Gender Differences In The Effects Of Vocational Training: Constraints On Women And Dropout Behavior[¶]

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Abstract

We provide experimental evidence on the effects of vocational and entrepreneurial training for Malawian youth in an environment where access to schooling and formal sector employment is extremely low. The training results in skills development, continued investment in human capital and improved well-being, with more positive effects for men, but no improvements in labor market outcomes in the short-run. We find that women make decisions in a more constrained environment, and their participation is affected by family obligations. We also find that participation is more expensive for women compared to their male counterparts, resulting in a worse training experience. Additionally, we track a large fraction of program dropouts – a common phenomenon in the training evaluation literature – which allows us to examine the determinants and consequences of the dropout decision and how it mediates the effects of such programs.

Keywords: apprenticeship training; vulnerable youth; gender; dropouts; Malawi

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1. Introduction

Providing training to help individuals acquire skills and increase their productivity is one way to increase earnings and employment in both developed and less-developed nations (The World Bank 2004). Job training programs have therefore emerged as a widely studied policy instrument. Due to data availability, however, the evaluation of such programs has been mostly limited to developed countries. (e.g. Lynch 1992; Bartel 1995; Heckman, Lochner, and Taber 1998; Frazis and Loewenstein 2005; Kluve 2010; Hirshleifer et al. 2015). Most evaluations rely on non-experimental techniques, including conditioning on observables to limit selection bias (Friedlander, Greenberg, and Robins 1997; Heckman et al. 2000), parametric selection correction methods (Heckman et al. 1998), and propensity score matching and duration analysis (Bring and Carling 2000; Gerfin and Lechner 2002; Sianesi 2004; Chong and Galdo 2006; Biewen et al. 2007; Jespersen, Munch, and Skipper 2008).

We report the results of a randomized control trial to evaluate an entrepreneurship and vocational training program in Malawi. Over 80-percent of the workforce in Sub-Saharan Africa engages in self-employment in small businesses and household enterprises (Gindling and Newhouse 2014), which makes entrepreneurship and vocational training more relevant in this context than formal job training programs (Malamud and Pop-Eleches 2010). In Banerjee and Duflo's (2007) 18-country, sample-based description of the lives of the poor, they report that a "large fraction of the poor act as entrepreneurs" and are self-employed, with many operating non-agricultural businesses. In contrast, formal employment opportunities are relatively scarce in the developing world (The World Bank 2012b).

The program we evaluate was designed to provide apprenticeship rather than classroom-based training. It targeted people aged 15-24, because the youth often lack the formal education or skills required to access salaried employment in Malawi. A growing number of development-aid agencies around the world have attempted to reduce youth unemployment through on-the-job training and vocational programs. Examples of the emphasis on vocational training are found in Tanzania, South Korea, and Indonesia, where some programs have attempted to shift secondary school curricula away from general education and towards vocational training (Newhouse and Suryadarma 2011). The program we evaluate in Malawi consisted of 1900 participants from 28 districts who received on-the-job training through placement as apprentices to master craftspeople (MC) in their preferred area of interest.

Apprenticeships of this type are common in Sub-Saharan Africa as a way for individauls without access to formal education to gain employable skills (Biavaschi et al. 2012). Despite their popularity, virtually no evidence exists on the effects of such programs.[1]

To our knowledge, only three papers have previously addressed the effects of vocational training programs in less-developed countries using experimental evidence.[2] Maitra and Mani (2015) find that women who participated in a sewing training program in India were more likely to be employed, worked more hours and earned more money in the short- and medium-term. Bandiera et al. (2012) evaluate the combined effects of life-skills and vocational (but not on-the-job) training on health-related sexual behavior and employment for adolescent girls in Uganda. They find that this dual-pronged intervention leads to more involvement in income generating activities, but, given their setting, cannot separate out the effects of the vocational training from the life-skills training. Chakravarty et al. (2014) evaluate the effects of a two-step training program for young women in Liberia that consists of classroom-based training in six trades and job-placement component. These authors find this program to increase employment and earnings significantly in the post-study period. Our study expands on this set of literature by examining the effects on-the-job apprenticeship training in a less-developed country for both men and women across a wide variety of occupations.

A related suite of literature exists for both classroom and on-the-job training in middle-income countries in Central and South America. Attanasio et al. (2011), Attanasio et al. (2015) and Alzúa et al. (2016) find that vocational training for youth has fairly large effects on wages and employment and identify that these effects persist in the medium- to long-run.[3] Conversely, Card et al. (2011), Ibarraran et al. (2014) and Ibarraran et al. (2015) find no effects of vocational training in the Dominican Republic on employment, yet find modest effects of training on earnings. In contrast to our study, these authors analyze programs in middle-

[1] The ILO (2012) provides an extensive review of qualitative and quantitative studies of informal apprenticeship programs. Monk et al. (2008), working in Ghana with descriptive data, find that returns to informal apprenticeships are high for those who have low levels of education, but fall as formal education increases. We are unaware of any experimental evidence on apprenticeships.

[2] A related (although recent and largely yet unpublished) literature deals with the returns to business training and financial literacy; however these trainings are designed to deliver generic business skills, rather than trade-specific skills. See Cole et al. (2011), Bruhn & Zia (2013), de Mel et al. (2014), Drexler et al. (2014), Karlan & Valdivia (2011), and Calderon et al. (2013).

[3] Macours, Schady, and Vakis (2012) evaluate a multi-pronged experiment in Nicaragua that includes a training component for a subset of their sample. All households that received the training program also received a conditional cash transfer and they do not report the effects of this joint treatment on employment-related outcomes.

income countries focused on wage employment in large formal sectors. Our study concerns on-the-job development of technical skills in an environment where self-employment, rather than wage employment, is the norm.[4]

A second important contribution of our paper lies in our treatment and analysis of program dropouts. Several published evaluations of job training programs report that a large fraction of beneficiaries randomly assigned to receive training fail to show up, or discontinue training after a short period, which complicates the evaluation method. Heckman et al. (2000), reviewing five different experimental evaluations of employment and training programs in the U.S., report dropout rates as high as 79%. The Card et al. (2011) study reports that 17% of their treatment group failed to attend training, and that follow-up data was not collected on these people. This can introduce a significant selection bias, which complicates the estimation of the treatment effects even for studies that start out with experimental data.[5]

In our study, we experience similarly high rates of dropout among those randomly assigned to receive training, but we anticipated this problem and tracked down a significant fraction of the dropouts in our follow-up surveys. This allows us to report intent-to-treat and treatment-on-treated results (accounting for the dropout decision) that are closer to the pure experimental estimates. The main short-term effects of training that we report – which are large, significant increases in the self-reported skills and knowledge that the training was meant to impart and improvements in trainees' life satisfaction – are not sensitive to the way dropouts are handled.

More importantly, we conduct a detailed analysis of *why* trainees chose to drop out. Since dropping out is a commonly observed phenomenon across such programs in both developing and developed nations, it is useful to identify its causes and consequences, in order to better understand the direction of bias in existing evaluations of training programs stemming from this specific source of attrition. Our data allow us to characterize whether dropouts in training are positively or negatively selected. Why potential participants do not take advantage of a heavily subsidized (or even free) program designed to build their human capital is an important

[4] Blattman, Fiala, and Martinez (2014) find that youth given a cash transfer in Uganda invest in vocational training and tools, which then translate into higher levels of employment and earnings.

[5] A large body of literature has devised non-experimental methods to correct for these biases (see: Manski 1989; Manski 1990; Horowitz and Manski 1998; Heckman, Lalonde, and Smith 1999; Heckman et al. 2000; Horowitz and Manski 2000; DiNardo, McCrary, and Sanbonmatsu 2006; Lee 2009).

puzzle worth exploring.[6] We collect data on the alternative opportunities and unanticipated shocks that occurred around the time of program inception to help explain why people choose to drop out.

These opportunities and constraints affect men and women differently – leading to the third main contribution of this paper: developing a better understanding of why training programs may have heterogeneous effects across gender. A growing literature documents differential treatment effects by gender for a variety of development programs (e.g. see Bergemann and van den Berg 2008; Attanasio, Kugler, and Meghir 2011; Blattman, Fiala, and Martinez 2014). We find that improvements in self-reported skills are similar across genders, however after the completion of the program women are significantly less likely to start a business and spend relatively less time in skill development post-training than men. Further, we find that improvements in subjective well-being as a result of participation in the program are more apparent for men.

These differences are partially explained by the conditions under which women participate in the training. In this setting, women are more likely than men to participate when alternative opportunities disappear (e.g. they become unemployed), whereas men's participation decisions are not affected by adverse external conditions. At baseline, women are more likely to report having responsibility for maintaining the household – they have more dependents and spend more time on domestic chores. As such, women, but not men, cite 'getting married' or 'family obligations' as the primary reason for not participating in the program. Additionally, participation in the program is expensive and we find that women draw upon their savings to participate in the program and that women are less likely to attend regularly.

It also seems that women sort into occupations where trainers do less for their trainees. As a result, male trainees are more likely to receive financial help from the MCs and are more likely to receive paid work from their MC after the training is complete. These results shed light on the more stringent constraints under which women in developing countries make

[6] This is related to a literature that identifies technologies designed to meet pressing needs are often not adopted at rates commensurate with their potential benefits (Mobarak et al. 2012; Meredith et al. 2013). The case of training appears related to a literature that suggests that the low take-up may signal that the product or service does not work as well as anticipated, given local conditions (e.g. see Ashraf, Giné, and Karlan 2009; Hanna, Duflo, and Greenstone 2016).

decisions, and how these conditions inhibit participation in programs that foster skill acquisition. This is similar to findings from other development programs, such as capital infusion producing much lower returns for female-owned micro-enterprises in Sri Lanka and Ghana (Fafchamps et al. 2014; de Mel, McKenzie, and Woodruff 2014) and Muslim women in India not benefiting from business training, likely due to social restrictions (Field, Jayachandran, and Pande 2010).

2. Context and Experimental Design

2.1. Background

Malawi is one of the world's poorest countries. Over 50% of the population falls below the national poverty line, while GNI per capita is just $360 (The World Bank 2012a). Unemployment among youth is high – 9.6% for women, 8.5% for men (ILO 2011). Levels of formal education are low, as about 58% of students drop out after primary school (Aggarwal, Hofmann, and Phiri 2010). Most youth are particularly vulnerable and rely on low-productivity subsistence agriculture or self-employment to sustain themselves and their families.

In 2009, the Government of Malawi decided to pilot a new apprenticeship program aimed at vulnerable youth (mainly orphans or school dropouts) to address employability issues, promote productive self-employment and reduce vulnerability to risky sexual behavior. The program was implemented by the Technical Education and Vocational Education and Training Authority (TEVETA) across all 28 districts of Malawi. The geographic scope of the program made data collection expensive and logistically challenging, but allowed us to evaluate the program based on a nationally representative sample of vulnerable youth.

The analysis of our baseline survey found in Table 1 illustrates that our selection process successfully chose participants who were especially vulnerable and poor. More than a third are orphans of both parents, over 60 percent live in a dwelling that has a grass roof (a proxy measure for poverty), and over 80 percent report living in a household where adults skip a meal "often" or "sometimes" due to lack of money. The participants were about 21 years old on average and around two-thirds were male. Only 10% of the participants were still attending school. When compared to a nationally representative sample of Malawian youth aged 15-24 from the Malawi Third Integrated Household Survey (National Statistical Office 2011), youth in

our sample are more likely to live in a house with a grass roof (an indicator for poverty), more than three times as likely to be an orphan, and less likely to still be in school.

Our baseline data also reveal some clear gender differences in the conditions faced by the target group before the training program. Women live in households with fewer adults and more dependent children, have lower completion rates of secondary education, have lower personal income, and spend more time on domestic chores and agriculture as opposed to paid labor or business activities. While both male and female youth of Malawi are burdened with a great deal of family responsibility at a young age, the fact that men's responsibilities appear to be more financial in nature, and more likely to carry market returns, may imply that they have the chance to develop skills outside the home that allow them to make better use of the training.

TEVETA identified a pool of potential trainers in each district. The MCs were selected from this pool based on their expertise and business performance in the neighborhood. TEVETA compensated the MCs for their work, and the MCs benefited from the free labor that the apprenticeship program provided. In the 23 districts where our survey took place, there were 164 MCs that offered 17 different trades, which we further categorize into 8 categories (see Table A2). Each MC had an average of 14 years of practical experience in their specific field and 90% of the MCs trained apprentices before. TEVETA created a set of training modules customized for each of the principal trades, and provided a one-day training to the MCs on how to use these modules.

During the apprenticeship, each MC trained between 1 and 17 trainees at their workshops. MCs' workshops tend to be located in urban areas, while many of the trainees lived in rural areas. The trainees were responsible for finding their own accommodations near the workshop, but received a small stipend (about 4300 MWK, approximately US$28) to cover meals and accommodation.

The results from the endline survey reveal that training was well received by those who attended (see Table 2). Trainees attended training for approximately three months (as designed), during which about a half of trainees and more than 80 percent of MCs attended every training session. Nearly 70 percent trainees report that practice tools were always available, and most of the trainees felt encouraged by MCs. Although some trainees felt that the stipend was not sufficient to cover their needs, the shortage was often compensated by

food or money provided by MCs. However, some gender differences are already apparent here – the simple means tests in Table 2 provide some evidence that men were significantly more likely to receive assistance from their MCs and were more likely to secure paid work from the MC after the training. Table 3 parses out these results and controls for district and occupation fixed effects. While these additional regressors make these gender effects indistinguishable from zero, it is still important to note that trainers treat trainees better in male dominated occupations (i.e. construction and metalwork).[7] Even though the gender effect is not robust to the inclusion of these fixed-effects, we cannot rule out the fact that men are treated better in this setting, even if it is based on occupational sorting.

2.2 Experimental Design

We used an experimental phase-in design for this evaluation. Participants were randomly assigned to two cohorts, a treatment group that started the program immediately, and a control group that started the program around 4 months later on average.[8] Two thirds of the 1,900 eligible youth were assigned to treatment and the remaining third to the control group. Those who were assigned to treatment were to receive an invitation to participate training sent by the TEVETA. However, owing to administrative errors, many of those who were supposed to be invited to participate in the training report in our follow-up that they never received the invitation. For our main analysis, we conservatively report only Intent-to-treat (ITT) estimates, ignoring the administrative errors, and lumping the 'non-invited' individuals with the treated youth. When we analyze drop-out dynamics, we separately examine the determinants of such administrative drop-outs versus others who chose not to participate after being invited.

Enumerators conducted the baseline survey during March-April 2010 on a randomly selected subset of the participants. We surveyed 1,122 individuals of the original 1,900 – 363 in the control group and 759 in the treatment group (see Figure 1). Summary statistics from the baseline survey indicate that randomization was successful in achieving balance across

[7] We also find evidence that trainees in the food occupation (which is split 64% women and 36% men) receive more food/money during their training, which is fitting given the nature of the occupation.
[8] The control group did not begin the program until all data collection was completed in their district.

treatment and control groups (see Table A1).[9] However, we do find a number of statistically significant differences between those who received their invitation letters and those who did not. The group who report not receiving an invitation are younger, more likely to be in school and come from larger households with less dependents, and more assets.

Trainees reported to training between May 2010 and April 2011, and the specific start date varied by district and by MC (see Figure A1). Training lasted for three months on average, but varied depending on the type of skill being taught. Table A2 provides the breakdown of occupations by trainee gender. As we might expect, we observe occupational segregation across gender where women prefer beauty, clothing and food while men prefer automotive, construction, and metal work. Since occupational sorting may be one potential explanation (or mechanism) for gender differences in the results, we include occupation fixed-effects to control for this gender-based sorting.

Enumerators conducted follow-up surveys approximately four months after the training was completed in the period between May and September, 2011. The follow-up survey included questions on time use, employment, psychological well-being, risky sexual behavior, and trainee assessments of training quality. We increased the sample size during follow-up by randomly drawing additional individuals from the entire pool of 1,900 youth who had been selected to participate in the training program. The follow-up sample is composed of 1177 individuals, 720 of whom were present in the baseline survey.[10] Notably, these numbers differ from our final analysis sample since we restrict our experimental analysis to exclude those who were included as replacements. The analysis sample includes 940 households in the follow-up survey, 457 of whom were present at baseline.

In addition, we surveyed MCs regarding their experience as trainers and their perception of each of the trainees' skills, diligence, effort, attendance, etc. Finally, we conducted a brief qualitative survey with the implementing agency's desk officers regarding their experience with the intervention to inform future program design.

[9] We drop 8 individuals in this analysis who report starting the training before the baseline survey.

[10] We drop 42 individuals from the endline dataset who report: (i) starting the training before the baseline survey, (ii) ending the training after the endline survey or (iii) starting the training after the endline survey.

2.3. Attrition and Dropout

Like many development programs in Sub-Saharan Africa, the TEVETA program suffered from implementation delays. Between the time that the original 1,900 youth were selected and the time that the baseline survey was conducted and the treatment participants were invited to begin training, over a year elapsed. Thus at the time that the training was offered, about 9% of the people invited to training chose not to participate (we explore the possible reasons – including other potential opportunities or barriers facing these people – in greater depth below). Even among those who were invited to the training and who chose to participate, not all completed the training. We tag all of these cases as dropouts (as labeled in Figure 1), as they were assigned to treatment but did not fully participate. In our analysis, we distinguish between those who dropped out because of the administrative error described above (i.e. they did not receive the invitation letters) and those who actively chose to drop out of the program. According to our data, approximately two-thirds of all people who dropped out did so because of the administrative error.

In addition to people who dropped out of the training, there was also survey attrition between the baseline and follow-up surveys. Specifically, about a third of the respondents in the baseline survey could not be found for the follow-up (242 from the treatment group, and 125 from the control group). This poses identification issues, since attrition from the survey is correlated with participating in training, and therefore with our variables of interest. People who participated in training were very easy for us to track since we conducted our follow-up survey shortly after the completion of training. Thus it is likely that of the attriters in the treatment group most are dropouts. However, this attrition is particularly problematic if we only successfully tracked a non-random sample of the dropouts.

We assess this problem by examining whether the attriters are statistically different, in terms of baseline characteristics, from the dropouts (both administrative and non-administrative) that we successfully tracked. The results in Table 4 suggest both sets of dropouts are statistically different from attriters on baseline characteristics. Further, it looks as if the group including administrative dropouts are even *more* different. It appears that TEVETA ultimately chose to not invite a few participants who were originally selected but turned out to be relatively rich. They may have been correcting an earlier administrative oversight in selecting an ineligible participant (since the program was designed to target the

most vulnerable youth). However, even after these corrections, the attriters have more dependents and income, are older, are more likely to have consistent access to food and water, are less likely to be enrolled in school and are more likely to have previously started a business, meaning that we cannot rule out selection bias in our purely experimental results. As a sensitivity analysis, we report all results with and without controls for the baseline differences identified in this analysis.

Further, we conduct a bounding exercise for all our main specifications, which confirms that the coefficient signs are robust to allowing for a range of possible values for the missing observations. To examine the direction of the potential bias due to dropouts, we compare the endline characteristics of dropouts to the control group. For example, if only the better educated individuals drop out of the program to pursue other opportunities, the analysis ignoring dropouts would systematically underestimate the effects of training. In most cases, dropouts (especially those excluding administrative dropouts) are not significantly different from the control group suggesting that little bias is introduced due to dropouts (see Table 5).

Further, it is crucial to investigate whether individuals assigned to treatment versus control attrite at different rates since such voluntary exit can threaten the validity of our randomized design. In Table 6, we estimate a linear probability model where attrition is a function of initial randomized assignment to receive training. The results, separated by gender, indicate that treatment assignment is completely irrelevant for men in their likelihood of attrition (coefficients between 0.000 and 0.035 with no statistical significance), while it is somewhat relevant for women (coefficients between -0.026 and -0.085 depending on specification but not systematically significant). We will present results separately by gender throughout the paper, keeping in mind that attrition bias is a higher-order concern in the female sample. Notably, this also provides the first indication that men and women appear to make training participation decisions under a different set of conditions.

3. Determinants of dropout decisions

The rates of program dropout were high, both because of administrative errors by the implementers and because some trainees chose not to attend or complete the program. To identify the determinants of the dropout decision, we successfully tracked down many dropouts, and collected data on adverse shocks and new opportunities that potential trainees faced in the period prior to program inception. Although dropouts are a common phenomenon

in training programs and a challenge to evaluation studies, this study is one of the few to collect data on dropouts and the conditions they faced at the time around the drop-out decision. Examining whether people are forced to leave the program due to external factors like unanticipated adverse shocks or choose to leave to take advantage of better opportunities will inform future program design. It also serves to shed light on the direction of bias associated with ignoring dropouts when follow-up data on them are missing. In our case, having follow-up data on a large fraction of dropouts means that we can get closer to reporting pure experimental (intent-to-treat) estimates of training program effects.

The overall dropout rate was 25.2% including administrative dropout (i.e. invitation not delivered), and just 9% excluding administrative dropout. Administrative dropouts were highest in electronics and lowest in food and metalwork. Non-administrative dropouts were highest in metalwork and clothing, and lowest in construction and electronics. Administrative dropouts made up 66% of all dropouts and between 44-82% of dropouts across the various occupations.

We estimate a linear probability model using the sample of individuals assigned to treatment where the dependent variable is an indicator for not completing training in Table 7.[11] We report results for both types of dropouts and genders. The location, accessibility, and convenience of the training sessions, as well as family support appear to be important determinants of attendance. Having friends or relatives close to the training center is a very strong predictor of whether male or females complete the training. Females who were fired from a job in the pre-study period were more likely to complete the program, but this is not true for men. This is evidence in favor of the hypothesis that women are more likely to stick with the program when other opportunities disappear, decreasing the opportunity cost associated with training. In contrast, men evidently drop out if alternative opportunities appear – they are more likely to drop out to take advantage of a migration opportunity.

Data on the small number of individuals (N = 47) who were assigned to the treatment (and received an invitation letter) but did not begin the program indicate gender differences in decision making constraints. Table 8 shows that 22% of these women cite family obligations as

[11] An individual is identified as *trained* if they attended the training for more than one month and they never or rarely missed training days – otherwise an individuals is considered a *dropout*.

the reason for not enrolling, while no men did. This matches reports we received at baseline, where women were twice as likely as men to report 'family obligations' as the reason they never took advantage of any previous training programs (p-value = 0.03). Women are also about five times as likely to mention getting married as the reason for not participating in the program (p-value = 0.078). Men, on the other hand, are more likely to report that they did not receive the message from TEVETA to show up, which could be related to higher migration rates for men.

4. Estimation of Program Effects

4.1. Outcome Measures

Vocational training may improve labor market outcomes through multiple channels. First, training imparts practical, technical skills, which increase trainees' human capital, and potentially their productivity. Second, training sessions may increase awareness of higher-paying job opportunities, and improve knowledge of how to access these jobs and how to connect to potential employers. Working directly with the MCs, the workers will be able to connect not only to one potential employer but potentially to the network of employers through recommendations (Owolabi and Pal 2011). Third, practical training under MCs' mentorship allows trainees to reveal their "type" (effort, skills and talents) to a potential employer. Fourth, training may also impart more general skills on how to start and operate a business, which could spur entrepreneurship. Therefore, either salaried employment or self-employment may increase due to training.

An additional consequence of participation in training may be increased human capital investment beyond the duration of the training program. Trainees may learn about the importance of investing in skill development to further improve their labor market prospects. With this hypothesis in mind, we estimate the effects of training on time use – specifically (i) hours worked in paid labor and self-employment (on a family farm or self-employed), and (ii) hours devoted to human capital investment beyond the training period. We also estimate the effect of the training on a few downstream outcomes such savings, business start-up and food security. Unfortunately, we were unable to observe longer-run labor market outcomes since the experimental (phase-in) design that TEVETA agreed to implement as a partner in this research implied that we did not have a well-defined control group after the second phase of

training (i.e. after the control group members received training). Card et al. (2010) and Cho and Honorati (2013) argue that it probably takes longer for labor market effects to materialize.

We also examine the effects of training on self-reported (subjective) outcomes related to the skills that the vocational training program aimed to improve. This analysis allows us to study: (i) whether the training program achieved its intended objectives focusing on building skills and (short-run) labor market outcomes, and (ii) whether the psycho-social well-being of participants improved as a result.

4.2 Estimating Equations

Randomizing the offer to attend the training allows us to overcome the selection bias into training. In the main tables, we report the effect of *offering* the training, which was randomly assigned (intent-to-treat estimates). In the online appendix we report the effects of receiving training among those who actually participated, with participation instrumented by the random assignment. The discrepancy between random assignment and program participation is almost entirely due to dropouts (control group individuals did not have any opportunity to participate in training). Tracking down a large fraction of the dropouts therefore allows us to report estimates closer to the pure experimental estimates in the main tables.

The estimating equation for the intent-to-treat estimate is:

$$Outcome_{t+1,ij} = \beta_0 + \beta_1 Invited\ Training_{ij} + \beta_2 X_{ij} + \beta_3 MC_{ij} + Occupation_{ij} + d_j + \varepsilon_{ij} \qquad (1)$$

where $Outcome_{t+1,ij}$ are a set of outcomes of interest for an individual i in district j at the follow-up *(t+1)*, $Occupation_{ij}$ controls for occupation specific effects and d_j captures time-invariant district-level characteristics and ; ε_{ij} is the error term. The estimated coefficient β_1 captures the effect of the random assignment, or being *offered to attend the training*. We conduct further analysis controlling for the baseline covariates found in X_{ij} and, in Appendix C, we test the robustness of our results using the MC-related controls in $MC_{ij.}$[12]

[12] The inclusion of the covariates reduces our sample size considerably since we do not have baseline data or matched MC-related data for the entire endline sample. The baseline covariates include: age, household size, household head indicator, number of adults, number of children under 18, number of dependents, value of assets, access to borehole water, currently attending school indicator, started business previously indicators, annual personal income, never skips meals indicator, time on other activities. The MC-related controls we include are an indicator if the MC gender matches the trainee gender, the

The online appendix tables report the effect of training for those who attended the training, where the random assignment to treatment, $Invited\ Training_{ij}$ is used as an instrument for the indicator variable $Attended\ Training_{ij}$ (=1 if the individual *attended* the training)[13] in the first stage in a two-stage least squares estimator:

$$Outcome_{t+1,ij} = \alpha_0 + \alpha_1\, Attended\ Training_{ij} + \alpha_2\, X_{ij} + \alpha_3\, MC_{ij} + Occupation_{ij} + d_j + \upsilon_{ij} \quad (2a)$$

$$Attended\ Training_{ij} = \gamma_0 + \gamma_1\, Invited\ Training_{ij} + \gamma_2\, X_{ij} + \gamma_3\, MC_{ij} + Occupation_{ij} + d_j + \omega_{ij,} \quad (2b)$$

The estimate of α_1 (2a) yields the local average treatment effect of the training – i.e, the effect for those who were induced to attend the training as a result of random assignment to participate. Since the invitations were randomly assigned, the IV estimate can be interpreted as the causal effect of the treatment among compliers.

5. Results

5.1. Effects of Training on Skill Development and Human Capital

We first investigate whether the training achieved its primary objective – boosting skills that the training was meant to improve, according to the trainees' own assessment. We construct two entrepreneurial skill indices, one using principal components analysis (PCA) and another using z-scores relative to normalizations around control group means and standard deviations. These indices are composed of self-assessed scores in the areas of skills in trade, ability to calculate profits, knowledge of starting a business, self-assessment as an entrepreneur, and ability to earn money outside farming.

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number of trainees in the group and the number of years the MC has been in their trade. The MC-related results are contained in Appendix C Tables A6-A8.

[13] $Attended\ Training_{ij}$ is defined by self-report of trainees. To be considered to have attended training, trainees must (1) have received the invitation to training, (2) state that they participated, (3) state that they participated for at least one month, and (4) state that they rarely or never missed training days. We also ran an alternative specification in which the dependent variable is one if the person was (1) assigned to treatment and (2) not listed as a dropout in administrative records. However, there is considerable discrepancy in the administrative reports of who did or did not drop out, and this variable also does not catch non-compliers in the control group (of which there were 4) who managed to attend training despite not being selected for it. The results from the two specifications are empirically similar, and we prefer the former specification.

The intent-to-treat estimates of the effect of the training presented in Table 9 indicate that the program was very successful in improving self-assessed practical skills of the individuals in our sample.[14] Assignment to treatment significantly increases the PCA index by 0.718 (1.066 including baseline controls) points for females and 0.820 (0.867 including baseline controls) points for males. Using our standardized normal index, which measures the effect size as the proportion of a standard deviation around the control group mean, the estimates show sizable and strongly significant effects of training: 0.64-0.87 standard deviations for women and 0.67-0.69 standard deviations for men. Neither measure suggests that the effect sizes for men and women are statistically different.

5.2. Time Use During and After Training, and Economic Outcomes

Next we study another first-order effect: how training changed the participants' time use relative to the control group during and after training. To measure after-training time use, our survey inquired about time use during the month after the training was completed (to create a consistent measure across respondents training in a variety of sectors with different lengths), and also time use during the week immediately prior to the follow-up survey, when recall bias would be minimized. In practice, both measures produce very similar results, and so we sum the two time use reports (after multiplying the weekly time use by 4) to report time use over a constructed two-month period.

The ITT results found in Table 10 estimate the effect of the training on hours worked in paid labor (which includes any paid employment, including paid labor in agriculture); in self-employment (which includes both work on family-owned land and in self-owned or family-owned business); and in skill development (such as school, job or trade training) during and after training.[15] Treatment assignment and training participation leads to very large increases in time spent on human capital development (i.e. training) during the training period. Being assigned to the treatment group leads to 262-351 extra hours of training. Since training in most professions lasted over three months (the average training duration was 13-14 weeks),

[14] Associated TOT results are found in Table A3 in the online appendix. We also present TOT results (Table A3) and results controlling for MC-related controls (Table A6). The TOT and ITT results with MC-related controls are qualitatively similar to our main analysis in Table 9.

[15] Reassuringly, there are no statistically significant effects of treatment assignment on time use in the month prior to training (a placebo outcome). These results are omitted for brevity.

this is a reasonable estimate, and suggests that the training kept all trainees quite busy over the entire training period (between 14 and 27 hours per week, on average). This is particularly true for males, partly due to more regular attendance (see Table 3).

Investing all this time in training displaced many hours of work in both paid labor and in self-employment, but not in a one-to-one fashion. Using the results without baseline controls, the hours spent in paid labor and self-employment declined by 26 and 40 hours for females and 32 and 96 hours for males, respectively. This suggests that a sizable number of the hours in training come from displaced paid labor and self-employment hours: 21% for females and 37% for males. Notably, this effect is statistically different for men and women. Thus, the opportunity cost of attending the training in terms of both time and forgone earnings is substantial and affect men and women in slightly different ways.

Turning our attention to the effects of treatment assignment on time use *after* the training is completed, we find that the most salient consequence of the training program is continued investment in human capital for men. Males increase total hours spent on skill development (through school or other job training) by 22 hours (29 hours including baseline controls), or 11-14.5 hours per month after the training is over. While we do not have the data to test the long-run labor market effects of continued investment in human capital, it is possible that increased investment in skill development may have significant and lasting implications for labor market opportunities in the long run (Attanasio et al. 2015). On the other hand, we observe no such effect for women suggesting that men and women react differently to training programs in terms of continued human capital investment, even when controlling for occupation. In Table 3, we shows that trainees in male dominated occupations generally have a better experience with the MC (they are more likely to receive food and stipend support, and to find paid work from MC), which makes it possible that men have added opportunities to continue skill development with their MCs after the actual training period concludes.

We show in Table 11 that this extra time spent on training comes at a financial cost to the trainees, with different consequences by gender. There is no discernible impact of training on an economic index we construct (a composite of last week's total earnings and total monthly expenditure) for either gender. However, participation in the training forces women to draw

down a significant amount (3011-8707MWK/20-57USD) of their private savings.[16] This reflects the fact that the stipend provided for the participants (of 4300 MWK/28USD on average) was not sufficient to cover all transportation and lodging costs, as indicated by about half the participants themselves in Table 2. However, there is no evidence that men need to draw down their savings to participate in the program. This is consistent with the evidence from Table 3, which suggests males select into occupations where trainees receive more financial support from their MCs.

The decrease in savings among women evidently reduces the amount of working capital available to them to start their own business. The very short-term effect of training on these women is that their likelihood of entrepreneurship actually decreases!

5.3. Effects of Training on Well-being and Health Behaviors

In Table 11, we also investigate the impacts of training on non-market outcomes including life satisfaction and psycho-social well-being. The life satisfaction index is a composite index based on two measures: (i) whether the respondent is happy and satisfied with life and (ii) whether the respondent's life has improved over the past year. The psychological index is based on five questions reflecting stress, confidence, anger, composure, and overall difficulties.

Subjective measures of well-being are a useful complement to our time use and labor market data to paint a more comprehensive picture of the overall effects of the training intervention. Various studies have addressed the validity of such measures and it is generally accepted that they can capture individuals' values, preferences, and outcomes of their choices which affect the quality of life.[17] As such, these measures are increasingly being used in the economics and evaluation literatures (Kahneman and Krueger 2006; Devoto et al. 2012; Ashraf, Field, and Lee 2014).

The results in Table 11 suggest that that participation in training has positive effects on subjective measures of well-being only for men. However, the point estimate of this effect is

[16] The exchange rate used is MWK 100 = 0.65 USD.

[17] Global life satisfaction questions are used in many large surveys including General Social Survey and the World Values Survey, where the response rate for questions of subjective well-being hover around 98% (Diener, Inglehart, and Tay 2013). Kahneman and Krueger (2006) state that, "respondents have little trouble answering these questions" and that "global life satisfaction questions have been found to correlate well with a variety of relevant measures".

not robust to the inclusion of control variables – it remains positive in the expanded specification but is no longer statistically significant.

5.4. Accounting for Attrition: Lower Bounds on the Effects of Training

Even though we tracked down many dropouts, our sample is still affected by survey attrition. Although our previous analysis (in Section 2.3) suggests that the attriters' profiles are unlikely to introduce systematic bias in either direction, we formally verify this fact using a matching and imputation method to estimate lower bounds for our treatment effects. Using the framework developed by Calderon et al. (2013), we use one-to-many matching to match attriters in both treatment and control groups (who were surveyed at baseline, but not at follow-up) to 5 members of the control group for whom we have follow up data.[18] We then replace the missing values of our outcome variables with the average of the matched control respondents. This constitutes a lower bound for our results because it assumes that attriters from the treatment group would have experienced the same outcomes as our controls, thereby minimizing the difference between treatment and control.[19]

The results of this bounding exercise are presented in Table 12. Overall, the results confirm our original estimates in terms of magnitude and direction. As expected, the effects are smaller in magnitude under this method, but the changes are not significant enough to change the overall message of our evaluation.

5.5. Examining Dropout and Attrition Bias using Follow-up Data on Dropouts

The follow-up data we collect on dropouts yields yet another strategy to examine whether dropouts are selected in either a positive or negative direction. If those assigned to training dropped out because better alternative opportunities cropped up (i.e. positive selection), then we would expect the dropout decision to be associated with better post-training outcomes. We

[18] Attriters were matched to control group non-attriters based on the following baseline characteristics: household size, number of dependents, owns home, acres of land owned, age, gender, currently a student, lives with at least one parent, completed primary school, married, previously received vocational training, previously started a business, and hours per year spent on agriculture, paid labor, and own business. We replace missing values for attriters in the treatment group with the average value for five matched non-attriters in the control group net of one randomly removed household and we replace missing values for attriters in the control group with the average value for five matched non-attriters in the control group. The sample size in the regression increases slightly because values for attriters (who were missing before) are now imputed and filled in.

[19] We do not include occupation fixed-effects in this specification, since there is no way to input from the data which occupation the attriters *would have* picked.

estimate a simple OLS model, separately by gender, where we compare the outcomes for those who chose to drop out of the program with the outcomes for those who chose to continue participating in training. The right-hand-side variable is an *endogenous* choice (to drop out) that is not randomly assigned, and therefore these results *cannot* be interpreted as causal effects. Nevertheless, the conditional correlations reported in Table 13 are helpful to identify the direction of bias, if any, associated with the dropout decision. This is a potentially useful exercise given the high dropout rates experienced in many training evaluations around the world.

The coefficient estimates across all dependent variables and specifications suggest that dropouts look very similar to the control group that was not assigned to training. Treated individuals are significantly more likely to report higher entrepreneurial skills compared to the dropouts and spend many more hours in training compared to dropouts. This increased training time comes at the expense of hours in paid labor and self-employment. The magnitudes (even if not well-identified) of Treatment-Control differences in the TOT estimates presented in the online appendix are within the range of Treatment-Dropout differences in Table 13.

In summary, dropouts experience outcomes that are very similar to the (randomly assigned) control group as a result of their decision leave the training program. This evidence suggest that there is not significant positive or negative selection bias in outcomes associated with dropping out in this context.

6. Conclusions

This study makes three important contributions to the literature analyzing the effects of vocational training programs. First, we are among the first to provide experimental evidence on the effects of vocational and entrepreneurship training in a country where the majority of individuals lack access to formal education and skills development. Apprenticeship training is particularly relevant in Sub-Saharan Africa, as programs that foster entrepreneurship provide alternatives to highly-rationed wage employment. Second, we shed light on gender differentials in the effects of such programs, by documenting the additional constraints under which women have to make human capital investment decisions. Third, by tracking a large fraction of program dropouts at follow-up, we are able to both examine the determinants and consequences of dropouts, and partially address a challenge faced by most published

evaluations of training programs: many potential participants drop out, and the lack of follow-up data on dropouts introduces the possibility of selection bias.

We find that the vocational training program led to enhanced (self-reported) skills of the type that the training was intended to impart. Male trainees reacted by continuing to invest in their human capital development after training ends, but there were no significant effects on labor-market outcomes in the short run. Participating in training was expensive, particularly for women who had to draw upon their savings to participate. Women were also more likely to enroll in training in occupations where trainers invested less in their trainees, which may be one reason why women did not attend the training as regularly as men. Further, external constraints (such as getting fired) increased women's participation in the program. These results support the conclusions of Duflo (2012)'s review of gender and development that women's empowerment will require active and continuous policy commitment to equality in order to level the playing field.

An important shortcoming of our analysis is that the follow-up survey was conducted only four months after the completion of the training program (on average). However, conducting the follow-up quickly allowed us to track down many of the dropouts, which was important for one of the key contributions of this paper. Given the continued investments in skills development that we observe among the male trainees, it would be valuable to follow this sample over a longer period to identify whether these increases in human capital investment persist and lead to meaningful increases in long-run labor market outcomes.

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Figure 1: Study Design

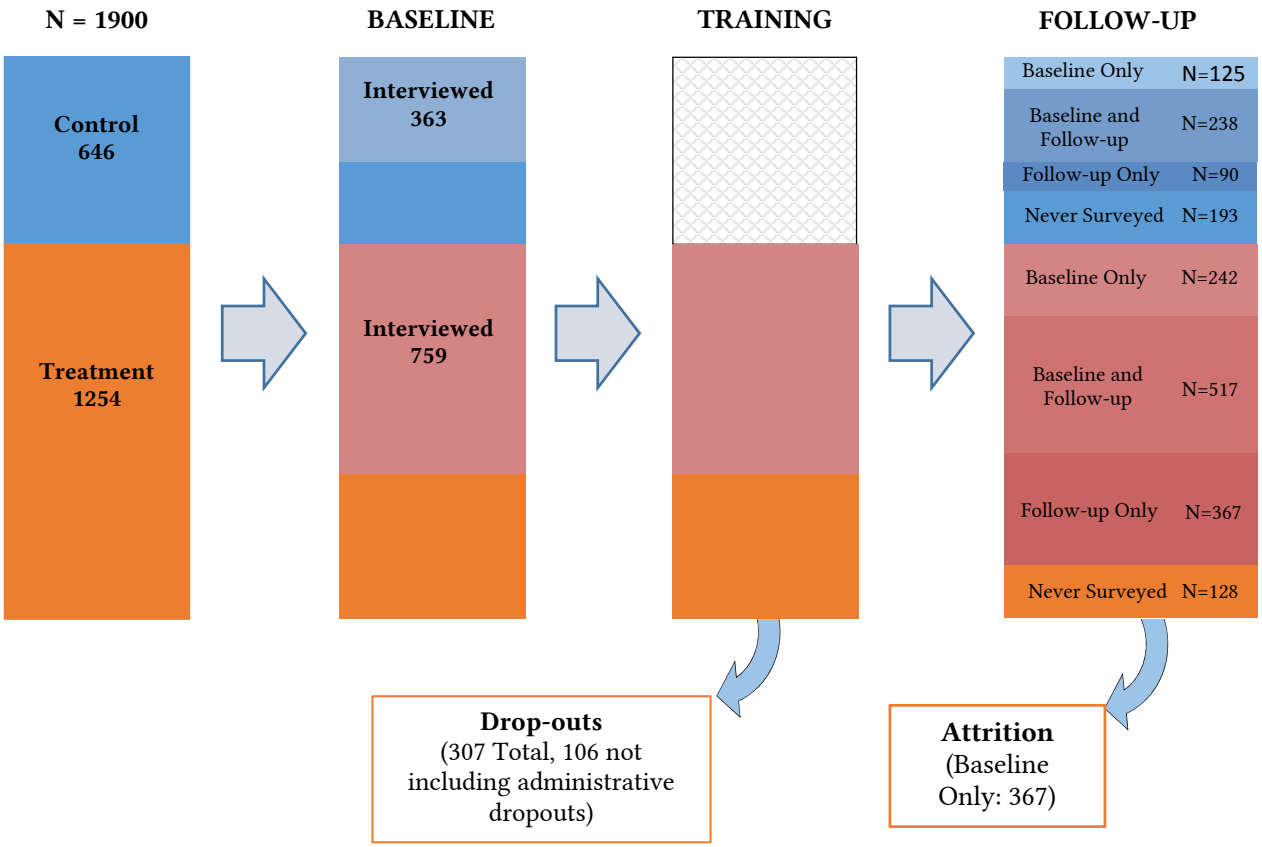

Table 1: Summary Statistics at Baseline by Gender

	Means			Diff. P-Value
	Female	Male	Total	Male/Female
HH Characteristics				
HH Size	5.461	5.422	5.435	0.805
Adult Members	2.504	2.786	2.693	0.002
Children Under 18	2.553	2.222	2.331	0.004
Number of Dependents	1.005	0.745	0.831	0.003
Owns Home=1	0.846	0.893	0.878	0.030
No. of Acres Owned	1.757	1.908	1.860	0.244
Value of Assets	28.781	31.610	30.680	0.497
Wall Construction				
Unburnt bricks	0.407	0.380	0.389	0.391
Burnt bricks	0.466	0.469	0.468	0.933
Roof Construction				
Grass	0.564	0.652	0.623	0.005
Ironsheets	0.423	0.335	0.364	0.005
Water Sources				
Unprotected well	0.087	0.104	0.098	0.356
Communal tap	0.230	0.161	0.184	0.007
Borehole	0.501	0.531	0.521	0.358
Ind. Characteristics				
Gender (Male=1)	0.000	1.000	0.671	0.000
Age	21.103	21.655	21.473	0.008
Head of household=1	0.125	0.203	0.177	0.001
Married/Live with Partner	0.127	0.183	0.165	0.013
Orphan=1	0.314	0.381	0.359	0.028
Education				
Completed primary	0.057	0.049	0.052	0.590
Some secondary	0.507	0.467	0.480	0.216
Completed Secondary	0.190	0.248	0.229	0.023
Currently a student=1	0.089	0.106	0.101	0.367
Previous Vocational Training=1	0.108	0.139	0.129	0.131
Previously Started Business=1	0.355	0.337	0.343	0.560
Economic Variables				
Annual Personal Income	17.227	26.820	24.005	0.153
No. Loans in Last Year	0.369	0.370	0.369	0.974
Loan Amount in Last Year	2.870	2.370	2.535	0.302
No. Grants (Past 6 Months)	0.637	0.697	0.677	0.215
Grant Value (Past 6 Months)	7.040	8.727	8.203	0.007
Do adults skip meals?				
Often	0.322	0.277	0.292	0.118
Sometimes	0.515	0.560	0.545	0.157
Not at all	0.163	0.164	0.163	0.967
Hours per year on:				
Agriculture or Domestic Chores	764.580	425.265	536.858	0.000
Paid Labor	105.740	203.787	171.541	0.000
Own Business	48.217	51.585	50.477	0.799
Other Activities	26.146	15.714	19.145	0.050
Observations	369	753	1122	

Value of assets, annual personal income, loan amount and grant value in 1000MWKs. Difference p-value based on a t-test using robust standard errors.

Table 2: Summary Statistics at Endline by Gender

	Means			Diff. P-Value
	Female	Male	Total	Male/Female
HH Characteristics				
Household size	4.881	4.932	4.914	0.703
No. Adults	2.665	2.855	2.786	0.019
No. Children Under 18	2.114	1.974	2.025	0.170
Number of Dependents	1.231	1.870	1.638	0.000
Owns home=1	0.772	0.880	0.841	0.000
No. of Acres Owned	1.393	1.385	1.388	0.937
Value of Assets	27.854	31.613	30.250	0.219
Individual Characteristics				
Gender:Male=1	0.000	1.000	0.637	
Age	21.358	22.065	21.808	0.001
Head of Household=1	0.134	0.302	0.241	0.000
Married or living with partner=1	0.255	0.240	0.246	0.587
Orphan=1	0.363	0.449	0.418	0.005
Education				
All primary	0.056	0.046	0.049	0.450
Some secondary	0.608	0.526	0.556	0.007
All secondary	0.097	0.171	0.144	0.000
Currently a student=1	0.092	0.098	0.096	0.756
Received vocational training=1	0.044	0.093	0.075	0.001
Addtl. simultaneous vocational training=1	0.017	0.040	0.032	0.017
Economic Variables				
Previously started a business=1	0.360	0.317	0.332	0.140
Worked for wage in past 12 months=1	0.153	0.186	0.174	0.143
Personal Savings	1.549	1.080	1.250	0.409
No. Loans in Last Year	0.337	0.409	0.383	0.039
Loan Amount in Last Year	3.112	2.661	2.805	0.404
Prop. of Expenditure on Food	0.430	0.479	0.462	0.013
Anyone in HH Skip Meals?				
No	0.486	0.473	0.478	0.692
Yes, but infrequently	0.306	0.326	0.319	0.536
Yes, about once a month	0.096	0.088	0.090	0.663
Yes, more than once month	0.111	0.114	0.113	0.904
Migration				
Migration Episodes in Last Year	0.221	0.218	0.219	0.926
Avg. Duration of Migration Episode	7.549	8.475	8.158	0.662
No. of Migration Episodes for Work Last Year	0.015	0.068	0.048	0.000
Trainee Experience				
Months of Training	2.884	2.907	2.898	0.654
No Missed Training Days	0.479	0.530	0.511	0.238
Stipend Amount Per Month	2.132	2.028	2.065	0.472
Sometime Stipend was Insufficent to Cover Needs	0.505	0.460	0.476	0.300
Received Food or Money from MC	0.463	0.554	0.520	0.033
MC Always Attended Training	0.819	0.811	0.814	0.795
Practice Tools Always Available	0.694	0.730	0.717	0.366
Felt Encouraged by MC	0.935	0.930	0.932	0.792
Secured Paid Work from MC After Training	0.014	0.038	0.029	0.062
Observations	412	724	1136	

Value of assets, annual personal income, loan amount and grant value in 1000MKWs. Difference p-value based on a t-test using robust standard errors. We include all households in the endline sample (i.e. those originally assigned to treatment and those who were added to the treatment after randomization) to increase statistical power.

Table 3: Trainee Experience

	No Missed Training Days			Received Food/Money			Secured Paid Work		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender:Male=1	0.051	0.061	0.088*	0.091**	0.099**	0.039	0.024*	0.016	−0.001
	(0.043)	(0.043)	(0.053)	(0.043)	(0.043)	(0.052)	(0.013)	(0.013)	(0.014)
Auto			−0.079			0.220			−0.009
			(0.150)			(0.143)			(0.023)
Beauty			0.103			0.090			0.019
			(0.158)			(0.157)			(0.028)
Clothing			−0.039			0.105			0.001
			(0.142)			(0.135)			(0.014)
Construction			−0.031			0.236*			0.065***
			(0.147)			(0.138)			(0.024)
Electronics			−0.123			0.017			0.023
			(0.161)			(0.156)			(0.028)
Food			−0.144			0.353**			0.022
			(0.165)			(0.161)			(0.051)
Metalwork			−0.095			0.243*			0.025
			(0.151)			(0.142)			(0.025)
R-Squared	0.002	0.091	0.102	0.008	0.117	0.141	0.005	0.051	0.070
Observations	585	585	585	586	586	586	582	582	582
District FEs		Yes	Yes		Yes	Yes		Yes	Yes
Baseline Controls			Yes			Yes			Yes

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Reference category for cccupation fixed-effects is the Other category, which was most evenly spread across males and females trainees. Null results for other trainee experience variables omitted for brevity.

Table 4: Summary Statistics at Baseline: Difference Between Dropout and Attrition

	Means			Diff. P-Value	
	(1) Dropouts W/ Admin Dropouts	(2) Dropouts W/O Admin Dropouts	(3) Attriters	(1) v (3)	(2) v (3)
HH Characteristics					
HH Size	5.711	5.529	5.150	0.006	0.220
Adult Members	2.841	2.700	2.578	0.033	0.500
Children Under 18	2.431	2.471	2.139	0.055	0.174
Number of Dependents	0.612	0.643	1.060	0.000	0.008
Owns Home=1	0.879	0.871	0.849	0.293	0.618
No. of Acres Owned	1.903	2.167	1.868	0.895	0.662
Value of Assets	35.296	24.975	22.809	0.006	0.668
Wall Construction					
Unburnt bricks	0.379	0.343	0.401	0.604	0.356
Burnt bricks	0.483	0.529	0.490	0.854	0.560
Roof Construction					
Grass	0.625	0.543	0.572	0.199	0.652
Ironsheets	0.358	0.414	0.411	0.188	0.965
Water Sources					
Unprotected well	0.078	0.057	0.104	0.270	0.146
Communal tap	0.164	0.186	0.213	0.129	0.593
Borehole	0.539	0.629	0.500	0.356	0.044
Ind. Characteristics					
Gender (Male=1)	0.659	0.629	0.657	0.944	0.656
Age	20.342	20.286	23.256	0.000	0.000
Head of household=1	0.147	0.200	0.240	0.004	0.452
Married/Live with Partner	0.164	0.129	0.204	0.208	0.095
Orphan=1	0.351	0.353	0.348	0.945	0.939
Education					
Completed primary	0.043	0.014	0.049	0.734	0.056
Some secondary	0.461	0.457	0.520	0.158	0.332
Completed Secondary	0.228	0.157	0.237	0.808	0.103
Currently a student=1	0.159	0.143	0.046	0.000	0.026
Previous Vocational Training=1	0.147	0.114	0.123	0.408	0.842
Previously Started Business=1	0.302	0.271	0.390	0.026	0.046
Economic Variables					
Annual Personal Income	15.918	8.796	30.203	0.042	0.001
No. Loans in Last Year	0.366	0.357	0.377	0.812	0.776
Loan Amount in Last Year	2.224	2.414	2.834	0.233	0.665
No. Grants (Past 6 Months)	0.659	0.614	0.728	0.292	0.268
Grant Value (Past 6 Months)	8.877	7.509	9.184	0.810	0.357
Do adults skip meals?					
Often	0.310	0.371	0.286	0.529	0.173
Sometimes	0.556	0.529	0.542	0.741	0.834
Not at all	0.134	0.100	0.172	0.203	0.081
Hours per year on:					
Agriculture or Domestic Chores	524.582	524.389	525.232	0.986	0.989
Paid Labor	167.111	152.762	197.478	0.283	0.282
Own Business	42.860	66.161	68.464	0.171	0.948
Other Activities	9.914	8.293	19.997	0.057	0.042
Observations	232	70	367		

Value of assets, annual personal income, loan amount and grant value in 1000MWKs. Difference p-value based on a t-test using robust standard errors.

Table 5: Summary Statistics at Endline by Dropout Status

	Means			Diff. P-Value	
	(1) Dropouts W/ Admin Dropouts	(2) Dropouts W/O Admin Dropouts	(3) Control Group	(1) v (3)	(2) v (3)
HH Characteristics					
Household size	4.849	4.854	4.933	0.641	0.751
No. Adults	2.734	2.767	2.841	0.307	0.620
No. Children Under 18	1.984	2.000	1.979	0.972	0.908
Number of Dependents	1.648	1.650	1.354	0.064	0.228
Owns home=1	0.835	0.824	0.841	0.826	0.676
No. of Acres Owned	1.342	1.535	1.416	0.527	0.549
Value of Assets	30.086	25.742	28.950	0.771	0.446
Individual Characteristics					
Gender:Male=1	0.641	0.612	0.643	0.962	0.565
Age	21.329	21.466	21.997	0.008	0.116
Head of Household=1	0.238	0.262	0.232	0.861	0.538
Married or living with partner=1	0.276	0.282	0.290	0.711	0.874
Orphan=1	0.421	0.379	0.446	0.518	0.223
Education					
All primary	0.040	0.019	0.055	0.366	0.057
Some secondary	0.535	0.553	0.546	0.781	0.892
All secondary	0.162	0.117	0.146	0.594	0.423
Currently a student=1	0.155	0.146	0.113	0.120	0.400
Received vocational training=1	0.076	0.087	0.110	0.139	0.496
Addtl. simultaneous vocational training=1	0.030	0.039	0.046	0.286	0.757
Economic Variables					
Previously started a business=1	0.310	0.311	0.366	0.140	0.298
Worked for wage in past 12 months=1	0.184	0.214	0.216	0.312	0.951
Personal Savings	0.730	0.717	2.266	0.067	0.070
No. Loans in Last Year	0.359	0.388	0.354	0.909	0.590
Loan Amount in Last Year	2.774	3.179	3.549	0.386	0.704
Prop. of Expenditure on Food	0.464	0.468	0.471	0.804	0.937
Anyone in HH Skip Meals?					
No	0.500	0.494	0.475	0.559	0.749
Yes, but infrequently	0.311	0.292	0.338	0.495	0.413
Yes, about once a month	0.076	0.090	0.097	0.377	0.837
Yes, more than once month	0.114	0.124	0.090	0.363	0.388
Migration					
Migration Episodes in Last Year	0.204	0.272	0.280	0.046	0.881
Avg. Duration of Migration Episode	12.927	12.669	8.610	0.202	0.434
No. of Migration Episodes for Work Last Year	0.049	0.068	0.082	0.125	0.637
Observations	304	103	328		

Value of assets, annual personal income, loan amount and grant value in 1000MWKs. Difference p-value based on a t-test using robust standard errors.

Table 6: Effect of Treatment Assignment on Likelihood of Attrition

	Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment Assignment	−0.082	−0.085*	−0.026	0.000	0.014	0.035
	(0.055)	(0.049)	(0.058)	(0.036)	(0.030)	(0.033)
Value of Assets (1000MWK)			0.001			−0.001
			(0.001)			(0.000)
Annual Personal Income (1000MWK)			0.000			0.000
			(0.001)			(0.000)
No. of Dependents			0.008			−0.007
			(0.017)			(0.012)
Married (1=yes)			−0.104			−0.091
			(0.083)			(0.056)
Never Skip Meals (1=yes)			−0.123*			0.014
			(0.072)			(0.046)
Currently a Student (1=yes)			−0.067			0.007
			(0.094)			(0.058)
Started Business Previously (1=yes)			0.003			0.044
			(0.064)			(0.035)
Household Head (1=yes)			−0.221**			0.009
			(0.097)			(0.060)
Household Size			0.014			−0.011
			(0.048)			(0.027)
Adults			−0.089*			−0.032
			(0.047)			(0.025)
Children Under 18			−0.034			0.026
			(0.051)			(0.028)
Borehole Water			−0.011			−0.050
			(0.056)			(0.035)
Time on Other Activities			0.000			−0.000
			(0.000)			(0.000)
Age			0.052***			0.058***
			(0.009)			(0.006)
Constant	0.398***	0.918***	0.165	0.320***	0.851***	−0.311**
	(0.046)	(0.075)	(0.224)	(0.030)	(0.055)	(0.149)
District Fixed Effects	No	Yes	Yes	No	Yes	Yes
R^2	0.006	0.315	0.530	0.000	0.284	0.444
Observations	369	369	223	753	753	534
F-stat			4.064			8.396
F-test p-value			0.000			0.000

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

The F-test is a test of joint significance for all control variables.

Table 7: Effects of Shocks on Likelihood of Dropout (OLS)

	Dropped Out (W/ Admin Dropout)			Dropped Out (W/O Admin. Dropout)		
	Female	Male	Diff. P-Value	Female	Male	Diff. P-Value
Migrated (1=Yes)	0.087	0.085*	0.505	0.115	0.169***	0.320
	(0.063)	(0.046)		(0.090)	(0.057)	
Lives >4KM from TC	0.106	−0.085	0.210	0.065	−0.037	0.437
	(0.112)	(0.071)		(0.137)	(0.081)	
Close Friends/Relatives at TC	−0.570***	−0.637***	0.384	−0.344***	−0.285***	0.859
	(0.063)	(0.041)		(0.094)	(0.070)	
In Past Year						
Fired	−0.360***	0.059	0.061	−0.409***	0.175	0.008
	(0.097)	(0.109)		(0.126)	(0.140)	
Incapacitated	0.151*	−0.084	0.052	0.211	−0.107	0.091
	(0.088)	(0.083)		(0.136)	(0.091)	
HH Member Incapacitated	0.004	0.008	0.952	−0.011	0.054	0.559
	(0.056)	(0.039)		(0.077)	(0.050)	
HH Member Death	−0.085	−0.007	0.963	−0.104	0.012	0.797
	(0.078)	(0.070)		(0.103)	(0.085)	
Had Child	0.097	0.041	0.521	0.181	0.119	0.811
	(0.112)	(0.089)		(0.153)	(0.106)	
Married	0.086	−0.034	0.630	0.110	−0.129	0.289
	(0.081)	(0.070)		(0.121)	(0.080)	
Month Before Training						
Hrs in Paid Labor	0.000	−0.000	0.449	0.000	−0.000	0.330
	(0.000)	(0.000)		(0.001)	(0.001)	
Hrs in Self Employment	0.001	−0.000	0.186	0.001	−0.000	0.181
	(0.001)	(0.000)		(0.001)	(0.000)	
Hrs in Skill Development	0.000	0.001*	0.743	0.001	0.001	0.768
	(0.001)	(0.000)		(0.001)	(0.001)	
R-Sq	0.536	0.486		0.354	0.227	
Observations	225	427		157	298	

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

District and occupation fixed effects and controls included in each regression. Controls include: number of dependens, value of assets (1000MWKs), age and indicators for head of household, orphan status, and always being healthy. TC = training center. Sample restricted to only those assigned to recieve treatment. Difference p-value based on a t-test using robust standard errors.

Table 8: Reasons for Not Participating in Training Program

	Mean Values			Diff. P-Value
	Female	Male	Total	Male/Female
Found other work opportunities	0.043	0.042	0.043	0.976
Found other training opportunities	0.043	0.000	0.021	0.322
New household/family obligations	0.217	0.000	0.106	0.017
Got married	0.217	0.042	0.128	0.078
Lost interest	0.087	0.042	0.064	0.539
Dissatisfied with the assigned trade	0.087	0.083	0.085	0.965
Was told to wait for second round of training	0.000	0.208	0.106	0.018
Was in school	0.217	0.125	0.170	0.413
Didn't receive message from TEVETA	0.000	0.125	0.064	0.077
Couldn't afford to participate	0.043	0.042	0.043	0.976
Had no transportation to training site	0.087	0.042	0.064	0.306
Migrated elsewhere	0.043	0.083	0.064	0.584
Other administrative	0.043	0.167	0.106	0.173
Observations	23	24	47	

Responses to question from endline: Why Did You Not Participate in TEVETA Program? Question asked of the 47 individuals who were assigned to receive the treatment but report not participating in the TEVETA program. Diffence p-value based on a t-test with robust standard errors

Table 9: ITT Effects of Training on Entrepreneurial Skill Development

	Female			Male			Diff. P-Value
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Entrepreneurial Skill Index (Principal Component)	0.718***	1.066***	−0.826	0.820***	0.867***	−0.701	0.909
	(0.154)	(0.269)		(0.105)	(0.154)		
Entrepreneurial Skill Index (Z-Score)	0.571***	0.868***	−0.074	0.665***	0.685***	0.040	0.901
	(0.134)	(0.239)		(0.090)	(0.131)		
Observations	323	132		617	325		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. Z-Score is calculated around control group means and standard deviations. The entrepreneurial skill index is composed of survey data on: (i) skill in trade [1-10; 1-6 = 0, 7-10 = 1], (ii) ability to calculate profit [1-10; 1-6=0 7-10=1], (iii) knowledge of starting a business [1=yes], (iv) regarding oneself as an entrepreneur [1=yes] and (v) ability to earn money outside of farming [1=yes].

Table 10: ITT Effects of Training on Time Use

	Female			Male			Diff. P-Value
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Time Use During Training Period (Hrs):							
Paid Labor	−26.248***	−40.394	39.743	−32.729**	−49.451**	68.723	0.834
	(9.499)	(27.087)		(12.997)	(19.795)		
Self Employment	−40.237***	−61.575**	94.587	−96.278***	−68.061***	155.614	0.009
	(14.019)	(30.461)		(15.286)	(17.835)		
Skill Development	305.237***	262.037***	47.734	351.411***	349.271***	34.792	0.321
	(28.113)	(59.732)		(23.439)	(33.771)		
Time Use After Training (Hrs/2 Months):							
Paid Labor	−9.266	−13.054	30.817	4.350	−3.751	49.718	0.178
	(8.556)	(16.532)		(9.412)	(14.824)		
Self Employment	−5.348	−11.747	68.495	−1.128	8.531	87.218	0.983
	(9.765)	(20.964)		(8.322)	(10.670)		
Skill Development	6.325	−19.695	22.202	21.593***	29.152***	15.089	0.061
	(9.642)	(16.974)		(6.227)	(9.440)		
Observations	323	132		617	325		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. The post-training time use data is a sum of time use during the month after the training and time use a week prior to the the follow up survey. The weekly time use measure is multiplied by four to generate this 2-month measure.

Table 11: ITT Effects of Training on Economic Outcomes & Well-Being Indices

	Female			Male			Diff. P-Value
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Economic Outcomes							
Economic Index (Z-Score)	−0.115*	−0.058	−0.020	−0.057	−0.011	0.011	0.469
	(0.059)	(0.106)		(0.108)	(0.045)		
HH Rarely/Never Skips Meals	−0.011	−0.024	0.795	−0.024	−0.056	0.818	0.471
	(0.054)	(0.107)		(0.038)	(0.060)		
Personal Savings	−3.011*	−8.707**	3.551	−1.142	0.097	1.684	0.319
	(1.707)	(4.386)		(1.287)	(0.293)		
Started Business	−0.126**	−0.146*	0.257	−0.015	−0.044	0.158	0.046
	(0.050)	(0.088)		(0.032)	(0.044)		
Well-Being							
Life Satisfaction Index (Z-Score)	0.171	0.197	0.023	0.328***	0.122	−0.013	0.454
	(0.113)	(0.227)		(0.083)	(0.120)		
Psychological Index (Z-Score)	−0.047	−0.010	−0.030	0.025	0.145	0.016	0.795
	(0.115)	(0.232)		(0.087)	(0.127)		
Observations	323	132		617	325		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. Observations are as noted except for skips meals where N=263 for females and N=553 for males in the endline sample and N=112 for females and N=289 for males in the panel sample. Z-Scores are calculated around control group means and standard deviations. The economic index is composed of survey data on: (i) monthly expenditures and (ii) total earnings in last week. The life satisfaction index is composed of survey data on: (i) happy and satisfied with life [agree=1] and (ii) life has improved during the previous year [1=yes]. The psychological index is composed of survey data on: (i) felt stressed or nervous last month [never/almost never=1], (ii) felt confident to solve problems last month [fairly often/often=1], (iii) felt that things were going your way last month [fairly often/often=1], (iv) felt anger due to problems last month [never/almost never=1] and (v) felt that faced many difficulties last month [never/almost never=1].

Table 12: ITT Effects of Training: Lower Bounds Matching

	Female			Male			Diff. P-Value
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Entreprenuerial Skills							
Entrepreneurial Skill Index (Principal Component)	0.590***	0.723***	−0.880	0.606***	0.610***	−0.749	0.846
	(0.115)	(0.180)		(0.080)	(0.104)		
Entrepreneurial Skill Index (Z-Score)	0.477***	0.617***	−0.128	0.485***	0.470***	0.000	0.988
	(0.100)	(0.159)		(0.068)	(0.089)		
Time Use							
During Training Period (Hrs)							
Paid Labor	−16.501**	−12.814	49.489	−21.482**	−31.084**	68.059	0.555
	(7.816)	(15.183)		(9.520)	(13.153)		
Self Employment	−24.009**	−35.465*	101.005	−69.526***	−42.137***	145.870	0.009
	(10.865)	(18.293)		(11.485)	(12.169)		
Skill Development	236.235***	230.701***	40.318	265.503***	244.714***	34.709	0.993
	(22.477)	(36.901)		(18.190)	(23.949)		
After Training Period (Hrs/ 2 Months)							
Paid Labor	−7.628	−3.741	39.836	2.760	−3.925	52.014	0.270
	(7.048)	(9.528)		(7.001)	(9.964)		
Self Employment	1.592	−0.280	68.341	0.055	7.993	82.026	0.962
	(7.205)	(12.471)		(5.936)	(6.885)		
Skill Development	0.272	−13.756	19.625	13.149***	16.527***	14.865	0.076
	(6.396)	(9.259)		(4.190)	(5.958)		
Economic Outcomes							
Economic Index (Z-Score)	−0.091*	0.050	0.006	−0.025	0.003	0.004	0.268
	(0.049)	(0.059)		(0.068)	(0.032)		
Personal Savings	−2.139*	−4.128	4.942	0.388	1.355***	2.212	0.018
	(1.294)	(2.820)		(0.860)	(0.431)		
Started Business	−0.128***	−0.137**	0.306	0.002	−0.018	0.200	0.012
	(0.039)	(0.058)		(0.026)	(0.031)		
Well-Being							
Life Satisfaction Index (Z-Score)	0.139*	0.120	0.013	0.226***	0.073	0.011	0.476
	(0.083)	(0.126)		(0.061)	(0.081)		
Psychological Index (Z-Score)	−0.098	−0.064	0.006	0.011	0.083	0.024	0.350
	(0.084)	(0.130)		(0.064)	(0.082)		
Observations	449	210		856	496		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. Z-scores calculated around control group means and standard deviations. See ITT tables for explanations of the various indices. These estimates are achieved by (i) replacing missing values for attriters in the control group (N=124) with the average value for five matched non-attriters in the control group and (ii) replacing missing values for the attriters in the treatment group (N=241) with the average value for five matched non-attriters in the control group net of one randomly removed household. The matches were determined using propensity score matching on baseline observables. We omit does HH skip meals since the frequency of missing data for this variable is problematic for the process outlined above.

Table 13: Effect of Dropout on Outcome Variables

	Dropped Out (W/ Admin)				Dropped Out (W/O Admin)			
	F	F	M	M	F	F	M	M
Entreprenuerial Skills								
Entrepreneurial Skill Index (PC)	−1.571***	−1.356***	−1.077***	−1.070***	−1.420***	−2.032***	−0.832***	−0.607**
	(0.193)	(0.455)	(0.131)	(0.201)	(0.269)	(0.535)	(0.190)	(0.280)
Entrepreneurial Skill Index (Z-Score)	−1.336***	−1.141***	−0.884***	−0.882***	−1.234***	−1.703***	−0.712***	−0.495**
	(0.165)	(0.396)	(0.111)	(0.169)	(0.229)	(0.453)	(0.161)	(0.236)
Time Use								
During Training Period (Hrs)								
Paid Labor	23.794**	37.502	56.273***	40.056**	25.905	69.966	34.079**	33.694
	(10.249)	(26.274)	(11.872)	(17.985)	(19.521)	(50.607)	(16.800)	(27.366)
Self Employment	96.177***	121.267***	112.968***	112.695***	90.770***	139.694**	54.023***	30.723**
	(14.245)	(30.385)	(11.624)	(17.246)	(19.761)	(68.493)	(15.776)	(12.042)
Skill Development	−426.255***	−380.565***	−412.962***	−401.057***	−346.685***	−402.614***	−255.308***	−212.179***
	(36.401)	(74.906)	(36.091)	(50.865)	(53.360)	(135.181)	(54.728)	(67.498)
After Training Period (Hrs/2 Months)								
Paid Labor	−4.841	15.392	23.036**	22.432	9.906	54.273	24.860	30.183
	(8.878)	(19.489)	(11.351)	(17.175)	(13.063)	(34.132)	(16.463)	(26.899)
Self Employment	12.976	36.100*	2.189	10.311	9.615	4.976	−2.662	−1.487
	(12.461)	(21.795)	(8.739)	(12.732)	(13.068)	(39.319)	(13.158)	(17.472)
Skill Development	−12.822	−13.041	−5.600	−9.733	−15.690	−1.339	6.605	11.418
	(9.467)	(12.528)	(8.936)	(13.448)	(12.257)	(17.858)	(14.099)	(21.880)
Economic Outcomes								
Economic Index (Z-Score)	−0.070	0.108	−0.036	−0.012	−0.005	0.218	−0.008	0.026
	(0.067)	(0.138)	(0.042)	(0.062)	(0.112)	(0.258)	(0.065)	(0.117)
HH Rarely/Never Skips Meals	0.045	0.034	−0.029	0.013	0.058	0.445**	−0.029	−0.024
	(0.074)	(0.120)	(0.045)	(0.075)	(0.103)	(0.227)	(0.063)	(0.121)
Personal Savings	0.071	0.643	0.255	1.189**	−0.321	0.757	0.238	0.956
	(0.324)	(0.578)	(0.420)	(0.544)	(0.267)	(1.154)	(0.524)	(0.616)
Started Business	−0.093	0.007	0.007	0.003	−0.047	0.045	0.058	0.081
	(0.057)	(0.117)	(0.037)	(0.059)	(0.077)	(0.186)	(0.058)	(0.098)
Well-Being								
Life Satisfaction Index (Z-Score)	−0.245*	−0.054	−0.380***	−0.498***	−0.129	−0.598	−0.426***	−0.679***
	(0.133)	(0.238)	(0.089)	(0.140)	(0.174)	(0.384)	(0.131)	(0.240)
Psychological Index (Z-Score)	−0.057	0.264	−0.104	−0.178	0.149	0.338	−0.228	−0.240
	(0.163)	(0.308)	(0.109)	(0.172)	(0.187)	(0.405)	(0.150)	(0.262)
Observations	214	91	415	216	150	63	290	147
Baseline Controls		Yes		Yes		Yes		Yes

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < 0.05$, *** $p < 0.01$.

Dependent variable in first column. All regressions restricted to the sample assigned to receive the treatment excluding individuals added to the treatment after randomization. Observations are as noted except for skip meals where where N=117 for females and N=269 for males in the endline sample and N=52 for females and N=135 for males in the panel sample. Z-score calculated around control group means and standard deviations. See ITT tables for explanations of the various indices.

Appendix for Online Publication Only

Gender Differences in the Effects of Vocational Training: Constraints on Women and Dropout Behavior

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A Additional Tables and Figures

Figure A1: Start Dates for Program Participants

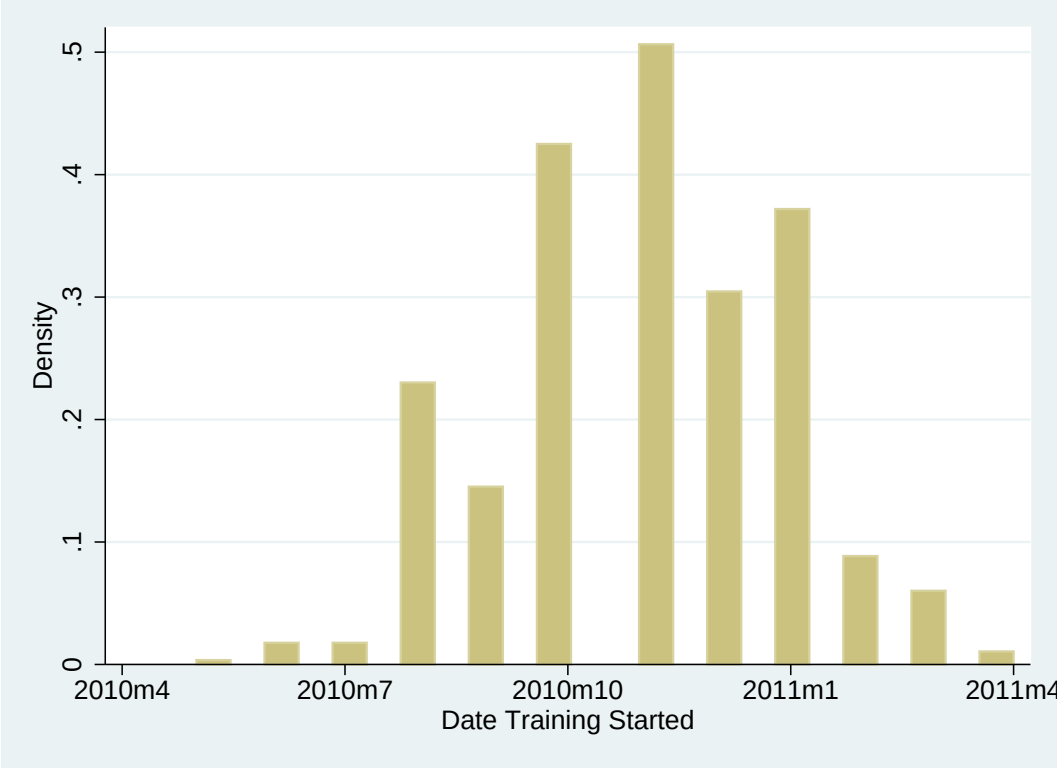

Table A1: Summary Statistics at Baseline by Treatment

	Means				Diff. P-Value			
	(1) Assigned to Treatment	(2) Assigned to Treatment Received Letter	(3) Assigned to Treatment No Letter	(4) Control	(1) v (4)	(2) v (4)	(3) v (4)	(2) v (3)
HH Characteristics								
HH Size	5.466	5.382	5.781	5.369	0.527	0.936	0.085	0.076
Adult Members	2.664	2.606	2.881	2.756	0.325	0.116	0.400	0.046
Children Under 18	2.391	2.384	2.419	2.203	0.101	0.130	0.211	0.830
Number of Dependents	0.803	0.855	0.606	0.889	0.350	0.728	0.022	0.025
Owns Home=1	0.872	0.868	0.887	0.889	0.431	0.349	0.971	0.503
No. of Acres Owned	1.830	1.844	1.778	1.925	0.499	0.590	0.500	0.760
Value of Assets	31.313	29.054	39.815	29.339	0.643	0.949	0.111	0.083
Wall Construction								
Unburnt bricks	0.395	0.395	0.394	0.375	0.520	0.530	0.686	0.971
Burnt bricks	0.459	0.458	0.463	0.486	0.402	0.407	0.619	0.928
Roof Construction								
Grass	0.622	0.610	0.669	0.625	0.924	0.635	0.334	0.162
Ironsheets	0.361	0.370	0.325	0.369	0.782	0.976	0.324	0.280
Water Sources								
Unprotected well	0.093	0.095	0.087	0.109	0.429	0.493	0.447	0.777
Communal tap	0.182	0.191	0.150	0.187	0.866	0.866	0.296	0.207
Borehole	0.528	0.535	0.500	0.507	0.520	0.403	0.884	0.433
Ind. Characteristics								
Gender (Male=1)	0.668	0.668	0.669	0.678	0.744	0.749	0.840	0.981
Age	21.445	21.724	20.390	21.532	0.666	0.366	0.000	0.000
Head of household=1	0.182	0.198	0.125	0.167	0.514	0.224	0.204	0.019
Married/Live with Partner	0.155	0.148	0.181	0.186	0.200	0.128	0.895	0.323
Orphan=1	0.347	0.345	0.354	0.384	0.230	0.224	0.519	0.820
Education								
Completed primary	0.054	0.053	0.056	0.047	0.635	0.682	0.673	0.880
Some secondary	0.480	0.485	0.463	0.481	0.994	0.893	0.704	0.612
Completed Secondary	0.217	0.206	0.256	0.256	0.155	0.080	0.987	0.190
Currently a student=1	0.100	0.083	0.163	0.103	0.875	0.314	0.074	0.011
Previous Vocational Training=1	0.123	0.113	0.163	0.142	0.404	0.202	0.547	0.121
Previously Started Business=1	0.329	0.332	0.319	0.372	0.163	0.211	0.234	0.746
Economic Variables								
Annual Personal Income	26.037	27.799	19.090	19.494	0.370	0.336	0.945	0.336
No. Loans in Last Year	0.365	0.363	0.375	0.378	0.732	0.691	0.958	0.796
Loan Amount in Last Year	2.496	2.593	2.146	2.617	0.784	0.959	0.356	0.350
No. Grants (Past 6 Months)	0.689	0.693	0.675	0.653	0.454	0.431	0.753	0.790
Grant Value (Past 6 Months)	8.044	7.659	9.488	8.557	0.513	0.236	0.557	0.218
Do adults skip meals?								
Often	0.302	0.306	0.287	0.269	0.254	0.222	0.673	0.645
Sometimes	0.547	0.542	0.563	0.542	0.876	0.982	0.660	0.650
Not at all	0.151	0.151	0.150	0.189	0.122	0.139	0.267	0.965
Hours per year on:								
Agriculture or Domestic Chores	533.309	534.937	527.186	544.369	0.711	0.764	0.673	0.838
Paid Labor	179.210	180.451	174.540	155.310	0.210	0.210	0.518	0.838
Own Business	47.305	51.053	33.202	57.192	0.489	0.684	0.161	0.232
Other Activities	16.128	17.567	10.713	25.530	0.122	0.209	0.019	0.117
Observations	762	602	160	360				

Value of assets, annual personal income, loan amount and grant value in 1000MWKs. Difference p-value based on a t-test using robust standard errors.

Table A2: Occupational Choice of Participants who Received Training

	Total Trained	Prop. Female	Prop. Male	Avg. Months of Training
Auto	89	0.213	0.787	3.180
Beauty	44	0.864	0.136	2.820
Clothing	167	0.659	0.341	2.898
Construction	141	0.0638	0.936	2.881
Electronics	37	0.351	0.649	2.912
Food	28	0.643	0.357	2.577
Metalwork	90	0.144	0.856	2.858
Other	17	0.471	0.529	3.088
Total	613	0.372	0.628	2.910

B TOT Estimates

Table A3: TOT Effects of Training on Entrepreneurial Skill Development

	Female			Male			Diff. P-Value
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Entrepreneurial Skill Index (Principal Component)	1.491***	2.324***	−0.815	1.607***	1.740***	−0.704	0.862
	(0.271)	(0.391)		(0.190)	(0.266)		
Entrepreneurial Skill Index (Z-Score)	1.180***	1.893***	−0.065	1.309***	1.377***	0.043	0.836
	(0.237)	(0.353)		(0.164)	(0.230)		
Observations	320	132		611	320		
Baseline Controls	No	Yes		No	Yes		No

Heteroskedasticity-robust standard errors in parentheses. * p< .10, ** p< 0.05, *** p< 0.01.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. 1st Stage F-Stats: F = 149.63 for women and F = 384.71 for men. Z-Score is calculated around control group means and standard deviations. The entrepreneurial skill index is composed of survey data on: (i) skill in trade [1-10; 1-6 = 0, 7-10 = 1], (ii) ability to calculate profit [1-10; 1-6=0 7-10=1], (iii) knowledge of starting a business [1=yes], (iv) regarding oneself as an entrepreneur [1=yes] and (v) ability to earn money outside of farming [1=yes].

Table A4: TOT Effects of Training on Time Use

	Female		Male		Diff. P-Value		
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Time Use During Training Period (Hrs):							
Paid Labor	−55.516***	−88.043*	39.741	−60.188**	−96.898**	66.110	0.964
	(19.235)	(50.237)		(24.844)	(38.158)		
Self Employment	−86.420***	−134.210**	95.463	−188.067***	−139.149***	155.220	0.008
	(26.768)	(53.034)		(28.737)	(32.997)		
Skill Development	641.176***	571.136***	48.176	689.300***	701.829***	34.650	0.225
	(46.271)	(81.165)		(39.129)	(52.056)		
Time Use After Training (Hrs/2 Months):							
Paid Labor	−20.231	−28.452	31.102	9.770	−5.916	48.955	0.149
	(17.345)	(30.161)		(18.316)	(28.840)		
Self Employment	−5.283	−25.604	66.463	0.146	19.297	86.730	0.871
	(19.094)	(38.514)		(16.205)	(21.490)		
Skill Development	11.699	−42.927	22.407	43.468***	62.017***	15.160	0.046
	(19.386)	(30.466)		(12.208)	(18.344)		
Observations	320	132		611	320		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * p< .10, ** p< 0.05, *** p< 0.01.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. The post-training time use data is a sum of the time use during the month after the training and time use a week prior to the the follow up survey. The weekly time use measure is multiplied by four to generate this 2-month measure. 1st Stage F-Stats: F = 149.63 for women and F = 384.71 for men.

Table A5: TOT Effects of Training on Economic Outcomes & Well-Being Indices

	Female		Male		Diff. P-Value		
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean	(5)
Economic Outcomes							
Economic Index (Z-Score)	−0.244**	−0.127	−0.020	−0.114	−0.017	0.014	0.476
	(0.122)	(0.196)		(0.210)	(0.086)		
HH Rarely/Never Skips Meals	−0.026	−0.052	0.793	−0.029	−0.073	0.816	0.558
	(0.110)	(0.183)		(0.071)	(0.106)		
Personal Savings	−6.390*	−18.977**	3.584	−2.270	0.230	1.701	0.317
	(3.462)	(8.622)		(2.497)	(0.585)		
Started Business	−0.247**	−0.319*	0.250	−0.029	−0.090	0.160	0.066
	(0.104)	(0.172)		(0.063)	(0.087)		
Well-Being							
Life Satisfaction Index (Z-Score)	0.352	0.430	0.029	0.625***	0.208	−0.007	0.480
	(0.225)	(0.399)		(0.160)	(0.232)		
Psychological Index (Z-Score)	−0.115	−0.021	−0.024	0.039	0.314	0.026	0.804
	(0.234)	(0.421)		(0.169)	(0.246)		
Observations	320	132		611	320		
Baseline Controls		Yes			Yes		No

Heteroskedasticity-robust standard errors in parentheses. * p< .10, ** p< 0.05, *** p< 0.01.

Dependent variable in first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District and occupation fixed effects included in each regression. Observations as noted except for skips meals where N=260 for females and N=547 for males in the endline sample and N=112 for females and N=284 for males in the panel sample. 1st Stage F-Stats for endline sample: F = for women and F = for men, except for HH skips meals where F = 84.05 for women and F = 73.45 for men. Z-Scores are calculated around control group means and standard deviations. The economic index is composed of survey data on: (i) monthly expenditures and (ii) total earnings in last week. The life satisfaction index is composed of survey data on: (i) happy and satisfied with life [agree=1] and (ii) life has improved during the previous year [1=yes]. The psychological index is composed of survey data on: (i) felt stressed or nervous last month [never/almost never=1], (ii) felt confident to solve problems last month [fairly often/often=1], (iii) felt that things were going your way last month [fairly often/often=1], (iv) felt anger due to problems last month [never/almost never=1] and (v) felt that faced many difficulties last month [never/almost never=1].

C Robustness to MC-Related Controls

In addition to the specifications in the main paper, we conduct analysis controlling for MC-related controls. In this section, we include controls for the number of trainees in the group, the number of years the MC has been in their trade and if the MC and trainee are the same gender. As an additional note, since those in the control group did not participate in training we imputed zeros in all of these categories for all control group members. As such, the coefficient estimates associated the MC-related control variables represent interaction effects with the treatment assignment.

Trainees were trained by individuals with an average of 15 years of experience in groups of 4-5, on average. About 74% of trainees were the same gender as their MC, with large differences across gender: 24% of women were trained by female MCs and 96% of men were trained by male MCs. This last result suggests that the variable we use to encode if the gender of the trainee matches the gender of the MC for males is highly collinear with our treatment variable, which may reduce the precision of the following estimates for males.

We do not have data on every MC, meaning these results come from systematically smaller samples than the main results. Before testing the robustness of our estimates to the inclusion of MC-related controls, we first ensure the results from the main paper are mirrored with smaller samples. In Tables A6-A8, we run the most parsimonious specification on the reduced samples in columns (1) and (3) and then include MC-related controls in columns (2) and (4) as robustness checks.

C.1 Entrepreneurial Skill Development

In the smaller sample we again identify the main results we present in the paper from Table 9 (i.e. strong positive increases in self-reported entrepreneurial skills). We also find that these results are robust to the inclusion of MC-related controls (see Table A6). For women, we find that self-reported entrepreneurial skills may be an increasing function of group size, suggesting the presence of peer effects. In all other cases, the MC-related controls are indistinguishable from zero, suggesting that the remainder of the MC-related controls are inconsequential in these specification.

C.2 Time Use

The parsimonious specification in Table A7 mirrors the results from the main analysis sample in Table 10. We find that most of our results for time use during the training period are robust to the inclusion of MC-related controls. However, time in skill development during the training period for males seems to be partially explained by trainees who were matched with Male MCs (see column (4) of A7).

For time use after training, the parsimonious specification again matches the results highlighted in Table 10. For females, we find the coefficient estimates on the treatment variable including MC-related controls are stable. However, we do find evidence that females in larger groups are less likely to spend time in paid labor after the training and women who are trained by female MCs are less likely to continue skill development after the conclusion of the training. Further, a primary result that we highlight in the paper is that male trainees spend more time in skill development after the training period is over, however, these results are not robust to the inclusion of MC-related controls. Notably, it seems that having a gender match between the MC and the trainee is important for this post-treatment behavioral response. Nevertheless, we must note the collinearity between this gender match variable and the treatment assignment for men, which make it difficult to identify the treatment and gender match effects separately.

C.3 Economic Outcomes and Well-Being Indices

The results on economic outcomes and well-being presented in Table 11 in the main paper are recast with MC-related controls in Table A8. In the parsimonious model, we no longer find that women reduce their personal savings to participate in the program or are less likely to start a business after the programs completion. These results suggest that this reduced sample cannot be used to test the robustness of these results to MC-related controls since we cannot separately identify robustness from sample selection. Using this reduced sample we also find that women assigned to treatment are more likely to have a higher life satisfaction index, although this is partially offset by larger group sizes. The single result that is identified through the parsimonious specification in this section and the main specification in Table 11 is positive and significant improvements in the life satisfaction index for men. However, the evidence in table A8 suggests this estimated effect is not robust to the inclusion of MC-related controls.

Table A6: ITT Effects of Training on Entrepreneurial Skill Development with Additonal MC-related Controls

	Female				Male	
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean
Entrepreneurial Skill Index (Principal Component)	1.546***	1.354***	−0.825	1.290***	1.547***	−0.708
	(0.173)	(0.360)		(0.119)	(0.365)	
No. of Trainees in Group		0.070**			0.028	
		(0.035)			(0.037)	
MC Years in Trade		−0.009			−0.005	
		(0.015)			(0.010)	
MC Gender = Trainee Gender		−0.016			−0.306	
		(0.366)			(0.345)	
Entrepreneurial Skill Index (Z-Score)	1.273***	1.206***	−0.074	1.056***	1.351***	0.040
	(0.149)	(0.300)		(0.100)	(0.296)	
No. of Trainees in Group		0.053*			0.019	
		(0.028)			(0.031)	
MC Years in Trade		−0.012			−0.003	
		(0.013)			(0.008)	
MC Gender = Trainee Gender		−0.045			−0.329	
		(0.309)			(0.276)	
Observations	203	203		411	411	

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Dependent variable are the unindented entries in the first column. The MC-related controls are included in each regression and are the indented entries in the first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District fixed effects included in each regression. Z-Score is calculated around control group means and standard deviations. The entrepreneurial skill index is composed of survey data on: (i) skill in trade [1-10; 1-6 = 0, 7-10 = 1], (ii) ability to calculate profit [1-10; 1-6=0 7-10=1], (iii) knowledge of starting a business [1=yes], (iv) regarding oneself as an entrepreneur [1=yes] and (v) ability to earn money outside of farming [1=yes].

Table A7: ITT Effects of Training on Time Use with Additonal MC-related Controls

	Female				Male	
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean
Time Use During Training Period (Hrs):						
Paid Labor	−35.310***	−48.802***	39.743	−66.674***	−49.985***	68.723
	(8.930)	(14.526)		(11.080)	(16.341)	
No. of Trainees in Group		0.423			−0.386	
		(1.050)			(1.302)	
MC Years in Trade		0.621			−0.030	
		(0.547)			(0.438)	
MC Gender = Trainee Gender		8.949			−15.017	
		(16.010)			(15.934)	
Self Employment	−73.838***	−66.455***	94.587	−161.319***	−151.810***	155.614
	(12.139)	(19.274)		(17.708)	(33.922)	
No. of Trainees in Group		−3.058			1.649	
		(2.329)			(2.111)	
MC Years in Trade		0.503			0.346	
		(1.258)			(0.678)	
MC Gender = Trainee Gender		−0.126			−21.974	
		(27.638)			(30.384)	
Skill Development	515.603***	625.530***	47.734	546.954***	283.237***	34.792
	(32.800)	(60.028)		(26.423)	(100.145)	
No. of Trainees in Group		−8.260			−3.287	
		(6.657)			(9.803)	
MC Years in Trade		−3.994			1.439	
		(3.038)			(2.482)	
MC Gender = Trainee Gender		−44.396			261.691***	
		(70.529)			(96.402)	
Time Use After Training (Hrs/2 Months):						
Paid Labor	−0.147	28.192	30.817	−9.417	−7.615	49.718
	(8.810)	(20.069)		(10.123)	(22.359)	
No. of Trainees in Group		−3.330**			0.456	
		(1.665)			(2.852)	
MC Years in Trade		−0.359			−0.569	
		(0.631)			(0.635)	
MC Gender = Trainee Gender		−26.616			5.029	
		(16.342)			(20.811)	
Self Employment	1.324	7.792	68.495	−8.774	56.016	87.218
	(11.821)	(24.722)		(10.308)	(36.547)	
No. of Trainees in Group		−3.246			−2.960	
		(2.185)			(2.250)	
MC Years in Trade		0.347			−0.184	
		(1.000)			(0.551)	
MC Gender = Trainee Gender		15.212			−51.162	
		(26.152)			(35.564)	
Skill Development	13.824	22.285	22.202	27.673***	−6.275	15.089
	(15.659)	(29.047)		(8.410)	(13.599)	
No. of Trainees in Group		−0.346			−2.549	
		(3.044)			(2.640)	
MC Years in Trade		0.616			−0.296	
		(0.963)			(0.567)	
MC Gender = Trainee Gender		−59.322*			49.997***	
		(30.603)			(16.431)	
Observations	203	203		411	411	

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Dependent variable are the unindented entries in the first column. The MC-related controls are included in each regression and are the indented entries in the first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District fixed effects included in each regression. The post-training time use data is a sum of the time use during the month after the training and time use a week prior to the the follow up survey. The weekly time use measure is multiplied by four to generate this 2-month measure of time use.

Table A8: ITT Effects of Training on Economic Outcomes & Well-Being Indices with Additonal MC-related Controls

	Female			Male		
	(1)	(2)	Ctrl. Mean	(3)	(4)	Ctrl. Mean
Economic Index (Z-Score)	−0.058	−0.074	−0.020	−0.094	−0.199	0.011
	(0.063)	(0.153)		(0.153)	(0.351)	
No. of Trainees in Group		−0.018			0.007	
		(0.014)			(0.019)	
MC Years in Trade		0.009			0.001	
		(0.007)			(0.003)	
MC Gender = Trainee Gender		−0.096			0.065	
		(0.124)			(0.157)	
HH Rarely/Never Skips Meals	−0.053	0.029	0.795	−0.006	−0.389*	0.818
	(0.072)	(0.140)		(0.045)	(0.213)	
No. of Trainees in Group		−0.005			−0.016	
		(0.013)			(0.011)	
MC Years in Trade		0.001			0.001	
		(0.007)			(0.003)	
MC Gender = Trainee Gender		−0.264*			0.443**	
		(0.144)			(0.210)	
Personal Savings	−2.879	−0.904	3.551	−2.176	−4.030	1.684
	(1.912)	(1.931)		(1.838)	(4.319)	
No. of Trainees in Group		0.181			0.171	
		(0.248)			(0.203)	
MC Years in Trade		−0.096			0.037	
		(0.148)			(0.034)	
MC Gender = Trainee Gender		−5.386			0.616	
		(4.410)			(1.986)	
Started Business	−0.030	−0.032	0.257	0.004	0.302	0.158
	(0.060)	(0.126)		(0.040)	(0.197)	
No. of Trainees in Group		−0.004			−0.011	
		(0.009)			(0.010)	
MC Years in Trade		−0.001			−0.005*	
		(0.005)			(0.003)	
MC Gender = Trainee Gender		0.134			−0.177	
		(0.137)			(0.194)	
Life Satisfaction Index (Z-Score)	0.407***	0.734***	0.023	0.495***	0.640	−0.013
	(0.135)	(0.242)		(0.094)	(0.419)	
No. of Trainees in Group		−0.047**			−0.025	
		(0.024)			(0.023)	
MC Years in Trade		−0.010			0.008	
		(0.011)			(0.007)	
MC Gender = Trainee Gender		0.176			−0.160	
		(0.273)			(0.382)	
Psychological Index (Z-Score)	0.190	0.298	−0.030	0.137	0.194	0.016
	(0.153)	(0.350)		(0.104)	(0.350)	
No. of Trainees in Group		−0.015			0.013	
		(0.035)			(0.030)	
MC Years in Trade		−0.007			0.000	
		(0.012)			(0.008)	
MC Gender = Trainee Gender		0.274			−0.120	
		(0.358)			(0.334)	
Observations	203	203		411	411	

Heteroskedasticity-robust standard errors in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Dependent variable are the unindented entries in the first column. The MC-related controls are included in each regression and are the indented entries in the first column. All regressions restricted to the sample without individuals added to the treatment after randomization. District fixed effects included in each regression. Observations are as noted except for skips meals where N= for females and N= for males in the endline sample and N= for females and N= for males in the panel sample. Z-Scores are calculated around control group means and standard deviations. The economic index is composed of survey data on: (i) monthly expenditures and (ii) total earnings in last week. The life satisfaction index is composed of survey data on: (i) happy and satisfied with life [agree=1] and (ii) life has improved during the previous year [1=yes]. The psychological index is composed of survey data on: (i) felt stressed or nervous last month [never/almost never=1], (ii) felt confident to solve problems last month [fairly often/often=1], (iii) felt that things were going your way last month [fairly often/often=1], (iv) felt anger due to problems last month [never/almost never=1] and (v) felt that faced many difficulties last month [never/almost never=1].