Courant Research Centre

'Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis'

Georg-August-Universität Göttingen
(founded in 1737)

Discussion Papers

No. 238

The Value of Skill Training Programs for Self-Employment, Entrepreneurship and Non-Cognitive Traits. Evidence from a Regression Discontinuity Design

SHUBHA CHAKRAVARTY, MATTIAS LUNDBERG, PLAMEN NIKOLOV, JULIANE ZENKER

September 2017

Platz der Göttinger Sieben 5 · 37073 Goettingen · Germany
Phone: +49-(0)551-3921660 · Fax: +49-(0)551-3914059

Email: crc-peg@uni-goettingen.de Web: http://www.uni-goettingen.de/crc-peg

The Value of Skill Training Programs for Self-Employment, Entrepreneurship and Non-Cognitive Traits. Evidence from a Regression Discontinuity Design*†

SHUBHA CHAKRAVARTY[1], MATTIAS LUNDBERG[2], PLAMEN NIKOLOV[2,3], and JULIANE ZENKER[4]

Current Draft: September 12, 2017

Using a "fuzzy" regression discontinuity design, we examine the short-run impacts of a vocational training program on self-employment, new business plans, entry into entrepreneurship and entrepreneurial traits using data from the Nepal Employment Fund training program, which funds training workshops offered to eligible individuals. We find striking positive effects of training on self-employment among transformative entrepreneurs. Among individuals who our analysis identifies as transformative entrepreneurs, training provision increases the likelihood of self-employment by 0.21, or equivalent to a 50 percent increase in self-employment from the baseline average. We find impact differences by gender: self-employment increase by 21 percent among women and we detect no impacts among men. The program also generated sizable improvements in self-reported self-regulation and a decreased frequency of anxiety about future income. The female sub-sample and the most labor-intensive training types primarily drive the positive program impacts.

Keywords: Regression Discontinuity Design, Human Capital, Labor Markets, Self-employment, Entrepreneurship, Nepal

JEL Codes: J24, M53, L26, O15

†Corresponding author: Plamen Nikolov, Assistant Professor of Economics, State University of New York, Department of Economics, Library Tower, PO Box 6000, Binghamton, NY 13902. Email: nikolov.pv@gmail.com

*We thank Siroco Messerli and Bal Ram Paudel for facilitating all aspects of this study. Data collection for this paper has been supported through the Swiss Development Corporation (SDC), the UK's Department for International Development (DFID), The World Bank's Multi-donor Trust Fund for Adolescent Girls. Headed by Madhup Dhungana, New Era Limited provided exceptional support with survey design, survey implementation and data management. At the World Bank, Jasmine Rajbhandary, Venkatesh Sundararaman, and Bhuvan Bhatnagar. Amita Kulkarni, Uttam Sharma and Jaya Krishna Upadhaya coordinated survey activities. Ali Ahmed, Marine Gassier, and Jennifer Heintz provided outstanding research support.

[1] The World Bank
[2] Assistant Professor, State University of New York (at Binghamton), Department of Economics.
[3] Harvard University Institute for Quantitative Social Science
[4] University of Göttingen.

1 Introduction

Self-employment plays a central role in labor markets in low-income countries. Fifty-three percent of workers in low-income countries and thirty-six percent workers in middle-income countries are self-employed (Ginding and Newhouse 2014). In South Asia and Africa self-employment rates hover around 80 percent and tend to be even higher in urban areas (Chen and Duane 2008; Heinz and Valodia 2008; Banerjee and Duflo 2011). Not only is self-employment pivotal as own source for individual income in low-income countries, but in South Asia's rural areas microenterprises generate the majority of non-farm jobs (Fox and Sohnesen 2012). Although most of those who work for themselves earn little due to being rationed out of wage jobs (de Mel, McKenzie and Woodruff 2010; Fields 1975; Tokman 2007) or because of their own preference for autonomy and flexibility (Maloney 2004), a small group among those who are self-employed become innovative and successful entrepreneurs with ambitions and potential for business growth (Bennett and Estrin 2007; de Soto 1989), which in turn can translate to higher economic growth (Ehrlich, Li, Liu 2017). Schoar (2010) distinguishes between the two types, calling them subsistence and transformational entrepreneurs, where the first type typically operates small businesses as an alternative employment opportunity for themselves whereas the latter group – under the right circumstances – could grow their business enterprise rapidly and create jobs for others.

In this paper we use a vocational skill-training program in Nepal to examine the short-run causal effects of training on transformational entrepreneurs' employment, future business plans, and financial outcomes. In particular, we focus on self-employment rates, entry into entrepreneurship, savings, and loans. We, further, examine the impact of training on self-regulation -- an index we build of various non-cognitive traits and which is strongly related to entrepreneurial success.[5] Finally, we examine program impacts on two proxies of individual well-being -- life satisfaction and anxiety about future income.

We use a regression discontinuity approach to identify causal effects by exploiting an exogenous feature of trainee selection into the intervention. To accept trainees into the program, program officers assigned scores to candidates based on predefined criteria. A selection

[5] Self-regulation is related to the concept of "grit", ''the tendency to pursue long-term challenging goals with perseverance and passion" (Duckworth, Kirby, Tsukayama, Bernstein, & Ericsson, 2011, p. 175) and grit was shown to influence subsequent entrepreneurial success (Mooradian et al. (2016)

threshold determined acceptance into the program. People who scored above the threshold were assigned to training, while applicants whose scores fell below the threshold were not assigned to training workshops. We use this discontinuity in the forcing variable to identify the impacts of training by comparing outcomes for people "near" the cut-off who received training with individuals who did not receive it. Identification comes from the assumption that potential outcomes and are smooth around the cutoff in absence of the program. To distinguish between subsistence self-employment and transformative self-employment we construct an index variable for transformative entrepreneurs using principle component analysis, which is a scalar measure combining various entrepreneurship-related traits based on Schoar (2010) and De Mel et al. (2010). We find striking positive effects of training on self-employment among transformative entrepreneurs. Among individuals who our analysis identifies as transformative entrepreneurs, training provision increases the likelihood of self-employment by 0.21, or equivalent to a 50 percent increase in self-employment from the baseline average. We see stark and large positive gains on the self-regulation index and large decrease in the frequency of worrying about income in the last month. Examining the impacts for the subsistence entrepreneurs, we find no effect on self-employment activities, yet the plans for starting a business in the future decrease strongly. An explanation for this result may be, that new employment opportunities due to training decrease the necessity to become self-employed. This interpretation is manifested when looking at other financial-related outcomes: for the subsistence type we detect large and positive impacts on having savings and logged savings as well as a decrease in anxiety about income.

We also detect patterns of program impacts by gender and trade of training. We find stark differences in program impact on self-employment rates by gender. The impact on self-employment is statistically significant for women, while we detect no significant program impacts in the male sample. The pattern of impact among entrepreneurial-related traits seems to be consistent by gender, though women seem to exhibit larger gains on self-regulation and life satisfaction, whereas men exhibit larger gains in decreased of frequency about income source worries. The gender results are repeated when we look at impacts by trade. We find large and statistically significant changes in self-employment rates among individuals in the female-pronounced handicraft and incense-stick making occupations. Further, we detect large (yet insignificant) coefficients for the also strongly female-pronounced beauty and garment-making

related occupations, while coefficients for the male-pronounced trades are typically small and insignificant.

This paper makes three important contributions to the existing empirical literature on self-employment and entrepreneurship. First, although previous studies examine various determinants for entry into self-employment in developing countries, in this paper we focus on the role of human capital for self-employment and entrepreneurship.[6] Previous empirical evidence documents the role of government regulation (Schoar 2010), cognitive skills (Hafer and Jones 2015), non-cognitive skills (Huber, Sloof and Van Praag 2014), access to capital (de Mel, McKenzie and Woodruff 2010), cash grants (Blattman, Fiala and Martinez 2013) and financial literacy (Krause, McCarthy and Chapman 2015). Most closely related to our research question are Premand et al. (2016) and Oosterbeek, van Praag and Ijsselstein (2010) who focus on entrepreneurship education. Premand et al. (2016) examine the effect of entrepreneurship education among students in Tunisia in 2010[7], whereas Oosterbeek, van Praag and Ijsselstein (2010) examine the impact of a leading entrepreneurship education program on college students' entrepreneurship skills and motivation using an instrumental variables approach in a difference-in-differences framework.[8] Both studies find no evidence of program impacts on self-employment. Our second contribution relates to how we measure self-employment: we account for heterogeneity by entrepreneurial type and specifically attempt to identify program impacts among transformational entrepreneurs. While studies focus on the impact of business practices only a limited number of studies focus on the consequences of business training on entrepreneurship (Bruhn and Zia, 2013; Drexler, Fischer and Schoar 2014; Karlan and Valdivia 2011; Klinger and Schundeln 2011; De Mel, McKenzie, and Woodruff 2014). One of the few studies by Fairlie, Karlan, and Zinman (2015), for instance, finds mixed effects of entrepreneurship training on business ownership in the United States. Our third contribution is that we estimate program impacts not only on self-employment rates but also on self-regulation -- an important entrepreneurial trait -- in a developing country context.[9] Non-cognitive skills and

[6] Labor market policies have generally focused on the productivity among low-skilled youths or the unemployed (Kluve, Rother, and Sa´nchez-Puerta 2010; Almeida, Behrman, and Robalino 2012). Most of the recent empirical studies focus on wage-employment in Latin American (e.g., Attanasio, Kugler and Meghir 2011; Card, Ibarraran, Regalia, Rosas-Shady and Soares 2011).

[7] In their intervention, students start with intensive business training to develop, modify, or refine an initial business idea. Students took twenty days of full-time training at local employment offices.

[8] Oosterbeek, van Praag and Ijsselstein (2010) exploit the fact that the program was offered to students at one location of a school but not at another location of the same school. Location choice (and thereby treatment) is instrumented by the relative distance of locations to parents' place of residence.

[9] A recent non-experimental intervention in South Africa examines training impacts on personal initiative (Solomon, Frese, Friedrich and Glaub 2013).

traits can influence long-term labor market outcomes in developed countries (Heckman, Stixrud and Urzua 2006) and the degree to which training can stimulate theses traits in a developing country context has barely been previously examined.

Section 2 details the Employment Fund training program in Nepal and the design of the intervention. Section 3 details the sample, data collected and study outcomes. Section 4 outlines our empirical strategy. Section 5 presents our results. Section 6 provides robustness checks. Section 7 concludes.

2 Program Background

2.1 Nepal's Employment Fund

Started in 2008, the Employment Fund (EF), one of the largest skills training programs in the country, funds vocational training in Nepal. The EF subsidizes training courses from existing training providers for young and vulnerable populations. Training courses vary across a wide range of trades (*e.g.,* incense stick rolling, carpentry, tailoring, welding and masonry). In addition, all females receive 40 hours of life skills training (beginning in 2011) and a sub-set of trainees receive a short course in basic business skills. Table 1 and Table 2 show the total number of training providers, number of training events, and number of trainees.

Upon completion of the classroom-based training, the EF places emphasis on job placement services. EF verifies trainees' employment status three months and six months after the completion of the training. Upon verification, training providers receive an outcome-based payment from the EF that is higher for trainees who are employed. The outcome-based payment system creates strong incentives for the training providers to provide placement assistance and provides graduates with an opportunity to put their new skills to work immediately after the training. The EF emphasizes the placement of trainees into "gainful" employment by paying higher rewards for trainees placed in jobs in which they earn a minimum of 3,000 NRs (≈40 USD) per month.[10] Further, providers receive higher payments for training and placing women and trainees from vulnerable groups.

[10] The definition of "gainful" employment was increased in 2012 to 4,600 NRs (≈60 USD). Throughout this paper, we use the 2010 exchange rate of 75 NRS to 1 USD.

2.2 Eligibility for Training and Selection of Trainees

Three factors comprise the eligibility criteria for all EF-sponsored training programs: age (from 16 to 35), education (below SLC, or less than 10 years of formal education), and low self-reported economic status.[11] Only applicants who meet all three criteria were viable for short-listing.

Based on the pool of eligible candidates, providers followed a standardized ranking procedure to select candidates into training. The process for ranking candidates and interviewing shortlisted candidates followed streamlined guidelines, including a detailed scoring rubric, instructions for ranking the shortlisted candidates by score, and selecting the top-scoring candidates for participation. Figure 4 displays a sample ranking form used by training providers. The individual score used in ranking candidates consisted of five components (detailed in Appendix Table A1): trade-specific education, economic status, social caste, geographic area, and interview score. Individuals were rated on each of these components and each component had a weight assigned to each category. Each individual then had a calculated score by summing across components. In each course, applicants with scores above a pre-determined threshold were assigned to training, while applicants whose scores fall below the threshold were not. The sampled applicants above the threshold comprise this study's treatment group, while those below the threshold make up the control group. Although eligibility for training based on the actual score influenced the likelihood of training course enrollment, individual assignment to training was not automatic as it was envisioned because of likely provider manipulation of the component scores, an issue which we address below.

3 Survey Design, Data and Study Outcomes

3.1 Sampling Method

Our primary source of data comes from a survey covering three consecutive cohorts of trainees (from 2010 to 2012), with two rounds of data collection for each cohort. Figure 1 depicts the data collection timeline. We sample at the training event and at the applicant level. The main

[11] An applicant is considered "economically poor" if they report a non-farm per capita household income of less than 3000 Nepali rupees (NRs) per month or, in the case of farming families, less than 6 months of food sufficiency.

sampling frame for data used in this study consisted of all training courses sponsored in a given year. The number of training events comprising the sample frame ranges from 598 (in 2010) to 711 (in 2012). Table 1 reports the number of events and participants by year. First, we selected a subset of training events occurring between the months of January through April.[12] Second, from the universe of training events offered during these four months, we randomly selected up to 15 districts. Third, from that list of training events occurring in these districts, we randomly selected 20 percent of the training events. Finally, a survey team visited each sampled training event on the day when applicant selection took place. Each event's ranking sheet listed the shortlisted applicants from the top-scorer to the bottom and indicated the threshold, or minimum score needed to gain admission to the course. From this ranking sheet, the survey team selected applicants whose scores were within 20 percent of the threshold for admission to training events. The baseline survey was administered immediately following the ranking of applicants and before the results of the selection process were announced.

Table 2 shows the resultant sample of events for the three cohorts. The 2010 event sample comprised 64 events across 30 districts. The 2011 sample comprised 182 events, of which 113 events were dropped from the baseline survey, either because the survey team could not reach the event on the day of applicant selection or because the event was not "oversubscribed".[13] The remaining 69 events in 34 districts were included in the 2011 baseline sample. In 2012, 85 out of 112 sampled events were included in the study sample. Events that were more likely to attract young women were oversampled in all cohorts.

This sample selection method for training events could potentially have implications for generalizability to all EF-sponsored training sessions. In all three cohorts, training events that enter our study sample tend to be based in district centers, tend to be oversubscribed training events, and tend to be run by high-capacity training providers.

3.2 Survey Data, Sample Description and Study Outcomes

The study sample comprises 4677 individuals across all three cohorts. The pooled sample is 64 percent female and the average age was approximately 25 years old. Approximately 12 percent of the sample engaged in a form of self-employment – 13 percent of self-employment

[12] Eighty percent of EF training events occurred during these four months.

13 Where possible, providers were instructed to rank 50 percent more applicants in the ranking sheet compared to the available slots in the course. Events were dropped when oversubscription was not possible due to low applicant numbers.

among the sample of rather-transformational entrepreneurs and 10 percent of self-employment among the subsistence self-employed type. A substantial fraction of the sample, approximately 79 percent report having a planned own business-related income generating activity in the next 12 months. Approximately 61 percent of the sample reported having any type of savings and 35 percent report having an outstanding loan. Among the study sample, the average individual reports worrying on a weekly basis about not being able to keep a job or income source. In terms of well-being, the average life-satisfaction score is 21 (out of a 36-point index). The average reported self-regulation score is 47 on 64-point scale (higher scores denote higher self-reported ability on a range of self-regulating behaviors, such as being able to set a plan, carry out a plan, stay focused, control one's mood, etc).

We collected survey data both at baseline and one-year follow-up. Survey response rates were approximately 90 percent for all follow-up surveys (see Table 3).[14] We were able to track and successfully interview 88 percent of the baseline survey respondents, yielding a final sample for analysis of 4,101 individuals.[15] We explore the possibility of "*differential attrition*" and show no evidence to support it. In Table 4 we show the results of a panel-based regression with attrition as a dependent variable on a set of covariates and the regression results indicate that attrition is not correlated with treatment status.

Both the baseline and follow-up questionnaires collect basic data on demographic, socio-economic, and the study outcomes. We collect data on self-employment rates, entry into entrepreneurship, and various entrepreneurial traits. The two main study outcomes are self-employment and future business plans. We capture change to current self-employment status with survey responses to the following question: "*Do you currently own or operate a business, either alone or jointly with someone else?*" We capture business plans and changes to future business plans using the following question: "*Are there any new income generating activities that you are planning to start in the next 12 months?*"[16]

We also examine two other sets of outcomes: entrepreneurial-related financial outcomes (savings and loans) and entrepreneurial-related non-cognitive outcomes (self-regulation, worries

[14] Because the EF-sponsored training courses vary in length from 1 to 3 months, the follow-up survey examines outcomes 9 to 11 months after the end of the training.
[15] The reasons given for loss to follow-up for the 2010 and 2011 cohorts include: inability to track the household (11%), no one in the household during multiple visits (15%), refusal (8%), and respondent migrated for work within Nepal or abroad (8%), respondent migrated after marriage (10%), or other (40%).
[16] The survey questionnaire contained a specific section on business-related activities and elicited directly from each respondent his or her intention to start a business-related self-employment activity in the next 12 months.

about future income source, and a life satisfaction score). Our self-regulation score (from 0 to 64) is computed based on a set of 16 questions focused on ability to set goals, ability to focus one's attention span, ability to avoid temptations, ability to self-organize, ability to stick to plans, and general ability to maintain self-control. Higher score on this composite index indicate higher ability to self-regulate. The self-regulation variable is most closely related to the concept of "grit" which has gained traction in recent psychology and entrepreneurship studies (Duckworth, Kirby, Tsukayama, Bernstein, & Ericsson, 2011, p. 175). Grit, defined as ''the tendency to pursue long-term challenging goals with perseverance and passion" was shown to influence subsequent entrepreneurial success (Mooradian et al., 2016). Mooradian et al. (2016) show that grit positively influences entrepreneurship outcomes through its influence on innovation and performance. Further, we compute a continuous score capturing one's anxiety about future income based on answers to the following question: "*How often did you worry that you will not get or keep a good job?*". Higher values on the income worry variable reflect increased frequency of these negative emotions in the last month. Finally, we compute life satisfaction as an index (from 0 to 36) based on current satisfaction with educational level, with relationship with one's family and friends, with one's job, with one's earnings, with living situation and with life as a whole. Higher values on the index indicate higher level of overall satisfaction.

To distinguish between transformational and subsistence entrepreneurs we, further, create a binary indicator to classify self-employment into two types. The measure is based on empirical analysis by Schoar (2010) and De Mel et al. (2010), who note that self-employment in developing countries is often a temporary transition for individuals that serves as an alternative to unemployment. Schoar (2010) argues that entry into subsistence self-employment is characterized by low human capital and a strong motivation to support families, while entry into business ownership (or transformational entrepreneurship), is characterized by higher human capital and higher willingness to take risks. We use data from variables collected in baseline to create a composite index, which we use to distinguish between subsistence self-employment and transformative entrepreneurship: years of schooling, a cognitive Raven's test based on six questions, responses from a module eliciting entrepreneurial attitudes, and financial literacy. The six questions on the Raven's progressives test consisted of visual geometric design with a missing piece that each respondent was asked to fill. The test taker was given six choices to pick from and fill in the missing piece based on a logical pattern. A survey module assessed each

respondent's ability in several entrepreneurship-related areas: to run a business, to work in a team, identify income generating activities, to obtain credit from a financial institution, to manage financial accounts and to collect the money someone owes to him or her. Based on these sub-areas, we created a composite entrepreneurship skills index. We also created a financial literacy score based the following areas: whether one how to make a budget for the household, whether one had actually written a budget before, whether one kept track of his or her money, ability to compute simple and compound interest, and knowledge of bank services and products.

We discuss the methodology we use to create a proxy continuous index of transformative entrepreneurship to distinguish between the two types of self-employment in the empirical methods section.

4 Empirical Approach

4.1 Estimating Treatment Effects of the Training Intervention

The individual-specific eligibility score enabled training providers to use an arbitrary threshold to select individuals to whom to offer training. We exploit this cutoff as an exogenous variation in one's probability of training assignment and to estimate the causal effects of training. In practice, training providers had room for discretion in the selection process of trainees and likely partially influenced training placements with partial manipulation of the individual-specific scores or the cutoff. We address potential manipulation of the individual scores (McCrary 2008) by following the framework of several empirical papers and reconstruct the 'actual' individual-specific score from survey data (Miller et al. 2013; Currie and Gruber 1996; Cutler and Gruber 1996; Hoxby 2001). We also re-estimate the score cutoff for each training course based on the approach in Chay, McEwan, and Urquiola (2005) and Miller et al. (2013). We use the reconstructed score as an instrument for training placement similar to Hahn, Todd, and Van der Klaauw (2001). We first instrument training placement with:

$$Trained_i = \alpha + \gamma_1 AboveThreshold_{ic} + \gamma_2 TotalScore_i + \gamma_3 RelativeScore_{ic} + \epsilon_i \,, \quad (1)$$

where $Trained_i$ is an indicator for whether or not an applicant i received training, $AboveThreshold_{ic}$ is an indicator, based on the reconstructed score for each applicant, set to 1 if one's score is greater or equal to the estimated score cutoff for the respective course c he or she applied to. $TotalScore_i$ is one's reconstructed assignment score, and $RelativeScore_{ic}$ (the forcing variable) is the difference between one's reconstructed assignment score and the estimated course score cutoff. $AboveThreshold_{ic}$ is the excluded instrument in this two-stage procedure.

We then estimate:

$$\Delta Y_i = \varphi + \lambda_1 Trained_i + \lambda_2 TotalScore_i + \lambda_3 RelativeScore_{ic} + \varepsilon_i \,, \qquad (2)$$

where λ_1 captures the causal effect of training on the differenced outcome Y_i. To estimate the causal effects of the training program, we focus on individuals with simulated training eligibility scores very close to the cutoff, i.e., applicants with calculated scores within five index points of the estimated cutoff.[17]

4.2 Principal Component Analysis: Distinguishing Transformational Entrepreneurs from Subsistence Entrepreneurs

Describing the concept entrepreneurship is central to the challenge of the measurement of entrepreneurship. Entrepreneurship is an attribute of individuals, which is best operationalized as a multidimensional set of domains. To obtain meaningful information on how to recognize entrepreneurship, we must determine a core of latent domains and their boundaries to identify the type of entrepreneurship that underpins new ventures, stirs innovations, generates business size growth and creates restructuring of the new economics. We separate self-employment into two groups, which allows for heterogeneity among self-employed individuals. The first group we attempt to identify are those who become self-employed as a means of providing subsistence income, which we call the subsistence self-employed. The second group, which we call transformative entrepreneurs, are the self-employed who act like entrepreneurs and aim to create larger and more dynamic ventures that eventually tend to grow well beyond the scope of subsistence needs. To distinguish between the two types, we build on a framework by Schoar

[17] We re-estimate the same procedure within, four-index, five-index, and ten-index points and the estimates persist across these various bandwidths.

(2010) and De Mel et al. (2010) who examine and identify several dimensions that distinguish the two groups: human capital, cognitive skills, financial literacy and attitudes towards risk. The authors find that the transformational entrepreneurs scored much higher on different measures of IQ, willingness to take risk, motivation, and the level of managerial and financial literacy.

We use these variables and based on information from our baseline survey, we construct an entrepreneurship index, which we then use to create a binary indicator that enables us to distinguish subsistence self-employment from transformative entrepreneurship. We construct the index based on a Principal Component Analysis (PCA).

We use the PCA method to reduce the dimensionality of correlated variables that capture various domains of the same intended concept, transformative entrepreneurship. We achieve this reduction of variable dimensionality by estimating *n* weighted linear combinations containing the proxy variables. The linear transformation produces *n* uncorrelated components (linear combinations) that are the eigenvectors of the system; combined they contain the same information as the original variables. By design, the first component contains the most information (largest eigenvalue), whereas the last contains the least. We reduce several variables that relate to business growth based on Schoar (2010) and De Mel et al. (2010) to one index by retaining the component with the largest overall variance (eigenvalue). Since PCA is sensitive to scaling and our variables don't have similar scales, we use the correlation matrix in the weighting procedure.

In our analysis, we find that the first component explained 58 percent of the overall variance, and has an eigenvalue of 1.40 (total variance is 2.41). The first two components explain about 60 percent of the total variance. The weights for the first component enter positively in the linear equation describing the composite score. This suggests that high levels of the variables, within the first component, translate into higher levels of the composite index. We opt for the first component as a collective proxy of transformative entrepreneurship in our analysis. In Appendix A, Table A.6 exhibits the PCA component loadings based on the four measures discussed previously.

4.3 Heterogeneous Effects

We examine for heterogeneous program impacts by gender, by type of training trade and by self-employment type. We do so as to determine the treatment effects for these sub-groups.

Following Becker et al. (2013)'s framework for estimating heterogeneous local average treatment effects in the RDD context we estimate:

$$\Delta Y_i = \varphi + \lambda\, Trained_i + \lambda\, H_i x Trained_i + \lambda\, H_i + \lambda\, TotalScore_i + \lambda\, RelativeScore_{ic} + \varepsilon_i\,, \quad (3)$$

where H_i denotes the subgroup indicator.[18,19]

5 Results

5.1 Balance across Discontinuous Eligibility

In Table 5 we show results testing the assumption that no individual characteristics, other than training enrollment and the running variables, vary across the eligibility cutoff. We regress individual attributes that could not reasonably change in response to training enrollment (age, ethnicity, gender, or educational attainment among adults) using specifications (1) and (2). With the exception of the variables age and education, we fail to detect variation cross the threshold for these demographic variables. The results of our 2SLS approach are stable to inclusion of age and education. In Figure 5, we present graphical evidence that no distinguishable difference exists around the threshold of the running variable for individual attributes unrelated to treatment.

[Table 5 about here]

5.2 Probability of Treatment Assignment and Continuity of Interaction Variables Around the Threshold

To show that probability of treatment jumps at cut-off of the individual training score, we present the probability of treatment assignment in Figure 6. We observe a clear jump in the

[18] We use the predicted probability of training and its interaction with the subgroup indicator as instruments for $Trained_i$ and $H_i x Trained_i$.
[19] To predict the probability of training, we estimated a Probit model regressing the training indicator on the subgroup indicator H_i, the assignment indicator $AboveThreshold_{ic}$, an interaction of the two, as well as the total and the relative score variables.

probability of treatment across the cut-off. Figure 5 and Appendix Figure A1 provide additional evidence that the subgroup indicators, variables we employ in our heterogeneous treatment effects analysis (entrepreneur type, applicants gender and trade of training), are continuous across the threshold. This visual analysis thereby confirms that assignment status is uncorrelated with the interaction variables conditional on the relative assignment score (which we control for in all specifications).

[Figure 6 about here]

5.3 Impacts on Business Plans, Self-Employment Rates, Entrepreneurial Traits, and Well-Being

Table 7 presents the results on self-employment and planned new businesses in the next 12 months for the pooled 2010, 2011, and 2012 cohorts. For the whole sample, program impact on self-employment is a probability increase of 0.15 but statistically insignificant at conventional levels, from a baseline of 12 percent (results in the first row of Table 7). We find strong evidence of consistent negative impact on new business plans for the next 12 months from a high baseline of 79 percent. This negative impact on future business plans is in parts likely a byproduct of the positive program impact on current self-employment (very close to statistical significance at the 0.10 percent level). Once individuals carry out their plans to start an enterprise the need for future business plans is likely dampened for the subsequent 12 months. The remaining decrease in business plans may be due to a potential increase in wage employment opportunities due to training. This explanation would be consistent with the assumption that part of our sample – the subsistence type -- only plans a business as an alternative to unemployment.

[Table 7 about here]

Table 7 also presents program impacts on an index of various non-cognitive traits and two indicators of well-being. We see stark and large positive gains on the self-regulation index and a large decrease in the frequency of income worries in the last month. In the full sample, we detect no significant program impacts on savings, outstanding loans, or life satisfaction.

5.4 Impacts Disaggregated by Entrepreneur-Type

[Table 8 about here]

To better understand the effects of training on "true" entrepreneurship, we examine program impacts on the two types of self-employment, subsistence self-employment and transformative entrepreneurship, in Table 8. Interestingly, we find striking and large positive program impacts on the business plan and self-employment outcomes among individuals of the rather transformative entrepreneur type. The likelihood of self-employment increases by around 21 percentage points due to program assignment, approximately a 156-percent increase from the baseline average. Further, new business plans are reduced by 32 percentage points in this group, which we interpret as a sign of longer-term commitment of fresh entrepreneurs to their newly started businesses. We, further, detect very large and positive impacts on the self-regulation index and a large decrease in the frequency of anxiety about future income.

While we detect no program impacts on self-employment among the subsistence self-employment type, we see a decrease in business plans – a result that is consistent with our definition of the subsistence type, who only plans a business as an alternative to unemployment. As training also increases the chance to find wage-employment, the decrease in business plans among the subsistence group is likely a result of better job opportunities after participation in the program. This interpretation is further strengthened by the fact that we detect large positive impacts on savings and logged savings for the subsistence type, which hints to improved economic conditions for members of that group. We observe a statistically significant increase in any savings of 37 percentage points from a baseline probability of 65 percent. The pattern of these results is consistent with Schoar (2010)'s argument regarding defining properties of the two self-employed types. For the subsistence type self-employment is merely an alternative employment opportunity and to meet subsistence needs and potentially for their family members. Interestingly, we observe both decreased frequency of worries about future income sources and an increase in savings for this type of self-employed individuals which is consistent with that fact that such self-employment enterprises typically do not grow and rely in savings to meet the high marginal utility of consumption of their owners. This is especially salient for individuals who live in extended families and more successful family members are expected to provide for the rest of their relatives. In sum, for this type of self-employed individuals training seems to have

more of a poverty alleviating effect as opposed to acting as a catalyst to remove constraints for further business growth.

5.5 Impacts Disaggregated by Gender and Trade

We examine program impacts by gender in Table 9. We find stark differences in program impacts: Among women, the probability of self-employment raise by 20 percentage points from a baseline average of 12 percent (or a 160 percent increase). We detect no such impacts in the male sample. However, program impacts on new business plans for the next 12 months are large and negative for both samples. The effect is considerably larger for men than for women, yet the difference is not statistically significant. The pattern of program impacts on the index of various non-cognitive traits and two indicators of well-being is consistent when we factor in gender, though women seem to exhibit slightly larger gains on self-regulation, whereas men seem to exhibit larger gains in experiencing a decreased of frequency of income source worries (yet, both differences not significant). Further, we detect large improvements in any savings for women, whereas men exhibit no improvements in any savings due to training.

[Table 9 about here]

Three factors likely account for these different patterns by gender. First, the EF introduced life skills training for women in 2011 in all of its training courses.[20] First, men and women apply for different types of trades. We grouped training courses into six broad categories (see Panel 1 of Table 6). Most of the training courses tend to be heavily gender-segregated. For example, men tend to dominate electronics and construction courses, while the tailoring, beautician, and handicraft trainings are comprised almost exclusively of females. When looking at impacts by trade the gender sorting is again evident. Training affects self-employment particularly in female-driven trades, where coefficients are large and positive (however only some are significant), while coefficients are close to zero or even negative in male pronounced trades, see Table 10. Moreover, it is possible that business regulations or entry costs differ between trades and make it easier to start a business in fields related to trades that women sign

[20] The forty-hour curriculum covered topics such as negotiation skills, workers' rights, sexual and reproductive health, and dealing with discrimination. Female students overwhelmingly responded positively to the life skills training, often claiming that it was one of their favorite parts of the course. The skills learned and the positive experience in this life skills training may contribute to the increased employment impact for women, which is line with the advice from experts in vocational training from around the world, who increasingly advocate for the inclusion of life skills in technical training programs

up for in training courses. It may be, for instance, be relatively expensive to obtain machinery necessary for starting a construction or electrician business. Second, it is possible that women are more likely to choose self-employment as it enables them to carry out an income generating activity in their home (compared to wage employment where they usually have to leave the house), which may be more in line with local gender norms. Finally, because all women received life-skills training, we cannot disentangle the influence of this factor, from other program elements, on outcomes.

[Table 10 about here]

6 Robustness Checks

To investigate the robustness of our results of impacts on self-employment among the group of transformative entrepreneurs, we re-estimate a variety of alternative non-parametric specifications based on our main estimating equations. Appendix Tables A2-A5 present all results for the alternative bandwidth of 4 index scores and show that all specifications are similar both in statistical significance and coefficient magnitude. We further re-estimate equations (1) and (3) with various bandwidth choices for the entrepreneur-type related results. In Table 11 we compare estimates from the alternative bandwidths of 3, 4, 5 and 10 index scores of the threshold. Table 11 provides evidence of a consistent pattern of the program impacts and shows stability in the coefficient magnitudes.

[Table 11 about here]

7 Conclusion

Most workers in low-income countries are self-employed. Examining factors with the potential to boost the second type of self-employment, among self-employed transformative entrepreneurs, can be particularly informative from a policy perspective. In the context of very high youth unemployment in low-income countries (World Bank 2013), factors on the demand side of the labor market and ones that promote private sector development and entrepreneurship among young people can be a partial solution to the youth employment challenge. Using a regression discontinuity design exploiting an applicant score cutoff that determines placement

into a vocational training program, we examine the effects of a training intervention in Nepal on self-employment rates, new business plans, financial outcomes, an index of various non-cognitive traits, and two indicators of well-being. Among individuals whom our analysis identifies as rather transformative entrepreneurs, training provision increases the likelihood of self-employment by 0.21, or equivalent to a 156 percent increase relative to the baseline average. Disaggregating the impact for the self-employment by gender, we find a statistically significant probability increase of 0.20 from a baseline average of 0.12 (or a 160 percent increase) for women; we detect no significant program impacts among men. We also see improvements on the self-regulation index and a decrease in the frequency of income worries in the last month across all specifications.

Our findings—beneficial outcomes for transformative entrepreneurs, females and large positive impacts on self-regulation and future income worries—have three important implications. First, we shed light on the role of human capital for self-employment and entrepreneurship and we provide strong evidence that vocational training programs can play an important role for increasing transformative entrepreneurship. Future research will need to examine whether the benefits of policies aimed to boost entrepreneurship through this approach are likely to exceed the program costs. Second, we show that training interventions seem to be an effective strategy to boost self-employment among certain populations: In our sample, the intervention shows benefits for women and particular trades. More generally, the results of this study show that the quest for boosting female entry into self-employment could be supported by training programs, which can play a beneficial role towards that policy objective in low-income countries. Finally, our paper sheds light on program impacts for entrepreneurial and non-cognitive traits in a developing country context. The causes and consequences of personality traits for the labor market and entry into entrepreneurship in a developing country context have not been previously examined. Future studies can shed more light on the importance of such traits for self-employment and entrepreneurship, and in particular on the specific mechanisms that underlie entrepreneurial success.

References

Almeida R, Behrman J, Robalino D. The right skills for the job? Rethinking training policies for workers. : World Bank; 2012.

Attanasio O, Kugler A, Meghir C. Training Disadvantaged Youth in Latin America: Evidence from a Randomized Trial. 2008;NBER Working Paper 13931.

Attanasio O, Kugler A, Meghir C. Subsidizing vocational training for disadvantaged youth in Colombia: Evidence from a randomized trial. American Economic Journal: Applied Economics 2011;3:188-220.

Banerjee A, Duflo E. Poor economics: A radical rethinking of the way to fight global poverty. : PublicAffairs; 2012.

Bennett J, Estrin S. Entrepreneurial entry in developing economies: Modeling interactions between the formal and informal sector. London School of Economics, working paper 2007.

Blattman C, Fiala N, Martinez S. Generating skilled self-employment in developing countries: Experimental evidence from Uganda. Quarterly Journal of Economics, forthcoming 2013.

Bruhn M, Zia B. Stimulating managerial capital in emerging markets: the impact of business training for young entrepreneurs. Journal of Development Effectiveness 2013;5:232-66.

Card D, Kluve J, Weber A. Active labour market policy evaluations: a metaanalysis. 2009;Austrian Center for Labour Economics and the Analysis of the Welfare State Working Paper, (0902).

Card D, Ibarrarán P, Regalia F, Rosas D, Soares Y. The Labor Market Impacts of Youth Training in the Dominican Republic. Journal of Labor Economics 2011a;29:267-300.

Card D, Ibarrarn P, Regalia F, Rosas-Shady D, Soares Y. The labor market impacts of youth training in the Dominican Republic. J Labor Econ 2011b;29:267-300.

Chay KY, McEwan PJ, Urquiola M. The central role of noise in evaluating interventions that use test scores to rank schools. Am Econ Rev 2005;95:1237-58.

Chen M, Doane D. Informality in South Asia: a review. Background paper for the Swedish International Development Cooperation Agency (Sida), Unpublished Working Paper 2008.

Cho Y, Honorati M. Entrepreneurship programs in developing countries: A meta regression analysis. Labour Economics 2014;28:110-30.

Currie J, Gruber J. Health insurance eligibility, utilization of medical care, and child health. The Quarterly Journal of Economics 1996a;111:431-66.

Currie J, Gruber J. Saving babies: the efficacy and cost of recent changes in the Medicaid eligibility of pregnant women. Journal of political Economy 1996b;104:1263-96.

Cutler DM, Gruber J. The effect of Medicaid expansions on public insurance, private insurance, and redistribution. Am Econ Rev 1996;86:378-83.

De Mel S, McKenzie D, Woodruff C. Business training and female enterprise start-up, growth, and dynamics: Experimental evidence from Sri Lanka. J Dev Econ 2014;106:199-210.

De Mel S, McKenzie D, Woodruff C. Who are the microenterprise owners? Evidence from Sri Lanka on Tokman versus De Soto. In: Anonymous International differences in entrepreneurship. : University of Chicago Press; 2010. p. 63-87.

De Soto H. The other path: The informal revolution. New York 1989.

Drexler A, Fischer G, Schoar A. Keeping it simple: Financial literacy and rules of thumb. American Economic Journal: Applied Economics 2014;6:1-31.

Duckworth AL, Kirby TA, Tsukayama E, Berstein H, Ericsson KA. Deliberate practice spells success: Why grittier competitors triumph at the National Spelling Bee. Social psychological and personality science 2011;2:174-81.

Ehrlich I, Li D, Liu Z. The Role of Entrepreneurial Human Capital as a Driver of Endogenous Economic Growth. Journal of Human Capital 2017:11:310-351.

Fairlie RW, Karlan D, Zinman J. Behind the GATE experiment: Evidence on effects of and rationales for subsidized entrepreneurship training. American Economic Journal: Economic Policy 2015;7:125-61.

Heckman JJ, Stixrud J, Urzua S. The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. J Labor Econ 2006;24:411-82.

Hoxby CM. All school finance equalizations are not created equal. The Quarterly Journal of Economics 2001;116:1189-231.

Maitra P, Mani S. Learning and earning: Evidence from a randomized evaluation in India. Labour Economics 2017;45:116-30.

Maloney WF. Informality revisited. World Dev 2004;32:1159-78.

McCrary J. Manipulation of the running variable in the regression discontinuity design: A density test. J Econ 2008;142:698-714.

McKenzie D, Woodruff C. What are we learning from business training and entrepreneurship evaluations around the developing world? The World Bank Research Observer 2013:lkt007.

Meyer BD. Natural and quasi-experiments in economics. Journal of Business and Economic Statistics 1995;13:151–161.

Miller G, Pinto D, Vera-Hernndez M. Risk protection, service use, and health outcomes under Colombia's health insurance program for the poor. American Economic Journal: Applied Economics 2013;5:61-91.

Mooradian T, Matzler K, Uzelac B, Bauer F. Perspiration and inspiration: Grit and innovativeness as antecedents of entrepreneurial success. Journal of Economic Psychology 2016;56:232-43.

Ñopo H, Saavedra-Chanduví J, Robles M. Occupational training to reduce gender segregation: The impacts of ProJoven. 2007;Inter-American Development Bank Working Paper #623.

Oosterbeek H, Van Praag M, Ijsselstein A. The impact of entrepreneurship education on entrepreneurship skills and motivation. Eur Econ Rev 2010;54:442-54.

Premand P, Brodmann S, Almeida R, Grun R, Barouni M. Entrepreneurship Education and Entry into Self-Employment Among University Graduates. World Dev 2016;77:311-27.

Puerta MLS. Training programs for the unemployed, low-income, and low-skilled workers. The Right Skills for the Job?: Rethinking Training Policies for Workers 2012:133.

Rubin DB. Randomization Analysis of Experimental Data in the Fisher Randomization Test. Journal of the American Statistical Association 1980;75:591–593.

Schoar A. The divide between subsistence and transformational entrepreneurship. In: Anonymous Innovation Policy and the Economy, Volume 10. : University of Chicago Press; 2010. p. 57-81.

Sykes NP, Govender KK. Entrepreneurship as the career choice of previously disadvantaged youth in South Africa: To be or not to be?

The World Bank. New Work Opportunities for Women in Jordan. 2010;2014.

Todd PE. How to Improve Women's Employability and Quality of Work in Developing and Transition
Economies. http://www.womeneconroadmap.org/sites/default/files/Todd_Improve%20Women%20Employability%20and%20Quality%20of%20Work.pdf2013.

Tokman VE. Modernizing the informal sector. UN/DESA Working Paper 2007;42:1-13.

World Bank. World Development Report 2013: Jobs. 2012;Washington, DC. DOI: 10.1596/978-0-8213-9575-2.

FIGURE 1. PROJECT TIMELINE AND SAMPLE SIZE

	2010			2011			2012		
2010 Cohort (N=1556; 1184 Treatment, 372 Control)	Baseline Survey	Training →		First Follow-up Survey →					
2011 Cohort (N=1586; 1237 Treatment, 349 Control)				Baseline Survey	Training →		First Follow- up Survey →		
2012 Cohort (N=1535; 1044 Treatment, 491 Control)							Baseline Survey	Training →	

FIGURE 2. DISTRICTS COVERED IN 2010-2011

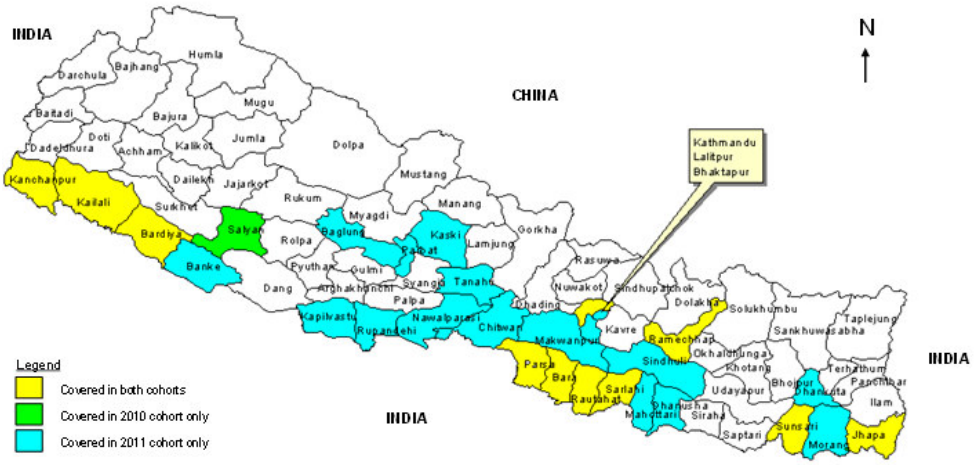


FIGURE 3. DISTRICTS COVERED IN 2012

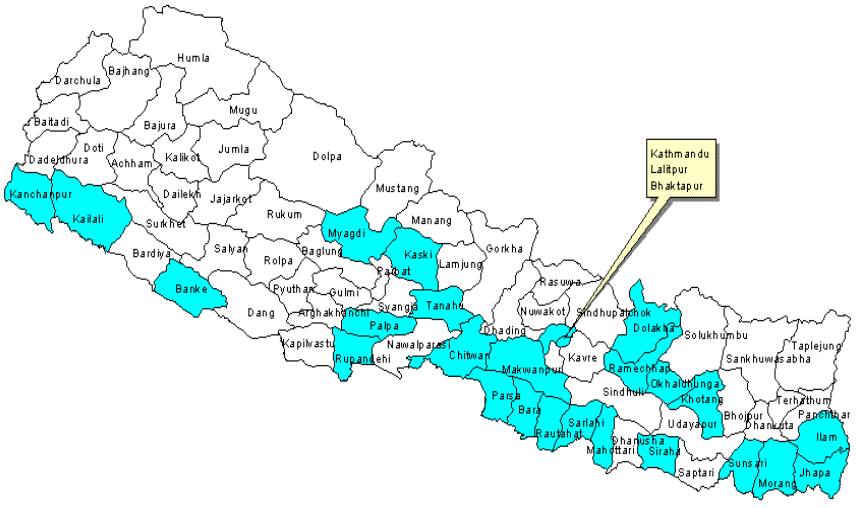
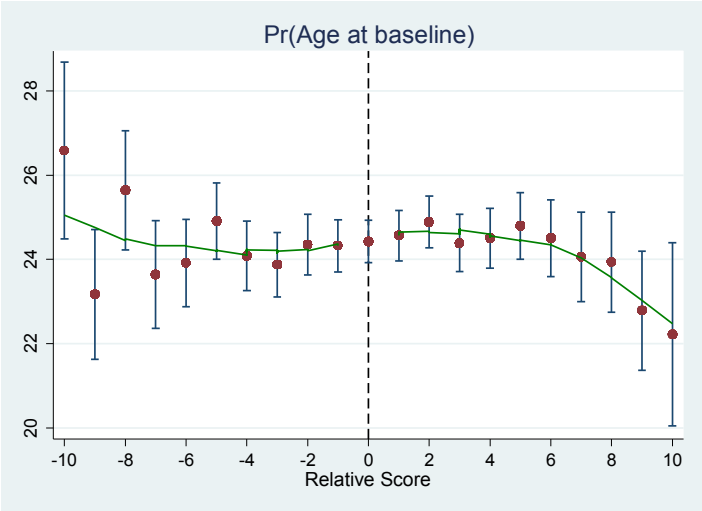


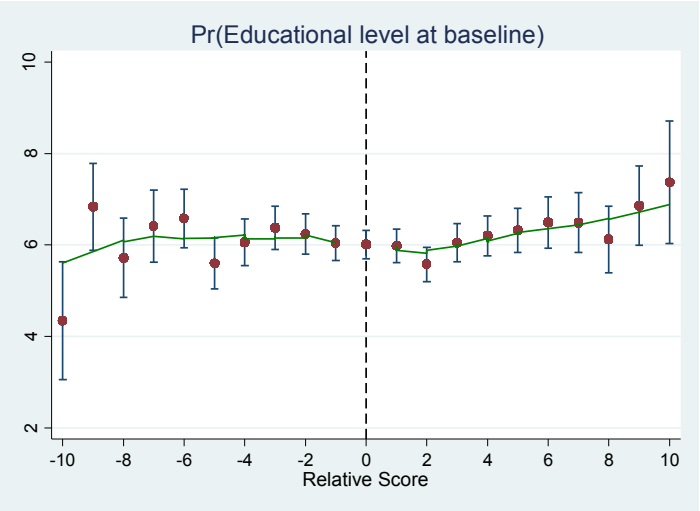
FIGURE 4: EXAMPLE RANKING FORM

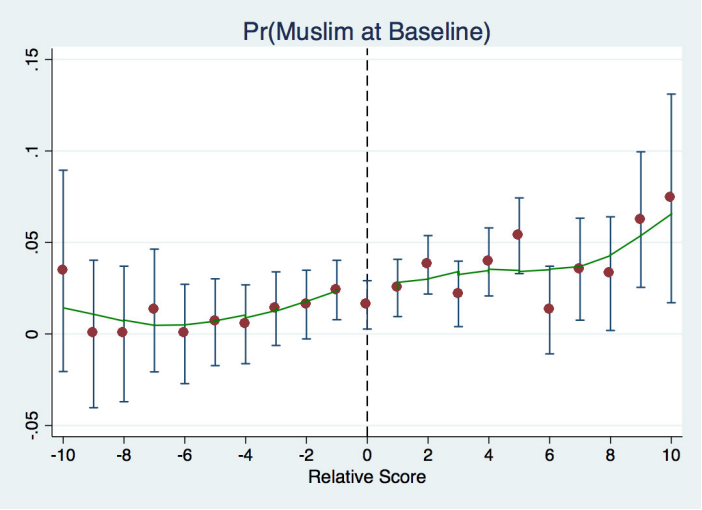
#	Name and Surname	Immediate contact telephone	Entry Requirement (Y/N)			Selection Criteria (Individual Scores)					Final Marks	Rank
						1 - 4 . Short-listing (70%)				5. Interview (30%)		
			Age 16-35 *(Write age)*	Education < SLC	<6 mon. food sufficiency / < Rs. 3,000 mthly income	1. Trade-specific education (15)	2. Economic status (20)	3. Social caste (25)	4. Geographical rep (10)		**TOTAL** MRAKS (100) *List candidates from highest to lowest*	
1	Jane Doe 1	12345678	21	Y	Y	15	20	20	5	26	86	1
2	John Doe 1	12345678	35	Y	Y	15	20	20	5	26	86	2
3	Jane Doe 2	12345678	23	Y	Y	15	20	20	5	25	85	3
4	John Doe 2	12345678	16	Y	Y	15	20	20	5	25	85	4
5	Jane Doe 3	12345678	27	Y	Y	15	20	20	5	23	83	5
6	John Doe 3	12345678	19	Y	Y	15	15	20	5	25	80	6
7	Jane Doe 4	12345678	37	Y	Y	15	15	20	5	25	80	7
8	John Doe 4	12345678	35	Y	Y	15	15	20	5	23	78	8
9	Jane Doe 5	12345678	22	Y	Y	15	15	20	5	23	78	9
10	John Doe 5	12345678	23	Y	Y	15	15	20	5	23	78	10
11	Jane Doe 6	12345678	25	Y	Y	15	15	20	5	23	78	11
12	John Doe 6	12345678	18	Y	Y	15	15	20	5	23	78	12
13	Jane Doe 7	12345678	20	Y	Y	15	15	20	5	23	78	13
14	John Doe 7	12345678	16	Y	Y	15	15	20	5	22	77	14
15	Jane Doe 8	12345678	18	Y	Y	15	15	20	5	22	77	15
16	John Doe 8	12345678	24	Y	Y	15	15	20	5	21	76	16
17	Jane Doe 9	12345678	25	Y	Y	15	15	20	5	21	76	17
18	John Doe 9	12345678	32	Y	Y	15	15	20	5	21	76	18
19	Jane Doe 10	12345678	20	Y	Y	15	15	20	5	18	73	19
20	John Doe 10	12345678	30	Y	Y	15	15	20	5	8	63	20

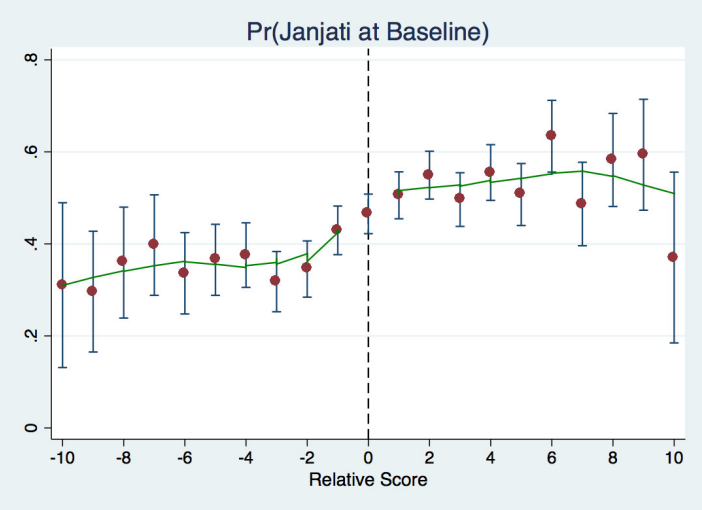
Note: Red line indicates cut-off between accepted and rejected candidates

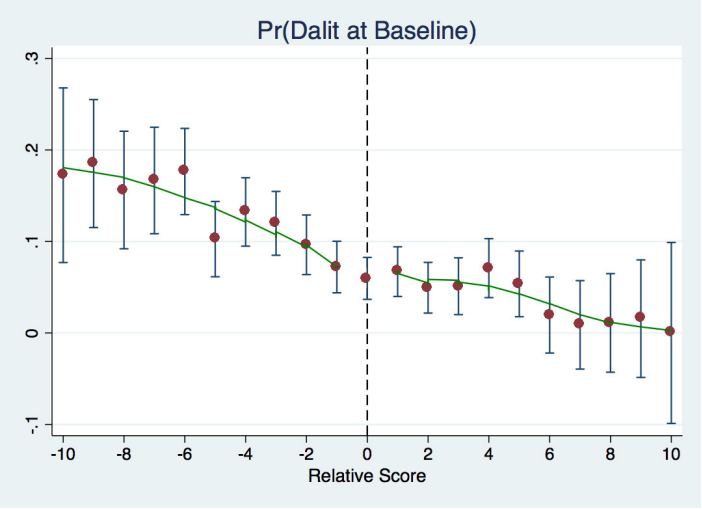
FIGURE 5: CONDITIONAL EXPECTATION AT BASELINE FOR COVARIATES











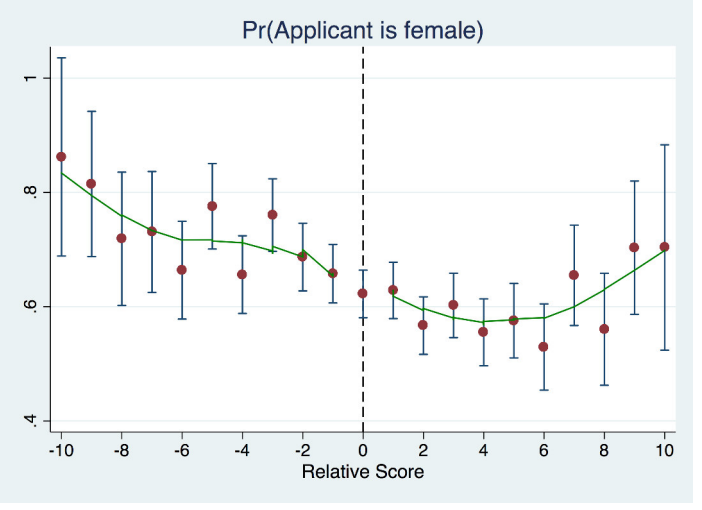


FIGURE 6: PROBABILITY OF TRAINING AT BASELINE

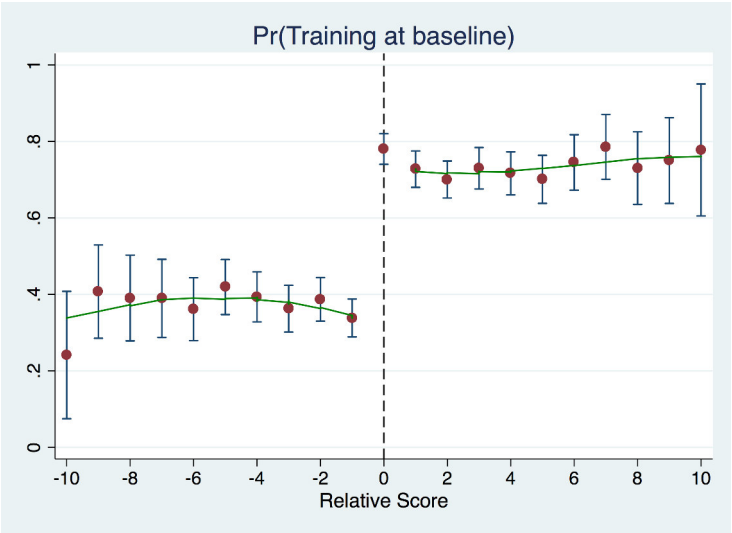


TABLE 1. SCALE EMPLOYMENT FUND PROGRAM AND AGEI SUB-GROUP

		2010	2011	2012
All EF Programs	Total T&E providers	21	32	35
	Total Events	598	645	711
	Total trained	11750	12869	14255
AGEI Only	T&E providers working with AGEI	11	13	13
	Total Events	110	218	246
	Total trained	808	1664	1936

Notes: T&E is an acronym for "training and employment" providers; AGEI group is women ages 16-24

TABLE 2. SAMPLE SUMMARY OF EVENTS, BASELINE SURVEYS

	2010	2011	2012
Total # events conducted by EF in Jan-Apr	110	142	143
# events randomly sampled	N/A	182	112
# events included in baseline survey	65	69	85
# districts covered	30	34	29
# T&E providers covered	18	26	28

Notes: More events were sampled than conducted in Jan-Apr 2011 because some events that were scheduled for Jan-Apr were delayed and did not start on time.

TABLE 3. SURVEY RESPONSE RATES

	Baseline	**Follow-up**	**Follow-up rate**
2010 cohort			
Above Threshold	1184	1047	88.43%
Below Threshold	372	330	88.71%
Total	1556	1377	88.50%
2011 cohort			
Above Threshold	1237	1113	89.98%
Below Threshold	349	306	87.68%
Total	1586	1419	89.40%
2012 cohort			
Above Threshold	1044	889	85.15%
Below Threshold	491	417	84.93%
Total	1535	1306	89.40%

TABLE 4. CORRELATES SURVEY ATTRITION

	(1)	(2)	(3)	(4)
"*Above Cutoff*"	0.041	-0.013	0.011	0.053
	(0.055)	(0.055)	(0.075)	(0.075)
Male		-0.373***	-0.345***	-0.394***
		(0.078)	(0.106)	(0.08)
Age		0.023***	0.023***	0.023***
		(0.007)	(0.007)	(0.007)
Parent		-0.013	-0.013	0.001
		(0.107)	(0.107)	(0.108)
Married		0.071	0.072	0.067
		(0.104)	(0.104)	(0.104)
Dalit		-0.284***	-0.284***	-0.265**
		(0.11)	(0.11)	(0.109)
Janjati		-0.06	-0.059	-0.047
		(0.068)	(0.067)	(0.068)
Any IGA at baseline		0.114*	0.113*	0.116*
		(0.061)	(0.061)	(0.062)
Male X *"Above Cutoff"*			-0.047	
			(0.105)	
Transformational Type				-0.049
				(0.084)
Transformational Type X *"Above Cutoff"*				-0.14
				(0.104)
N	0.706	0.793	0.778	0.829
District, T&E dummies	Yes	Yes	Yes	Yes

Notes: All regressions use probit models. "District, T&E dummies" indicates that the regression controls for district and training provider effects. The models are estimated based on the reconstructed score. The difference in sample size between the initial baseline sample and the sample we use in this analysis arises due to missing in the variables that were necessary to reconstruct the score variable that determines assignment. Columns 2 and 3 also include training category dummies (not shown). All standard errors are clustered by event.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE 5. BALANCE TESTS ON DEMOGRAPHIC CHARACTERISTICS BY BANDWIDTH

2SLS Estimate	Age	Dalit	Janjati	Muslim	Education	Male
	(1)	(2)	(3)	(4)	(5)	(6)
3 Index Scores	-2.418	-0.0369	-0.035	-0.0375	1.458	0.144
	(1.546)	(0.080)	(0.149)	(0.0495)	(0.910)	(0.131)
4 Index Scores	-3.015**	-0.0725	-0.061	-0.0118	1.282	0.026
	(1.350)	(0.070)	(0.130)	(0.0403)	(0.784)	(0.113)
5 Index Scores	-2.886**	-0.092	-0.028	-0.00276	1.077*	0.061
	(1.133)	(0.059)	(0.108)	(0.0333)	(0.650)	(0.094)
10 Index Scores	-3.192***	-0.120**	0.065	0.0211	0.746	0.090
	(1.092)	(0.058)	(0.103)	(0.0324)	(0.622)	(0.091)

Notes: Bandwidth is within 2 index scores of threshold; Standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE 6. TYPE OF TRAINING

Panel 1: EVENT-WISE TABULATION	**2010**		**2011**		**2012**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Farming	0	0	0	0	5	6
Poultry	2	3	0	0	0	0
Food Prep/ Hospitality	11	17	3	4	2	2
Electrical/ Electronics/Computer	9	14	14	20	14	16
Handicraft & Incense	3	4	4	6	5	6
Construction/Mechanical/Automobile	20	31	13	19	30	35
Beautician /Barber	2	3	5	7	4	5
Tailoring/ Garment/Textile	18	28	30	44	24	28
TOTAL	65	100	69	100	85	99
Panel 2: APPLICANT-WISE TABULATION	**2010**		**2011**		**2012**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Farming	0	0	0	0	92	7
Poultry	41	3	0	0	0	0
Food Prep/ Hospitality	195	14	38	3	32	2
Electrical/ Electronics/Computer	178	13	277	19	186	14
Handicraft & Incense	87	6	79	6	69	5
Construction/Mechanical/Automobile	413	30	258	18	457	35
Beautician /Barber	61	4	117	8	61	5
Tailoring/ Garment/Textile	415	30	650	46	396	30
TOTAL	1390	100	1419	100	1306	99

Notes: This table only includes panel observations (those who were interviewed at baseline and midline).

TABLE 7. PROGRAM IMPACTS, BANDWIDTH: 5 INDEX SCORES

	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2SLS Estimate	0.147	-0.320**	0.152	0.990	-0.0849	3.808***	-1.008***	1.178
	(0.0973)	(0.126)	(0.110)	(0.850)	(0.104)	(1.290)	(0.339)	(1.226)
First-stage F-statistic	105.1	105.1	120.6	120.6	121.7	105.1	121.7	105.1
Baseline mean	0.117	0.79	0.605	4.543	0.346	47.312	2.729	21.052
	(0.321)	(0.408)	(0.489)	(3.856)	(0.476)	(4.462)	(1.392)	(4.312)
Observations	3,137	3,137	3,625	3,625	3,697	3,137	3,697	3,137

Notes: Bandwidth is within 5 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE 8. PROGRAM IMPACTS BY ENTREPRENEURSHIP TYPE. BANDWIDTH: 5 INDEX

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment Effect Transformative Type	0.205*	-0.327**	0.0714	0.672	-0.0398	3.415**	-0.801**	0.909
	(0.113)	(0.138)	(0.131)	(1.015)	(0.123)	(1.397)	(0.408)	(1.358)
Treatment Effect Subsistence Type	0.0641	-0.321*	0.368**	2.552**	-0.114	4.348**	-1.286***	1.755
	(0.117)	(0.165)	(0.153)	(1.181)	(0.147)	(1.690)	(0.474)	(1.550)
Difference	-0.141	0.00601	0.297*	1.880	-0.0737	0.933	-0.485	0.846
	(0.125)	(0.166)	(0.156)	(1.210)	(0.146)	(1.690)	(0.476)	(1.571)
Baseline Mean Transformative Type	0.131	0.812	0.576	4.363	0.321	47.487	2.801	20.943
	(0.337)	(0.391)	(0.494)	(3.925)	(0.467)	(4.327)	(1.396)	(4.256)
Baseline Mean Subsistence Type	0.101	0.765	0.652	4.844	0.389	47.115	2.711	21.175
	(0.301)	(0.424)	(0.476)	(3.736)	(0.488)	(4.601)	(1.383)	(4.372)
Observations	3,137	3,137	3,081	3,081	3,137	3,137	3,137	3,137

Notes: Bandwidth is within 5 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE 9. PROGRAM IMPACTS BY GENDER. BANDWIDTH: 5 INDEX SCORES

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment Effect Women	0.196*	-0.256*	0.226*	1.594*	-0.0274	3.877***	-0.747**	1.822
	(0.104)	(0.133)	(0.116)	(0.894)	(0.108)	(1.393)	(0.359)	(1.276)
Treatment Effect Men	0.0806	-0.451**	-0.00845	-0.257	-0.175	3.429**	-1.518***	0.0461
	(0.130)	(0.180)	(0.150)	(1.183)	(0.142)	(1.709)	(0.469)	(1.727)
Difference	-0.115	-0.195	-0.235	-1.851	-0.148	-0.448	-0.772*	-1.776
	(0.129)	(0.177)	(0.148)	(1.167)	(0.137)	(1.732)	(0.453)	(1.680)
Baseline Mean Women	0.122	0.808	0.669	5.037	0.324	47.442	2.548	20.891
	(0.327)	(0.394)	(0.471)	(3.756)	(0.468)	(4.601)	(1.378)	(4.086)
Baseline Mean Men	0.108	0.760	0.496	3.709	0.384	47.094	3.035	21.322
	(0.310)	(0.427)	(0.500)	(3.880)	(0.487)	(4.212)	(1.363)	(4.654)
Observations	3,137	3,137	3,625	3,625	3,697	3,137	3,697	3,137

Notes: Bandwidth is within 5 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE 10. PROGRAM IMPACTS BY TRADE, BANDWIDTH: 5 INDEX SCORES

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Sample (pooled	0.147	-0.320**	0.152	0.990	-0.0849	3.808***	-1.008***	1.178
across all training types)	(0.0973)	(0.126)	(0.110)	(0.850)	(0.104)	(1.290)	(0.339)	(1.226)
Food prep. &	-0.125	-0.598	-0.146	-2.665	-0.628	3.390	0.0122	-8.572
Hospitality	(0.407)	(0.601)	(0.467)	(4.286)	(0.562)	(4.427)	(1.726)	(5.444)
Electrician &	0.0450	-0.423**	0.210	1.815	-0.197	3.832*	-1.217**	3.277
Electronics	(0.159)	(0.206)	(0.183)	(1.393)	(0.157)	(2.077)	(0.532)	(2.045)
Handicraft &	0.564**	-0.719***	-0.250	-1.570	-0.119	2.831	-0.767	1.642
Incense stick making	(0.245)	(0.252)	(0.305)	(2.417)	(0.284)	(2.865)	(0.886)	(2.622)
Construction	-0.0461	-0.364**	-0.116	-1.228	-0.144	2.244	-1.209***	1.935
	(0.108)	(0.167)	(0.142)	(1.119)	(0.136)	(1.582)	(0.432)	(1.618)
Beautician &	0.359	-0.295	-0.178	-1.290	0.139	3.197	-0.615	-0.309
Barber	(0.226)	(0.297)	(0.273)	(2.162)	(0.249)	(3.112)	(0.782)	(2.772)
Weaving, Tailoring &	0.192	-0.132	0.451***	3.357***	-0.0388	5.738***	-1.003**	2.781*
Garment Making	(0.127)	(0.159)	(0.144)	(1.094)	(0.128)	(1.744)	(0.441)	(1.574)

Notes: Bandwidth is within 5 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

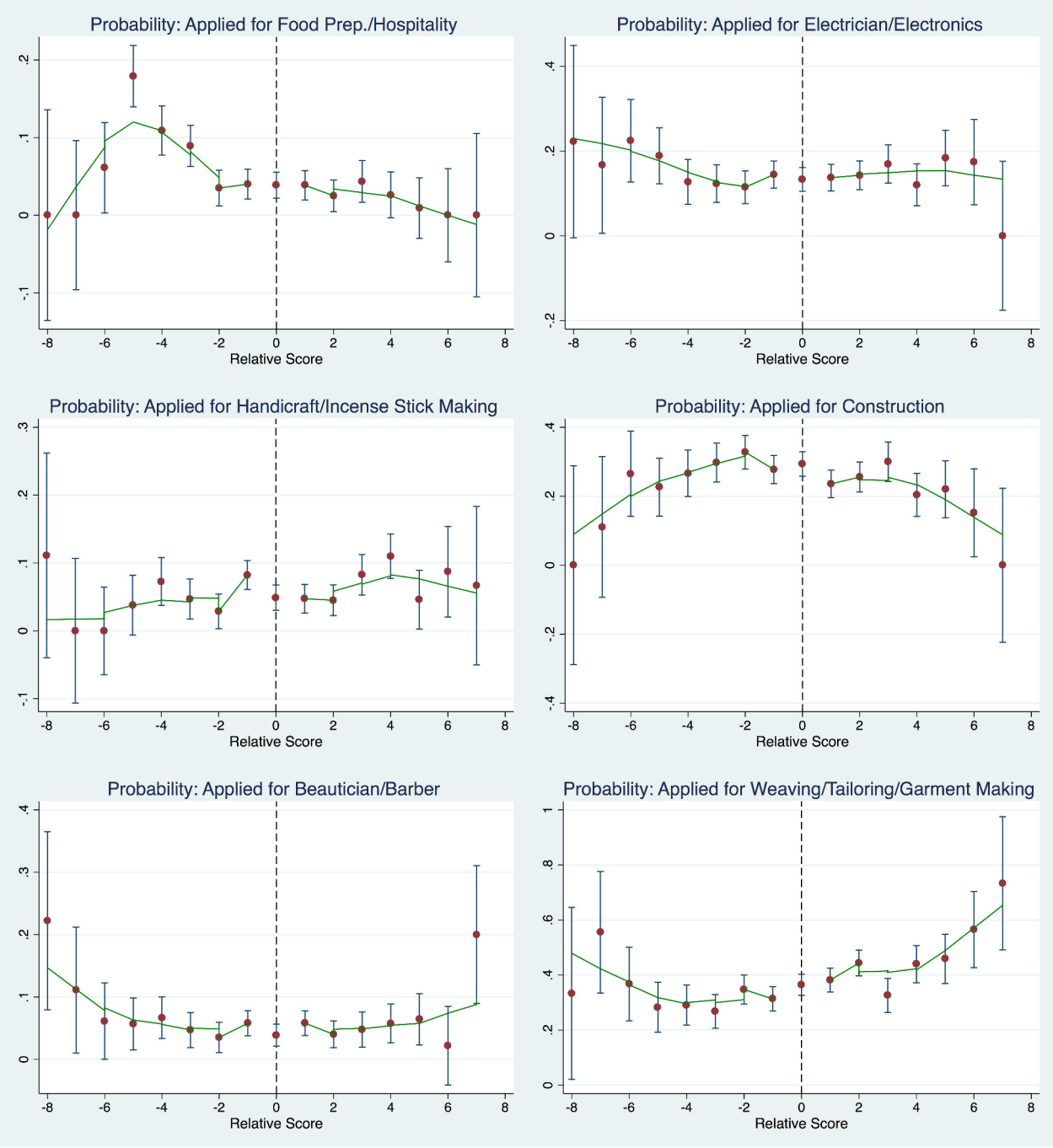
TABLE 11. ESTIMATES BY ENTREPRENEURSHIP TYPE. DIFFERENT BANDWIDTH CHOICES

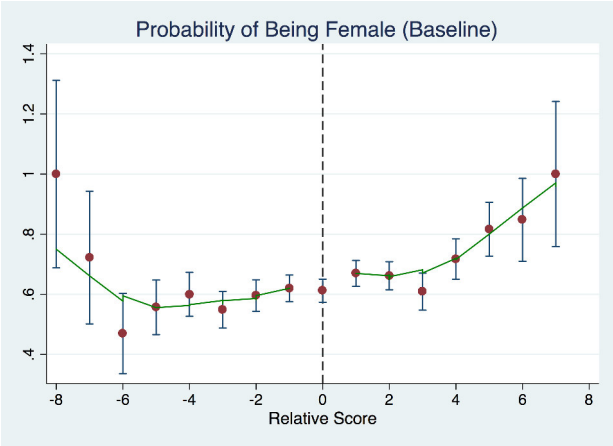
2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Transformational Type								
3 Index Scores	0.157	-0.234	0.0405	0.486	-0.0305	1.924	-1.000*	1.331
	(0.138)	(0.173)	(0.166)	(1.290)	(0.159)	(1.715)	(0.532)	(1.721)
4 Index Scores	0.173	-0.379**	0.0976	0.611	-0.0286	3.483**	-0.842*	1.186
	(0.124)	(0.158)	(0.147)	(1.142)	(0.141)	(1.566)	(0.467)	(1.528)
5 Index Scores	0.205*	-0.327**	0.0714	0.672	-0.0398	3.415**	-0.801**	0.909
	(0.113)	(0.138)	(0.131)	(1.015)	(0.123)	(1.397)	(0.408)	(1.358)
10 Index Scores	0.258**	-0.231*	-0.0218	0.0311	-0.0616	2.058	-0.746*	0.733
	(0.111)	(0.133)	(0.129)	(1.010)	(0.120)	(1.343)	(0.394)	(1.315)
Subsistence Type								
3 Index Scores	-0.0243	-0.353*	0.320	2.331	-0.138	2.878	-1.834***	1.913
	(0.150)	(0.213)	(0.200)	(1.555)	(0.190)	(2.113)	(0.641)	(1.999)
4 Index Scores	0.0248	-0.455**	0.338*	2.036	-0.119	3.584*	-1.382**	1.727
	(0.133)	(0.191)	(0.175)	(1.345)	(0.167)	(1.918)	(0.544)	(1.760)
5 Index Scores	0.0641	-0.321*	0.368**	2.552**	-0.114	4.348**	-1.286***	1.755
	(0.117)	(0.165)	(0.153)	(1.181)	(0.147)	(1.690)	(0.474)	(1.550)
10 Index Scores	0.111	-0.182	0.354**	2.560**	-0.139	3.634**	-1.060**	2.079
	(0.112)	(0.153)	(0.146)	(1.130)	(0.141)	(1.573)	(0.446)	(1.472)

Notes: Bandwidth is within 5 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

APPENDIX A

FIGURE A1: CONTINUITY OF INTERACTION VARIABLES AT CUT-OFF




Probability of Being Female (Baseline)
.4
.6
.8
1
1.2
1.4
-8
-6
-4
-2
0
2
4
6
8
Relative Score

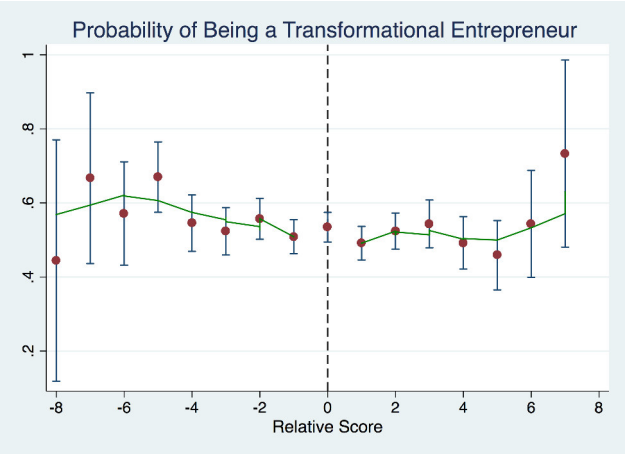

Probability of Being a Transformational Entrepreneur
.2
.4
.6
.8
1
-8
-6
-4
-2
0
2
4
6
8
Relative Score

TABLE A1. RECONSTRUCTION OF ASSIGNMENT SCORE COMPONENTS

Component	Basis for evaluation	Indicators	Available Marks	Total weight	Source
1	Trade-specific education requirement	Compulsory Prerequisite: All candidates must meet the minimum requirement for their trade.	0-3	15 %	Predetermined/ Predicted
2	Economic poverty	Less than 3 months of food sufficiency	4	20 %	Official Formula
		Less than 6 months of food sufficiency or less than 3000 per capita family income from non-farm based income	3		
		More than 6 months of food sufficiency and per capita family income from non-farm based income equal or more than 3000	0		
3	Social caste	Women: Dalit women or women from the following special groups: widows; internally displaced; ex-combatants; physically disabled; HIV-infected infected	5	25%	Official Formula
		Women: Economically poor women not referred to above	4		
		Men: Dalit, Janjati, Madhesi men or men from the following special groups: internally displaced; ex-combatants; physically disabled; HIV-infected infected	3		
		Men: Economically poor men not referred to above	2		
		Neither of the above	0		
4	Geographical representation	Least developed districts	2	10 %	Official Formula
		Moderately developed districts	1		
		Developed districts	0		
	Preliminary marks for short-listing (Sub – total)		**14**	**70%**	
5	Interview	Commitment, Motivation, Attitude, Aptitude, Clear Vision for Employment and Enterprising	0-6	30%	Predicted
	Total marks after interview		**20**	**100%**	

TABLE A2. PROGRAM IMPACTS, BANDWIDTH: 4 INDEX SCORES

	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2SLS Estimate	0.116	-0.403***	0.162	0.843	-0.0527	3.534**	-1.024***	1.344
	(0.114)	(0.153)	(0.129)	(0.996)	(0.121)	(1.537)	(0.397)	(1.461)
First-stage F-statistic	74.49	74.49	88.63	88.63	90.83	74.49	90.83	74.49
Baseline mean	0.116	0.791	0.608	4.563	0.348	47.305	2.727	21.094
	(0.321)	(0.406)	(0.488)	(3.850)	(0.477)	(4.461)	(1.391)	(4.331)
Observations	2,842	2,842	3,276	3,276	3,345	2,842	3,345	2,842

Notes: Bandwidth is within 4 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE A3. PROGRAM IMPACTS BY ENTREPRENEURSHIP TYPE. BANDWIDTH: 4 INDEX

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment Effect Transformative Type	0.173	-0.379**	0.0976	0.611	-0.0286	3.483**	-0.842*	1.186
	(0.124)	(0.158)	(0.147)	(1.142)	(0.141)	(1.566)	(0.467)	(1.528)
Treatment Effect Subsistence Type	0.0248	-0.455**	0.338*	2.036	-0.119	3.584*	-1.382**	1.727
	(0.133)	(0.191)	(0.175)	(1.345)	(0.167)	(1.918)	(0.544)	(1.760)
Difference	-0.148	-0.0757	0.240	1.425	-0.0906	0.101	-0.540	0.541
	(0.123)	(0.168)	(0.155)	(1.199)	(0.145)	(1.669)	(0.476)	(1.557)
Baseline Mean Transformative Type	0.130	0.812	0.576	4.352	0.321	47.509	2.798	20.941
	(0.336)	(0.391)	(0.494)	(3.911)	(0.467)	(4.328)	(1.400)	(4.286)
Baseline Mean Subsistence Type	0.102	0.769	0.660	4.906	0.390	47.079	2.705	21.264
	(0.303)	(0.422)	(0.474)	(3.726)	(0.488)	(4.594)	(1.377)	(4.377)
Observations	2,842	2,842	2,789	2,789	2,842	2,842	2,842	2,842

Notes: Bandwidth is within 4 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE A4. PROGRAM IMPACTS BY GENDER. BANDWIDTH: 4 INDEX SCORES

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment Effect Women	0.171	-0.364**	0.221*	1.425	0.00694	3.562**	-0.744*	1.977
	(0.117)	(0.154)	(0.131)	(1.015)	(0.122)	(1.595)	(0.406)	(1.460)
Treatment Effect Men	0.0485	-0.483**	0.0351	-0.251	-0.131	3.519*	-1.542***	0.130
	(0.142)	(0.200)	(0.165)	(1.289)	(0.156)	(1.891)	(0.515)	(1.893)
Difference	-0.122	-0.119	-0.186	-1.676	-0.138	-0.0426	-0.798*	-1.847
	(0.129)	(0.179)	(0.150)	(1.185)	(0.138)	(1.732)	(0.459)	(1.680)
Baseline Mean Women	0.121	0.813	0.674	5.074	0.323	47.431	2.544	20.936
	(0.326)	(0.390)	(0.469)	(3.744)	(0.468)	(4.603)	(1.373)	(4.090)
Baseline Mean Men	0.109	0.755	0.498	3.719	0.391	47.097	3.029	21.355
	(0.312)	(0.430)	(0.500)	(3.876)	(0.488)	(4.211)	(1.368)	(4.692)
Observations	2,842	2,842	3,276	3,276	3,345	2,842	3,345	2,842

Notes: Bandwidth is within 4 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE A5. PROGRAM IMPACTS BY TRADE, BANDWIDTH: 4 INDEX SCORES

2SLS Estimate	Self-employment (1=Yes)	Planning a Business (1=Yes)	Any Savings	Logged Savings	Outstanding loan	Self-regulation Index	Income Worry Index	Life Satisfaction Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full Sample (pooled	0.116	-0.403***	0.162	0.843	-0.0527	3.534**	-1.024***	1.344
across all training types)	(0.114)	(0.153)	(0.129)	(0.996)	(0.121)	(1.537)	(0.397)	(1.461)
Food prep. &	-0.221	-0.676	-0.00786	-1.720	-0.582	3.983	-0.354	-6.028
Hospitality	(0.503)	(0.766)	(0.573)	(5.258)	(0.688)	(5.555)	(2.171)	(6.045)
Electrician &	0.0192	-0.419**	0.264	1.819	-0.158	3.616*	-1.179**	2.713
Electronics	(0.164)	(0.213)	(0.190)	(1.449)	(0.165)	(2.137)	(0.557)	(2.073)
Handicraft &	0.492**	-0.727***	-0.286	-2.304	-0.0576	2.154	-0.599	1.549
Incense stick making	(0.239)	(0.259)	(0.310)	(2.446)	(0.283)	(2.813)	(0.876)	(2.658)
Construction	-0.0670	-0.474**	-0.112	-1.344	-0.119	1.901	-1.180**	2.100
	(0.120)	(0.188)	(0.156)	(1.227)	(0.148)	(1.770)	(0.470)	(1.781)
Beautician &	0.370*	-0.328	-0.163	-1.443	0.217	3.394	-0.507	-1.073
Barber	(0.222)	(0.297)	(0.277)	(2.207)	(0.253)	(3.111)	(0.809)	(2.726)
Weaving, Tailoring &	0.165	-0.216	0.436***	3.103***	-0.0240	5.530***	-1.055**	2.655
Garment Making	(0.136)	(0.177)	(0.156)	(1.193)	(0.139)	(1.887)	(0.480)	(1.706)

Notes: Bandwidth is within 4 index scores of threshold; robust standard errors (reported in parentheses).
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

TABLE A6. PRINCIPAL COMPONENTS TO DEFINE TRANSFORMATIONAL ENTREPRENEURS. INITIAL FACTOR METHOD

EIGENVALUES OF THE CORRELATION MATRIX: TOTAL= 4 AVERAGE= 1

	Eigenvalue	Difference	Proportion	Cumulative
1	1.405	0.397	0.351	0.351
2	1.008	0.139	0.252	0.603
3	0.869	0.15	0.217	0.82
4	0.719			

FACTOR PATTERN

	PCA Component 1	PCA Component 2
Years of schooling	76*	-7
Financial literacy score	68*	2
Self-reported entrepreneurial skills	-12	97*
Raven's Score	60*	26

Notes: Rotation Method: Varimax. Robust standard errors. Printed values are multiplied by 100 and rounded to the nearest integer. Values greater than 0.4 are flagged by an "*".