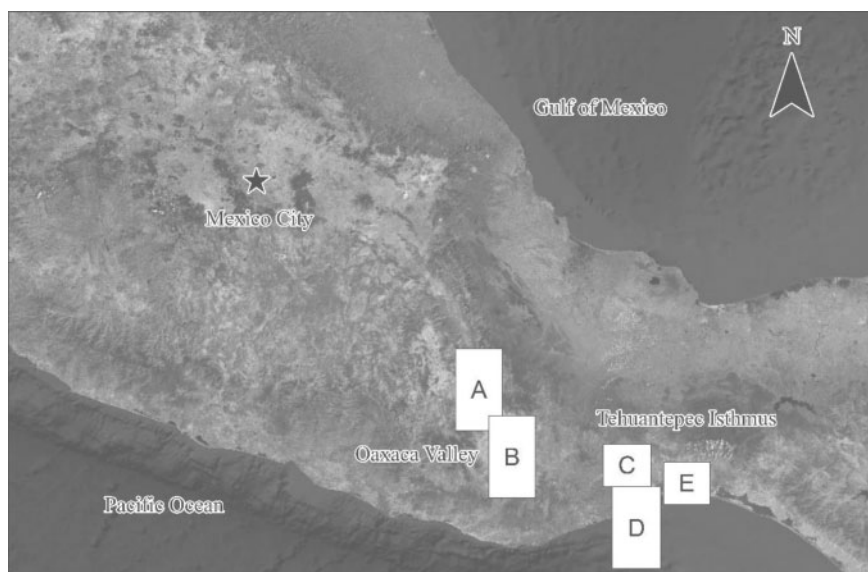


Fig. 2. Location of SCGs included in the study in the state of Oaxaca, Mexico (see Appendix Figure A1 for detailed maps of areas A, B, C, D, and E).

2016. The questionnaire included basic demographic information of the SCG members such as age, schooling, religion, number of children, marital status and type of business owned. We also collected data to construct measures of happiness, hope, aspirations, pathways, and agency, as well as measures of religiosity and microenterprise performance. Survey modules on aspirations, agency, and conceptualization of pathways were inspired by questions in Snyder (1994), but significantly adapted to the context of female entrepreneurship in the Oaxacan indigenous population. Questions were piloted among test groups of entrepreneurs in the area until we were satisfied that they were easily understandable and were able to capture corresponding phenomena as developed in Snyder's (1994) development of hope psychology. In Section 4.2 we give a detailed explanation of the variables included in our questionnaire and how we construct the outcomes of interest. In Appendix A we include our complete translated questionnaire, which was administered in Spanish.

At baseline our sample included 555 SCG members of which 308 were members of treatment groups and 247 of control groups. Of these, 17 (3%) dropped out of groups before one-month follow-up, while 46 new members were added between baseline and one-month follow-up to the 52 groups. Thus, by the end of the one-month follow-up we had included 601 SCG members in either the baseline or the first follow-up. By the 12-month follow-up, 33 SCG members had dropped out, and 132 members had been added. In Appendix C Table C2 we show the number of observations in each possible survey status. Our study thus involved a total of 733 different women, about 69% of which were in treatment or control over the whole duration with the remaining 31% involved in the study in either a treatment or control SCG over part of the study duration. The survey attrition rate from baseline to endline of 5.5% (33/601) was primarily due to members relocating to other states in Mexico without a known phone number. (Appendix C provides additional details related to attrition.) For those groups that were dissolved between the baseline and

12-month follow-up survey period, we scheduled visits with each former member individually in their homes.

The second source of data we use is the administrative data from *Fuentes* that includes—as recorded by the bank officer and verified by group members—the amount of weekly savings and internal loans, as well as the amount of *Fuentes* loans at the beginning of the cycle. Internal loans are financed with the accumulated pool of savings in each group and are given at an interest rate decided by the group. Since these credits depend on the availability of funds, most groups do not offer internal loans until after at least one or two cycles of operation. Other groups do not offer internal credits at all. *Fuentes* loans are externally financed by *Fuentes* and given once at the beginning of each borrowing cycle. We collected administrative data for all 48 of the currently *Fuentes*-financed groups; this data extends before the baseline and after the 12-months follow-up surveys to approximately 16–20 months for most SCGs. Due to some changes of individual members of SCGs at the beginning of each borrowing cycle, when using the administrative data we analyse the financial outcomes using group-level averages by treatment status.

4.2 Measuring psychology, religiosity and business performance

We divide our outcomes into three broad categories: psychological outcomes, religiosity outcomes, and business performance outcomes:

Psychological outcomes: We designed a series of modules in the questionnaire to characterize psychological outcomes of the individuals in our sample based on standard survey instruments in the psychology literature. Rather than use standard psychological instruments, we adapted the principles behind these to our Oaxaca microenterprise context. Responses to these questions allow us to construct indices measuring the degree of awareness and importance of aspirations, pathways, and agency in the woman's personal and financial life. We also elicited measures of happiness, optimism, future-mindedness, and risk-aversion from the women in our sample.

To construct the aspirations index we asked the respondents to evaluate how strongly they agreed with the following five statements using a 10-point scale: 1) 'It is better to accept things as they come rather than dreaming for a better future'; 2) 'It is better to have aspirations for your family rather than accepting each day as it comes'; 3) 'I am very satisfied with the sales and profit from my business'; 4) 'When you have a business it is important to set goals'; and 5) 'I have goals and specific plans for my business growing.' We use responses to these five questions to build an aspirations index using the method proposed by Anderson (2008), which weights down variables in the index proportionally to covariance with other variables. This index captures how important goals and aspirations are in the way the respondent manages her personal affairs and her microenterprise.

Similarly, we construct an agency index that captures the individual's perception of self-efficacy, locus of control, and the relative importance of effort and external forces in businesses performance. To create this index, we ask respondents to evaluate on a 10-point scale how they feel or how strongly they agree with the following questions and statements: 1) 'How important is working hard for the prosperity of your business?'; 2) 'How important is luck for businesses prosperity?'; 3) 'My future is mainly determined by my own actions and not by others' actions'; 4) 'It is difficult for people like me to be a community leader'; and 5) 'Women like me can add for a positive change in our community'.

To construct a measure of a subject's ability to conceptualize pathways out of poverty, we construct a pathways index using respondents' 10-point assessment of how strongly they agree with the following five statements: 1) 'I can find a way to solve most of my challenges'; 2) 'If my business sales are low, I know how to explore new markets'; 3) 'I get easily disappointed when I find obstacles in my business'; 4) 'If I went out of business, I could start a new business with a new product'; and 5) 'Social networks are a means to boost the grow of my business.'

We construct indices of happiness and optimism by asking the respondents, respectively 'how happy do you feel today?' and 'how positively do you feel about the future?' Respondents gave their assessments using a 10-point scale. We construct standardized happiness and optimism indices by subtracting the mean and dividing this difference by the standard deviation of the entire sample. Thus, our measures have a mean of zero and unit standard deviation and variance; impacts for these indices can therefore be interpreted as changes in standard deviation units. We construct two additional indices intended to measure time and risk preferences. First, we construct a future orientation index by asking the respondents to evaluate using a 10-point scale their agreement with the following three statements: 1) 'When I have a task to do I do it right away rather than leaving it for tomorrow'; 2) 'It is more important to enjoy life now rather than making sacrifices to enjoy it more in the future'; and 3) 'I use my business' profits to reinvest rather than to expending on my personal needs.' Based on [Lybbert and Wydick \(2018\)](#), we expect risk aversion to decline as aspirations become stronger. Our risk-aversion index measures agreement with the following three statements: 1) 'In general, I am a person willing to take risks'; 2) 'When I learn about new business opportunities in the market I am willing to take financial risks to invest in those opportunities'; and 3) 'I prefer 100 pesos rather than a coin-flip of 500 pesos or nothing (yes or no).'

Religiosity outcomes: We construct a simple index to measure the religious convictions and commitments the individuals in our sample. While *Fuentes* is a Christian faith-based organization, the female members of *Fuentes* SCGs are not uniformly religious: around 60% of the women in our sample are Catholic, 30% Protestant, and around 10% consider themselves non-religious, without religion, agnostic, or atheist. For our religiosity index we ask: 1) 'How many days a week to you devote time for actively praying or reading the Bible?'; 2) 'How many days a week do you go to church or meet with a church-related group?'; and 3) 'Which of the following statements best describes your religious understanding: 1) God gives opportunities to grow and prosper; 2) God directs every event in your life.' The latter question is used to help understand whether a subject's faith is centred more in aspirational hope (more proactive) relative to wishful hope (more passive).

We explore and discussion of the religious dimensions of both the intervention and its effects on microentrepreneurs elsewhere (see [Wydick et al., 2020](#)).

We use [Anderson's \(2008\)](#) procedure to create two composite hope indices from the pre-specified variables in our pre-analysis plan, which we call *Hope 3* and *Hope 8*. While the indices themselves were not directly pre-specified in our PAP, *Hope 3* is created as the combination of the aspirations, pathways, and agency indices and strictly captures the key elements of Snyder's Hope Theory. *Hope 8* is created as the combination of these three hope components plus the happiness, optimism, time, and risk preference, and religiosity indices. These two composite hope indices are consistent with established practice in psychology and capture a broader characterization of individuals' hope.

Business performance outcomes: Our survey had six questions to capture self-reported measures of business performance. For this, we ask the respondent to report: 1) ‘How many hours did you work at their business in the previous seven days?’; 2) ‘What were your total sales in the last seven days?’; 3) ‘What was your profit in the last seven days?’; 4) ‘How much did you save in your *Fuentes* account the past week?’; 5) ‘How many employees does your business have?’; and 6) Do you have plans for having employees in the future?’ Note that while questions relating to employees and plans for employees were included in our six survey questions measuring effects on economic performance, the latter two questions on employees were inadvertently omitted from our PAP. We use these six individual outcomes to construct a Business Performance Index following [Anderson \(2008\)](#).

4.3 Reduced-form estimation

We estimate treatment effects at the individual level on outcomes using ANCOVA specifications that control for the baseline level of the outcome variables of the following general form ([McKenzie, 2012](#)):

$$y_{ijpt} = \alpha + \tau \text{Treatment}_j + T_t + \theta y_{ijp,t-1} + X_i' \beta + \gamma_p + \varepsilon_{i,t}, \quad (7)$$

where y_{ijpt} is the outcome variable of individual i who is member of SCG j in matched pair p at time t , and which includes measures of hope and hope components, religiosity, time, and risk preferences, business performance, and the specific microenterprise investment measures included in this business performance index. We estimate treatment effects for τ at both one month and 12 months, including controls for the second follow-up time period and observable covariates X_i such as age, education, religion, number, and age of children of each of the individuals. To account for the matched pair cluster randomization design, we control for the matched-pair fixed-effect γ_p , where p indexes the 26 different pairs ([Imai et al., 2009](#)). We cluster the standard errors at the SCG level. While ANCOVA is our preferred specification since it has been demonstrated to provide smaller standard errors, based on our pre-analysis plan we also carry out difference-in-differences, which yield similar results and are available upon request.

For those outcomes that are not aggregated into an index (business hours worked, log of sales, log of profits, log of savings, number of employees, and the dummy indicator for planning to hire employees in the future), we control the type I error rate using the [Benjamini and Hochberg \(1995\)](#) procedure that corrects for the expected proportion of falsely rejected hypotheses—the false discovery rate’ at a 0.05. (In estimation tables, we flag the estimated coefficients that are significant after the correction with the symbol ‘^’.)

Conventional regression analysis relies on sampling-based inference, where uncertainty comes from the sampling error. Since we work with the entire population of *Fuentes Libres* SCGs, this conventional source of uncertainty is, in the strict sense, non-existent in our case. To provide further robustness to our findings, we also carry out randomization inference ([Athey and Imbens, 2017](#)). In randomization-based inference, uncertainty comes from the assignment of the treatment. This provides a particularly compelling robustness check on our statistical inference in this case because of the limited number of randomization units (SCGs) we inherited from *Fuentes*. Specifically, we randomize the group-level treatment assignment 1000 times and estimate [Equation \(7\)](#) in each repetition. This random assignment of treatment yields the distribution of the treatment effects we would expect under the sharp null hypothesis of zero effect ([Kerwin and Thornton, forthcoming](#)). The

randomization inference p -value is given by the share of the repetitions in which the absolute value of the estimated *fake effect* is greater than the actual effect obtained using the real data. We report randomization-inference p -values together with the standard p -values.

4.4 Econometric specification for estimating effects on group outcomes

We use the administrative data to evaluate the effect of our treatment on savings and credit demand. For savings and internal credit, we estimate a modified version of (7) where we substitute the outcomes at the individual level for group average weekly savings and group average weekly demand for internal loans as the dependent variable, and where we control for the week within the current borrowing cycle, an indicator variable for the week of the month, and the pair dummy, and where we cluster the standard errors at the group level. In our ANCOVA specification we include as baseline outcome the mean of the average group weekly savings or internal loan demand for all weeks before the treatment for which we have data.

We also analyse the effect of the treatment on the group average demand for *Fuentes* loans per cycle and the total demand for loans per cycle defined as the group average sum of *Fuente*-financed loans and internal loans. As described earlier, *Fuentes* loans are given once, at the beginning of each cycle. The amount of loans varies individually within a cycle, and across individuals from a cycle to the next one. Here we estimate an analogous version of (7) with data at the cycle level:

$$y_{jpc} = \alpha + \tau \text{Treatment}_j + T_c + \theta y_{jpc_0} + W_j' \mathbf{B} + \gamma_p + \xi_{jc} \quad (8)$$

where y_{jpc} is the log of the loan demand (either *Fuentes* loans or total loan demand). We include a vector of group level characteristics W_j that include the cycle number as a measure of the time a group has been working together. Similarly to our estimation in (7), γ_p is the pair fixed effect. We cluster the standard errors at the group level. For our ANCOVA estimation we include y_{jpc_0} , which is the average of each outcome in all pre-treatment cycles for which we have data.

5. Empirical results

We structure the presentation of our results in this section as follows. First, we estimate simple (non-experimental) correlation functions not contained in our PAP to test how our measures of business performance are shaped by baseline and endline measures of hope. Although these results do not capture causal relationships, they do provide a useful point of departure for our true causal estimates as they suggest that endogenous hope is strongly correlated with business performance. Second, we present and discuss balance tests showing that the randomization of the treatment was successful. Third, we present the ANCOVA results on psychological, religious, and business outcomes from the pre-specified hypotheses in our PAP. Finally, we present exploratory results not included in the pre-analysis plan that we find insightful even if not confirmatory in the strict sense.

5.1 Correlation of hope with business performance

To set the stage for our ANCOVA estimation of the causal effects of our hope intervention on borrower hope and microenterprise performance, we begin by asking whether hope

correlates positively with enterprise performance. First, we estimate the relationship between endline hope on endline business performance measures, as in Equation (9):

$$y_{ijpt} = \alpha + \tau Hope3_{ijpt} + \theta y_{ijp,t-1} + X_i' \beta + \gamma_p + \varepsilon_{it} \quad (9)$$

where the estimate τ is the conditional (on controls) correlation between our index of eight hope variables and business performance. We also estimate this correlation regression using baseline hope, $Hope3_{ijp,t-1}$, as a test of whether baseline levels of hope predict future improvements in business performance. These results are shown in Table 1 and suggest that endline hope and endline business performance are strongly correlated: Borrowers with high *Hope-3* at the end of the intervention have significantly higher sales, profits and business performance. Although slightly weaker and less precise, we also find that higher hope at baseline predicts higher sales and profits a year later. Clearly these results do not imply that high hope causes improved business performance. Indeed, the opposite may be true: the anticipation of a future development that is likely to positively affect business performance may cause entrepreneurs to be more hopeful at baseline. The crux of our research design and analysis is to test whether it is possible to exogenously stimulate hope among borrowers and whether this exogenously-induced hope fosters higher levels of microenterprise performance.

5.2 Balance tests

In Table 2 we show summary statistics of the variables collected in our baseline survey. We test for balance in observable characteristics of individual SCG members and outcomes across the treatment status by regressing the value of each of the characteristics and outcomes on the treatment indicator. We find that only the number of a woman's children younger than 18 years of age seems to be smaller in the treatment group (significant only at 10% level). Although the randomization appears to have been successful, we account for any residual imbalance in the randomization of treatment by controlling for a set of individual characteristics in the estimation of the treatment effects at the borrower level. Table 3 shows the levels of savings, internal loans, and *Fuentes* loans, at the borrowing cycle of the baseline. The mean group average saving is 32 pesos a week and the mean group average internal loan is 109 per week. The mean group average *Fuentes* loan is 3,489 pesos per cycle. None of these financial measures is statistically different across treatment and control groups at baseline.

5.3 Confirmatory results (pre-specified)

The PAP for this project pre-specified several borrower-level outcomes of interest, along with SCG-level outcomes using *Fuentes* administrative data. Here we focus on the reduced-form results that test general implications of the model for psychological, economic, and group financial outcomes. Appendix B describes and presents a pseudo-structural approach to estimating the aspirations-dependent utility function in Lybbert and Wydick (2018) that was also pre-specified.

5.3.1 Impacts on psychological outcomes and religiosity We pre-specified a total of eight psychological and religiosity indices. In addition to presenting the treatment effects on these outcomes, we test the effect on our two composite hope indices (*Hope-3* and *Hope-8*),

Table 1. Correlation of business performance with the Hope-3 index

Dependent variables are:	(1) Log of sales	(2) Log of profits	(3) Bus. Perf. Index
Hope-3 Index at endline (12-month follow up)	0.110*** (0.036)	0.146*** (0.043)	0.118*** (0.038)
Observations	683	683	729
R-squared	0.315	0.251	0.248
Hope-3 Index at baseline	0.057 (0.043)	0.085* (0.046)	0.046 (0.046)
Observations	683	683	729
R-squared	0.305	0.238	0.237

Source: Author's calculations. Notes: standard errors clustered at the group level in parentheses. Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome. All regressions include controls for age, education, a dummy for members self-identified as protestant evangelical, a dummy for bank leaders, number of children, number of children younger than 18 years of age, a dwelling index, a dummy for the type of business, and treatment pair fixed effects.

which we construct as described above.¹⁰ In Table 4 we present the results of the estimation of Equation (7). The relevant coefficients for effects at the short-run follow up is $Treatment \times one\text{-}month\ follow\text{-}up$.¹¹ At one month, we found aspirations to be strongly elevated by the treatment, a 0.27σ increase (Holm-Bonferroni q -value¹² = 0.0082), and positive but insignificant effects on other psychological variables. At the one-month follow-up, we saw a 0.18σ increase in the Hope-3 Index ($p < 0.05$), but an insignificant 0.14σ increase in the Hope-8 Index. One month after treatment, the main impact from the hope intervention appears to have been in elevated aspirations.

At the 12-month follow-up ($Treatment \times 12\text{-}months\ follow\text{-}up$) we find positive point estimates on every measure of hope, with many showing statistical significance. While the effect on aspirations subsided after one year, we find subjects in the treatment group had realized positive and statistically significant increases in agency (0.15σ , $p = 0.03$), conceptualization of pathways out of poverty (0.17σ , $p = 0.02$), optimism (0.13σ , $p = 0.04$), and future orientation (0.12σ , $p = 0.01$), although only for the latter of these outcomes is $q_i < 0.10$. The religiosity index, which had been negative after the one-month follow-up,

10 We intended to include these composite indices of pre-specified variables in our PAP and regret their omission from this plan. Based on the fact that they are simply composite indices of pre-specified outcomes rather than additional outcomes per se, we report results for these indices among pre-specified outcomes, but note this caveat in the results tables.

11 Lybbert and Wydick (2019) includes an analysis of the short-term reduced-form impacts of the hope intervention on borrower outcomes based on the one-month follow-up survey data. We review these results briefly here, focusing mainly on the 12-month follow-up results.

12 q -values are calculated using the Holm-Bonferroni formula $q_i = p_i(m - k_i + 1)$, where m is the number of hypotheses in the family of variables for which we test (for variables within the Hope-8 index, we use $m=8$, and k_i is the ascending ordered ranking of the i^{th} p -value within the family.) Per our PAP, we report p -values for aggregate indices and include q -values as well as p -values for relevant individual indices.

Table 2. Balance test of observed characteristics and outcomes at baseline

	Mean at baseline	Treatment coefficient	Std. error	N
<i>Controls:</i>				
Age at baseline	41.00	2.62	(0.75)	552
Years of completed education	7.31	0.56	(0.46)	552
Identifies as protestant evangelical	0.28	-0.07	(0.05)	555
Number of children	2.91	0.11	(0.17)	552
Number of children under 18	1.34	-0.27*	(0.10)	552
Community bank leader	0.28	-0.02	(0.02)	552
Business: Clothes (dummy)	0.13	0.02	(0.03)	555
Business: Food (dummy)	0.30	0.07	(0.03)	555
Business: Groceries (dummy)	0.06	-0.01	(0.02)	555
<i>Outcomes:</i>				
Aspirations Index	-0.00	-0.03	(0.08)	555
Agency Index	0.02	-0.02	(0.11)	555
Pathways Index	-0.28	0.11	(0.09)	555
Hope-3 Index	-0.11	0.03	(0.09)	555
‘How happy are you today?’	8.68	-0.02	(0.11)	552
‘How optimistic about future?’	8.63	-0.07	(0.14)	552
Future Orientation Index	-0.00	-0.07	(0.09)	555
Risk Aversion Index	-0.12	0.18	(0.09)	555
Religiosity Index	-0.13	0.01	(0.08)	555
Hope-8 Index	-0.12	0.03	(0.08)	555
Business hours worked	35.38	-0.18	(2.14)	541
Log of sales	7.22	0.02	(0.10)	541
Log of profits	6.26	0.01	(0.09)	541
Log of savings	3.50	0.21	(0.08)	549
Employees	0.11	-0.00	(0.03)	541
Plans for Employees	0.54	-0.06	(0.05)	541
Business Performance Index	-0.00	0.06	(0.07)	555
H0: treatment status predicted by observables (p-value)	0.12			

Source: Author’s calculations. Notes: standard errors clustered at the group level in parentheses. Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

showed an increase of 0.14σ . This pattern of results may suggest that aspirations can be changed quickly but it is hard to sustain these changes (perhaps given the self-confirming nature of aspiration feedback loops), while agency and pathways only change more gradually with experience.¹³ Measuring the increase in overall hope, we find that the Hope-3 index increased after 12 months by 0.14σ ($p < 0.05$) and Hope-8 by 0.17σ ($p < 0.01$). A summary of these effects at both one month and 12 months is shown in Fig. 3.

13 An interesting related discussion on the relationship between material wellbeing, happiness and the evolution of aspirations over time can be found in Easterlin (2001).

Table 3. Balance test of financial outcomes at baseline

	Mean at baseline	Treatment Coefficient	Std. error	N
Savings				
Weekly	32.15	4.77	(4.44)	2,223
Log of weekly	3.34	0.18	(0.12)	2,223
Pre-treatment weekly	30.27	7.00	(4.13)	48
Log of pre-treatment weekly	3.37	0.20	(0.11)	48
Internal loans				
Weekly	109.06	-29.35	(24.73)	1,814
Log of weekly	2.06	-0.35	(0.35)	1,814
Pre-treatment weekly	98.34	-28.35	(22.83)	41
Log of pre-treatment weekly	4.35	-1.10*	(0.44)	41
Savings + Internal loans				
Weekly	144.05	-27.79	(27.56)	1,814
Log of weekly	4.13	-0.09	(0.19)	1,814
Pre-treatment weekly	130.93	-25.21	(25.47)	41
Log of pre-treatment weekly	4.72	-0.36	(0.22)	41
Fuentes loans				
Pre-treatment cycles	3,489.90	-270.21	(388.04)	90
Log of pre-treatment cycles	8.09	-0.06	(0.10)	90

Source: Author's calculations. Notes: standard errors clustered at the group level in parentheses. Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3.2 Impacts on economic outcomes As seen in [Table 5](#) and [Fig. 3](#), although sales and profits show large point estimates indicating increases of 16% and 17% respectively at the time of the one-month follow-up, at only one month after the hope treatment began, the treatment did not exhibit statistically significant effects on overall economic outcomes as measured by our business performance index. We did not expect to see changes in employment at the end of one month, and results indicated an essentially zero-point estimate for changes in employees and even plans to add employees to businesses. Savings in community banks increased, but without statistical significance and hours dedicated to the microenterprise surprisingly declined, although not significantly. The composite business performance index shows no change statistically at one month.

By the 12-month follow-up, however, we find that like the psychological and religious outcomes, the point estimate on every economic outcome we measure is positive (see [Fig. 3](#)). This includes hours worked sales, profits, and savings, although point estimates for these variables are relatively low and they are statistically insignificant. We find that the women in the treatment group increased employment in their enterprises relative to the control group ($p = 0.049$, $q = 0.24$). This is important because by far the modal level of employees in both treatment and control was zero; after treatment, eight women in the treatment group added a single employee to their businesses, while zero employees were added in the control group. This increase is a small but remarkable difference given the level and dynamics of employment creation within enterprises in the counterfactual. The treatment group was also far more likely (12 percentage points, $p = 0.00014$, $q = 0.00068$) to indicate that it planned to add employees in the future.

Table 4. Treatment effect on pre-specified psychological and religiosity indices and composite Hope-3 and Hope-8 indices (ANCOVA)

Independent variables are:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Aspirations	Agency	Pathways	Hope-3	Happiness	Optimism	Future Orientation	Risk Aversion	Religiosity	Hope-8
Treatment × one-month follow-up	0.27*** (0.082)	0.04 (0.063)	0.04 (0.083)	0.18** (0.071)	0.07 (0.067)	0.09 (0.075)	0.11 (0.070)	0.04 (0.084)	-0.10 (0.098)	0.14 (0.089)
Treatment × 12-months follow-up	0.02 (0.066)	0.15** (0.068)	0.17** (0.071)	0.14** (0.067)	0.02 (0.048)	0.13* (0.064)	0.12** (0.046)	0.01 (0.066)	0.14** (0.060)	0.17** (0.061)
12-months follow up (dummy)	0.13 (0.096)	0.05 (0.072)	0.20** (0.078)	0.17** (0.078)	0.10 (0.077)	0.03 (0.058)	0.04 (0.059)	-0.10 (0.075)	-0.06 (0.086)	0.05 (0.080)
Age at baseline	-0.01* (0.003)	-0.01 (0.003)	-0.00 (0.004)	-0.01** (0.003)	-0.00 (0.003)	-0.00 (0.003)	-0.01* (0.003)	-0.00 (0.004)	0.01*** (0.003)	-0.00 (0.003)
Years of completed education	0.03*** (0.009)	0.04*** (0.011)	0.03** (0.011)	0.04*** (0.012)	0.01 (0.010)	-0.00 (0.010)	0.01 (0.009)	0.01* (0.008)	-0.01 (0.008)	0.02* (0.012)
Dependent variable at baseline	0.14*** (0.038)	0.26*** (0.030)	0.26*** (0.029)	0.28*** (0.032)	0.19*** (0.034)	0.13*** (0.033)	0.22*** (0.032)	0.23*** (0.037)	0.25*** (0.051)	0.27*** (0.032)
Constant	-0.13 (0.232)	-0.43* (0.220)	-0.35 (0.275)	-0.38 (0.243)	0.05 (0.183)	0.07 (0.220)	-0.23 (0.196)	-0.19 (0.206)	-0.32* (0.175)	-0.37* (0.212)
Observations	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327	1,327
R-squared	0.15	0.21	0.22	0.26	0.08	0.07	0.11	0.12	0.17	0.18

Source: Author's calculations. Notes: Standard errors clustered at the group level in parentheses. Randomization inference p-values in brackets. ** p<0.01, * p<0.05, * p<0.10. All regressions include evangelical and community bank leader (dummies), number of children, number of children under 18 years old, and an index of dwelling quality. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome. All regressions include treatment pair and type of business fixed effects.

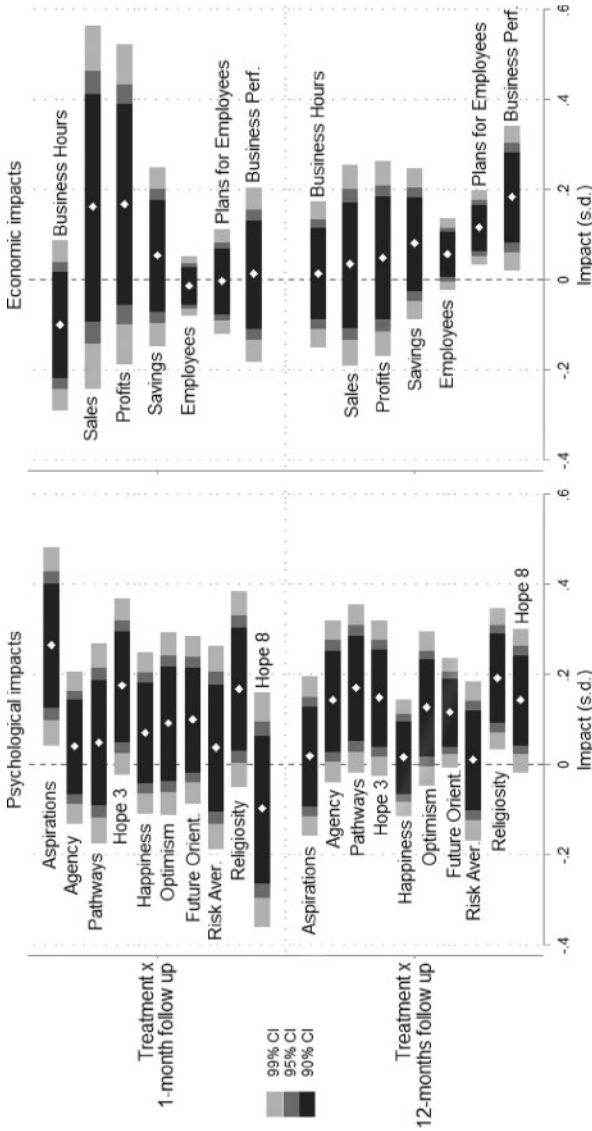


Fig. 3. Reduced-form Impacts from Treatment.

Table 5. Treatment effect on pre-specified economic outcomes and composite Business Performance Index (ANCOVA)

Independent variables are:	(1) Business hours worked	(2) Log of sales	(3) Log of profits	(4) Log of savings	(5) Employees	(6) Plans for Employees	(7) Business Performance Index
Treatment × one-month follow-up	-2.40 (1.687)	0.16 (0.151)	0.17 (0.133)	0.05 (0.074)	-0.01 (0.025)	-0.00 (0.044)	0.01 (0.072)
Treatment × 12-months follow-up	0.27 (0.27)	0.36 (0.36)	0.32 (0.32)	0.60 (0.60)	0.59 (0.59)	0.97 (0.97)	0.87 (0.87)
	0.35 (1.456)	0.034 (0.084)	0.050 (0.081)	0.080 (0.063)	0.057** (0.029)	0.12*** ^a (0.031)	0.18*** (0.060)
12-months follow up (dummy)	0.86 (0.86)	0.63 (0.63)	0.53 (0.53)	0.21 (0.21)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Age at baseline	1.56 (1.800)	0.45*** ^a (0.117)	0.46*** ^a (0.103)	0.14** (0.067)	-0.00 (0.031)	-0.07 (0.041)	0.11* (0.065)
Years of completed education	0.91 (0.91)	0.22 (0.22)	0.19 (0.19)	0.61 (0.61)	0.95 (0.95)	0.03 (0.03)	0.98 (0.98)
Dependent variable at baseline	0.14* (0.076)	-0.00 (0.004)	-0.00 (0.004)	0.00 (0.002)	-0.00 (0.001)	-0.01*** ^a (0.001)	-0.00 (0.003)
Constant	0.39** (0.175)	0.02 (0.014)	0.02 (0.015)	0.01 (0.007)	0.01 (0.004)	0.00 (0.005)	0.02** (0.010)
Observations	0.46*** ^a (0.037)	0.56*** ^a (0.048)	0.53*** ^a (0.051)	0.40*** ^a (0.071)	0.46*** ^a (0.120)	-0.16* (0.091)	0.50*** (0.049)
R-squared	0.91 (4.311)	2.40*** (0.485)	2.21*** (0.386)	1.32*** (0.273)	0.00 (0.094)	1.09*** (0.122)	-0.49*** (0.194)
	1,228	1,229	1,227	1,233	1,228	1,200	1,327
	0.35	0.28	0.25	0.26	0.16	0.17	0.29

Source: Author's calculations. Notes: Standard errors clustered at the group level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Randomization inference p-values in brackets.

^aIndicates that null hypothesis is rejected at a 0.05 level after correction for a false discovery rate (Benjamini and Hochberg, 1995). All regressions include evangelical and community bank leader (dummies), number of children, number of children under 18 years old, and an index of dwelling quality. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome. All regressions include treatment pair and type of business fixed effects.

Because all economic outcomes were positive (albeit many statistically insignificant), the treatment shows a 0.18σ increase in the composite business performance index.¹⁴ The statistical significance of results of the business performance index, however, depends on the inclusion of 'Plans for New Employees' in the index. When we remove this variable, the p -value on the index falls from 0.040 to 0.152. We included 'Plans for New Employees' in the business performance index because plans to add new employees tend to be indicative of a healthy business. However, one could argue that a positive response to this question at least equally represents an aspiration as it does a measure of current business health. If we were thus to move 'Plans for New Employees' into our aspiration index, it would strengthen the results of the treatment on aspirations (and hope generally), but weaken the measured results on current business performance. With this caveat, we interpret our results on business performance as suggestive of modest effects on business performance with business outcomes generally increasing, but with impacts on enterprise variables from our survey at 12 months not as clear or robust as the impacts on psychological variables.

5.3.3 Impacts on group financial outcomes In Table 6 we present the results of using Equation (6) at the group level to estimate the treatment effect on average weekly savings (column 1), average weekly demand for internal loans (column 3), and the sum of savings and internal loans (column 5) as a measure of overall financial activity. The coefficient on the variable *Treatment* gives the treatment effect. We find no statistically significant effect of treatment on savings in columns (1) and (2), even after six months from the initiation of treatment. However, we do find evidence for an increase in internal loan activity, where borrowers in community banks borrow internally from the savings within the community bank. Point estimates are large, showing a 54% increase in column (4) yet with large standard errors ($p = 0.093$, $q = 0.183$). We find no differential of the effect six months after the intervention, and in fact there may be some dissipation in the impact on internal credit demand after six months, as seen in column (4), although the coefficient is statistically insignificant. Columns (5) and (6) show an increase in overall microfinance activity when savings and internal borrowing are included together.

In Table 7 we analyse the effects of the treatment on the cycle group-average *Fuentes* loan. *Fuentes* loans are given at the beginning of the cycle and their size depends on both an initial individual request and an evaluation from the microfinance on the probability of repayment. *Fuentes* loans tend to increase with the age of the borrowing group, so we control for the number of working cycles in our estimation of (7). We did not expect to see a large effect from the treatment on this type of credit given how the formula used to assign the amounts of *Fuentes* loans heavily constrains increases in borrowing. We find that the demand for *Fuentes* loans falls in the first cycles, but then increases sharply in the third cycle, resulting in only a very small and statistically insignificant net increase by the end of the third cycle.

5.4 Exploratory results (not pre-specified)

Our research design and data offer several opportunities to explore results and patterns beyond those pre-specified in our pre-analysis plan. These additional results, while

14 Note that we test the treatment effect on individual outcomes of business performance. Thus, we correct for a false discovery rate using the Benjamini and Hochberg (1995) procedure. The effect on the plans for future employees persists after the correction.

Table 6. Treatment effect on pre-specified community bank outcomes (ANCOVA)

Independent variables are:	(1)	(2)	(3)	(4)	(5)	(6)
	Log of avg. group weekly savings	Log of avg. group weekly savings	Log of avg. group weekly internal credit demand	Log of avg. group weekly internal credit demand	Log of avg. group weekly (savings+ internal credit)	Log of avg. group weekly (savings+ internal credit)
Treatment	0.02 (0.04)	0.01 (0.07)	0.44 (0.30)	0.54* (0.32)	0.39** (0.15)	0.44*** (0.16)
Six months after treatment (dummy)		0.03 (0.08)		0.09 (0.25)		0.16 (0.13)
Treatment × Six months after treatment		0.03 (0.11)		-0.20 (0.24)		-0.02 (0.14)
Cycle number	1.16*** (0.10)	0.12*** (0.04)	0.02 (0.14)	0.01 (0.15)	0.16** (0.07)	0.12* (0.07)
Cycle number squared	0.13*** (0.04)	-0.01*** (0.00)	0.00 (0.01)	0.00 (0.01)	-0.01* (0.01)	-0.01 (0.01)
Dependent variable at baseline	-0.01*** (0.00)	1.15*** (0.10)	0.30 (0.30)	0.35* (0.18)	0.65*** (0.17)	0.67*** (0.16)
Constant	-1.05** (0.44)	-1.00** (0.43)	-0.29 (1.29)	-0.34 (1.36)	0.14 (0.97)	0.21 (0.95)
Observations	2,443	2,443	1,880	1,880	2,121	2,121
R-squared	0.47	0.47	0.40	0.40	0.41	0.41

Source: Author's calculations. Notes: standard errors clustered at the group level in parentheses. Significance codes: *** p<0.01, ** p<0.05, * p<0.1 All regressions follow an ANCOVA specification controlling for the baseline value of the outcome and including treatment pair, number of within cycle week, and month fixed effects.

Table 7. Treatment effect on pre-specified *Fuentes* loans and total microfinance use outcomes (ANCOVA)

Independent variables are:	(1)	(2)	(3)	(4)
	Log of avg. group cycle <i>Fuentes</i> credit demand		Log of avg. group cycle total microfinance use	
Treatment	-0.02 (0.05)	-0.04 (0.05)	-0.10 (0.07)	-0.14** (0.07)
Three cycles after treatment (dummy)		0.04 (0.06)		-0.02 (0.05)
Treatment × Three cycles after treatment		0.09 (0.08)		0.15** (0.07)
Cycle number	0.12*** (0.04)	0.09** (0.04)	0.12*** (0.04)	0.11*** (0.03)
Cycle number squared	-0.01*** (0.00)	-0.01*** (0.00)	-0.01** (0.00)	-0.01** (0.00)
Dependent variable at baseline	0.57*** (0.11)	0.63*** (0.09)	0.81*** (0.12)	0.76*** (0.11)
Constant	3.22*** (0.85)	2.94*** (0.72)	1.18 (1.05)	1.76* (0.97)
Observations	143	143	113	113
R-squared	0.57	0.59	0.75	0.77

Source: Author's calculations. Notes: standard errors clustered at the group level in parentheses. Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome and including treatment pair fixed effects.

exploratory, we believe are insightful and suggest potential directions for future research on these topics. We briefly describe three such sets of results and refer readers to an additional set of heterogeneity tests available in [Appendix D](#).

5.4.1 Moderation and heterogeneous effects To test for heterogeneous effects, we assess the effect of moderators, baseline values of key variables in our study that may amplify or diminish treatment effects on our overall business performance index. Specifically, we interact 18 potential moderators both with 1-month treatment and 12-month treatment. Results from moderation tests are given in Table 8 with a larger set of results in [Appendix D](#). In general, effects from the treatment on the business performance index appear to be larger among those who are less happy and optimistic at baseline, although the interaction between treatment and these variables has only borderline statistical significance. Other psychological variables do not seem to moderate the effects of the intervention although low-hope entrepreneurs realized much greater gains in hope, equal to approximately 0.33σ (see Appendix Table D5).

Impacts are also stronger among the women entrepreneurs with lower levels of sales, profits, and savings at baseline. For example, the expected impact on our business performance index for a woman with baseline business sales half a standard deviation above the mean is approximately 0.09σ , but for those with baseline sales that were half a standard

deviation below the mean, the impact rises to 0.25σ , with nearly identical impact results for differences in baseline profits. More details can be seen in Appendix Table D5. Our study provides evidence that the impacts of hope and aspirations interventions are likely to realize bigger impacts among less (initially) confident entrepreneurs with smaller enterprises.

5.4.2 Mediation of impact We can use a mediation test to see whether increases in hope act as a channel for the positive impact we find on our business performance index. An intuitive way of thinking about mediation is in terms of the well-known [Baron and Kenny \(1986\)](#) mediation triangle in [Fig. 4](#). The direct effect of the treatment on the outcome is given by arrow *c*. The indirect effect of the treatment is the product of the effect of the treatment on the mediator (arrow *a*) and the effect of the mediator on the outcome (arrow *b*). We estimate the indirect and total effect of treatment on business performance with the different components of hope (aggregate and disaggregate indices) as mediators using structural estimation. The results of these estimations are presented in [Table 9](#). We base our inference on 95% confidence intervals constructed using a Monte Carlo method as in [Preacher and Selig \(2012\)](#).

Evidence of mediation requires the significance of the ($a*b$) indirect effect, and secondly, that the significance of the treatment variable diminishes as it is included in a regression of the outcome variable along with the mediation variable. As [Table 9](#) shows, with *p*-values on ($a*b$) lower than the 0.05 critical value, we find significant evidence of a pathway to increased business performance through our Hope-3 index (as well as through conceptualization of pathways and agency individually). Yet because the treatment variable does not diminish when it is included with the mediators in this regression, it also appears that other dimensions of the hope treatment perhaps not fully measured or captured by our mediator variables also positively affected business performance.

5.4.3 Group survival as treatment outcome We also study whether the treatment influenced the rate at which the groups were dissolved during the year after the treatment began. We perform a survival analysis at the group cycle-group level since only at the end of each cycle groups are in risk of being dissolved. In [Fig. 5](#), we present the Kaplan-Meier estimated survival functions of the probability of each group of surviving *c* cycles or beyond, for both the treatment and controls groups. These estimated survival functions show that treated groups outlasted control groups by approximately two cycles on average. To formally test this differentiated survival rate as a treatment effect from the hope intervention we estimate a Weibull proportional-hazards survival model, parameterized with the treatment indicator and the dummy indicator for treatment pairs. The coefficient on the treatment indicator is -8.86 (standard error= 2.61), which indicates an estimated statistically significant lower probability of treatment groups to be dissolved at each of the observed cycle.

One potential concern with this result might be that our partner *Fuentes* made a disproportionate effort to keep treated SCGs functioning for the duration of the study. While we cannot directly test if this is the case, based on our communication with officials at *Fuentes* before, during, and after the 12-month intervention, we are confident that aside from the hope curriculum treatment and control SCGs were given access to the same services and support. The disbanding of SCGs after the completion of a 16-week loan cycle typically reflects unfavourable or dysfunctional group dynamics, conflicts or other tension among members, and lack of repayment. Although we cannot rule out other explanations, it seems plausible that increased survival of the treated SCGs was due at least in part to the hope

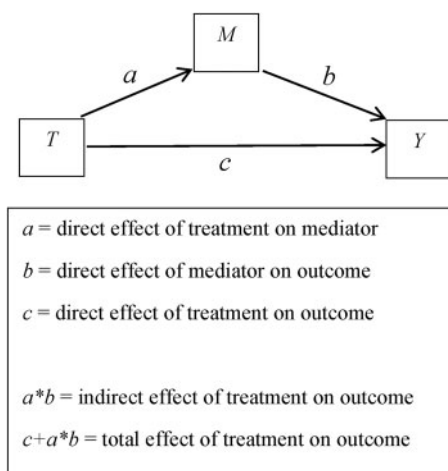


Fig. 4. Mediation Triangle.

intervention itself, including more favourable group dynamics and relationships among the women in these groups.

6. Conclusion

Poverty—especially persistent poverty—often emerges from the interactions and interdependencies between layers of constraints. Disappointing impacts found in areas such as educational interventions (e.g. [Beuermann et al., 2015](#)) or entrepreneurial interventions such as microfinance (e.g., [Banerjee et al., 2015](#)) may in part reflect this tangle of constraints: Relaxing an external constraint may do little to address internalized constraints that continue to bind and keep many in a state of poverty. Understanding the role that internal constraints play in the formation of poverty traps is a critical concern not only for researchers, but for practitioners, who have a similar desire to understand why many interventions that convincingly relax external constraints in practice display limited effects.

We find that a hope intervention focused on augmenting aspirations, conceptualization of pathways out of poverty, and personal agency raised all three of these components of hope, albeit with different temporal lags. In the first month, the hope treatment increased aspirations significantly but had no measurable effect on pathways and agency measures. One year later, the effect on aspirations faded, and the effects on pathways and agency were significant and large in magnitude. This pattern of results seems sensible: Aspirations may be more malleable in the short run than an individual's perceptions of possible pathways to achieving these goals and her sense of agency to pursue and reach these goals. Enhancing pathways and agency, on the other hand, may come only slowly through steady trial and error – and with an accumulation of small successes. This can be seen in other instances, such as in [Goux et al. \(2017\)](#), who find that a randomized intervention focused on low-achieving students in Paris was able to successfully adjust aspirations of students over time to vocations in line with their academic achievement, reducing dropout rates by 25–40%.

Table 8. Moderation tests for impact on Business Performance Index (ANCOVA)

Moderator at Baseline →	(1) Happiness	(2) Optimism	(3) Aspirations	(4) Agency	(5) Pathways	(6) Future Orient.
Treatment	0.183*** (0.060)	0.178*** (0.061)	0.183*** (0.060)	0.186*** (0.060)	0.193*** (0.060)	0.185*** (0.061)
Treatment × Moderator	-0.099* (0.058)	-0.082 (0.059)	-0.011 (0.067)	-0.064 (0.074)	0.078 (0.066)	-0.042 (0.046)
Moderator at Baseline →	(7) Risk	(8) Spirituality	(9) Hope-3	(10) Hope-8	(11) Bus. Hours	(12) Bus. Sales
Treatment	0.181*** (0.059)	0.190*** (0.059)	0.184*** (0.061)	0.180*** (0.060)	0.311*** (0.090)	0.487*** (0.150)
Treatment × Moderator	-0.007 (0.053)	0.069 (0.060)	0.005 (0.073)	-0.043 (0.061)	-0.004 (0.003)	-0.053* (0.024)
Moderator at Baseline →	(13) Profits	(14) Savings	(15) Employees	(16) Plans for Employees	(17) Bus. Perf. Index	(18) Anderson Per. Index
Treatment	0.484*** (0.147)	0.419*** (0.144)	0.231*** (0.068)	0.217*** (0.078)	0.186*** (0.059)	0.187*** (0.060)
Treatment × Moderator	-0.061*** (0.027)	-0.081* (0.046)	-0.307 (0.207)	-0.074 (0.137)	-0.083 (0.110)	-0.057 (0.109)

Source: Author's calculations. Notes: Coefficients show the 12-month impact on the business performance index (above) and the impact of 12-month treatment x the potential moderating variable measured at baseline. Standard errors clustered at the group level in parentheses. Significance codes: *** p<0.01, ** p<0.05, * p<0.10. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome and including treatment pair, number of within cycle week, and month fixed effects.

Table 9. Mediation tests of psychological and religiosity outcomes on business performance

Mediator	(1) Effect of treatment on mediator <i>a</i>	(2) Effect of mediator on outcome <i>b</i>	(3) Indirect effect <i>a*b</i> [95% CI]	(4) H0: <i>a*b</i> < 0 p-value	(5) Effect of treatment on outcome controlling for mediator	(6) Previous estimate of effect of treatment on outcome
Aspirations Index	0.02 (0.07)	0.02 (0.02)	0.0005 [-0.0038,0.006]	0.42	0.18 (0.06)	0.18 (0.06)
Agency Index	0.15 (0.07)	0.07 (0.03)	0.0103 [0.0001,0.026]	0.02	0.17 (0.06)	0.18 (0.06)
Pathways Index	0.17 (0.07)	0.09 (0.04)	0.0149 [0.001,0.0359]	0.01	0.17 (0.06)	0.18 (0.06)
Hope-3 Index	0.14 (0.07)	0.08 (0.03)	0.0114 [-0.0002,0.0295]	0.03	0.17 (0.06)	0.18 (0.06)

Source: Author's calculations. Notes: Standard errors clustered at the group level in parentheses. The standard error of ($a*b$) is calculated following Preacher and Selig (2012). We take the estimated a and b and their covariance matrixes to generate 10,000 draws of \tilde{a} and \tilde{b} and calculate the product $\tilde{a}*\tilde{b}$. The percentiles of this sampling distribution serve as the limits of the 95% confidence interval. We also test whether $a*b > 0$ by computing the proportion of times when $\tilde{a}*\tilde{b} > 0$. Full evidence for mediation requires the coefficients estimated in column 5 to fall relative to the original estimates of the impact of the treatment on business performance in column 6. All regressions follow an ANCOVA specification controlling for the baseline value of the outcome and include controls for age, education, a dummy for members self-identified as protestant evangelical, a dummy for bank leaders, number of children, number of children younger than 18 years of age, a dwelling index, a dummy for the type of business, and treatment pair fixed effects.

Our hope intervention increased the composite index of the three elements of Snyder's aspirational hope increased by 0.14 standard deviations, yet displayed positive but mostly insignificant effects on individual measures of microenterprise performance, including hours devoted to the business, enterprise sales, and savings. However, because all of our economic measures display positive effects, an index of enterprise performance increases significantly by 0.18 standard deviations among the treated entrepreneurs. Effects from the hope intervention on microenterprise, like the effects of microfinance itself, appear to be heterogeneous. In contrast to other microfinance studies that show the biggest effects on somewhat larger and more profitable enterprises (Crépon *et al.*, 2015), our intervention appears to generate larger effects on those that are initially smaller and less-profitable.

While we take this as an encouraging sign that exogenous hope and aspirations interventions may be able to elevate impacts on interventions such as microfinance, there are important caveats to our results. First, the significance of the effect we find on our overall economic impact index is sensitive to the inclusion of plans to hire new employees. This being said, demand for internal loans does not compose part of our pre-specified economic impact index, and we find substantial impacts on this economic variable as we measure it at the SCG level. As a result, we interpret our results of the hope intervention on business performance as offering suggestive, but not definitive, evidence of economic impacts. Second, unlike some previous studies (e.g. Bernard *et al.*, 2014) we have no 'placebo treatment' in which subjects watched a documentary or intentionally received attention from experimenters in matters unrelated to hope or aspirations development. We justify this

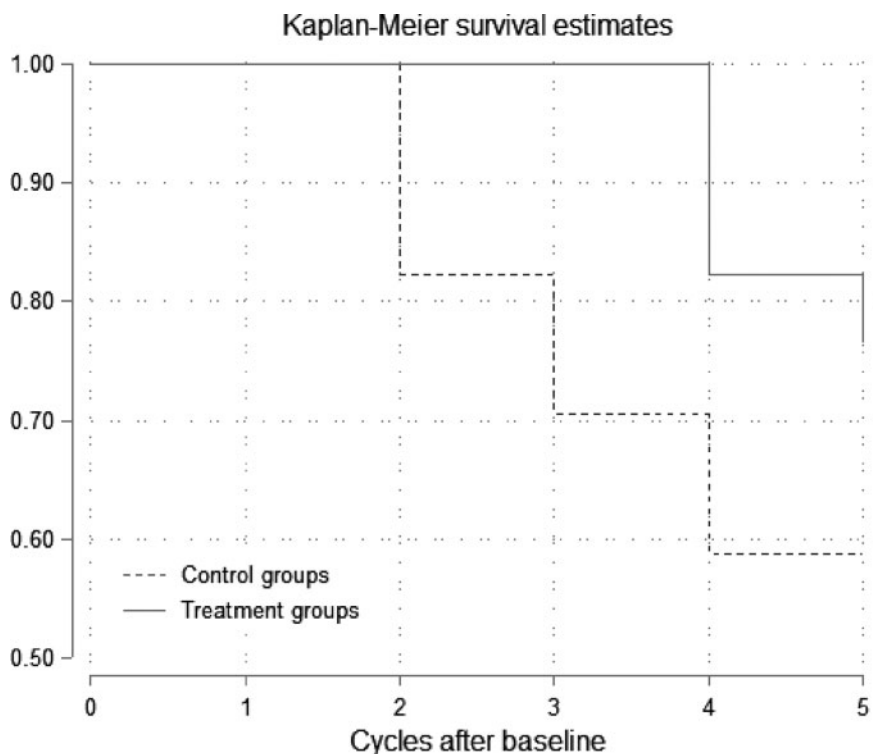


Fig. 5. Group survival test.

based on the context of our study in which (unlike subjects in rural Ethiopia) all subjects had abundant exposure to media and non-treated community groups and still received weekly attention from *Fuentes* personnel. Third, the lack of reduction in the impact of the treatment on business performance after controlling for our hope index may indicate that the treatment had impacts (perhaps related to aspirational hope or other influences) that were not picked up in our measures of these phenomena.

While this study suggests that key components of hope can be increased by an external intervention, and modest evidence that increased hope elevates the performance of microenterprises, we consider this to be one of the first rather than last words on the topic of aspirational hope and movements out of poverty. Indeed, our results appear to raise a number of important questions. These include whether there is a difference between the kind of (endogenous) hope that emerges within an individual based on personal traits and experiences and the kind of hope that we may try to create exogenously through an intervention. We find that both endogenous and exogenously-induced hope relate measurably to microenterprise performance. Endogenous hope may be a more resilient form of hope as it is the result of a self-confirming equilibrium reinforced by experiences and updated beliefs. Yet it may be that exogenous hope interventions are able to help begin this process of endogenous hope creation. Differentiating between these types of hope and their effects on improving tangible economic outcomes remains an intriguing and important avenue for further research.

Supplementary material

[Supplementary material](#) is available on the OUP website. These include the data and replication files as well as an [online appendix](#) with supplemental tables and figures as referenced in the main text.

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