DIFFERENTIAL EFFECTS OF VOCATIONAL TRAINING ON MEN AND WOMEN AND THE BIAS FROM PROGRAM DROP-OUTS[¶]

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Abstract

We provide experimental evidence on the effects of vocational and entrepreneurship training for Malawian youth, in an environment where access to formal schooling and skills development is extremely low and most people are self-employed. We track a large fraction of program drop-outs – a common phenomenon in the training evaluation literature – and this allows us to examine the determinants and consequences of drop-out and how it mediates the effects of such programs. We find that women are forced to make decisions in a more constrained environment. Their participation decisions are more affected by external constraints, training participation is more expensive for them, and this results in relatively worse training experience and outcomes. 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.

Keywords: apprenticeship training; vulnerable youth; Malawi
JEL codes: J24, O15, I15

1. Introduction

Providing young people with opportunities for skills acquisition is widely perceived to be a fair and effective use of public resources. Job training programs have therefore emerged as an important – and widely studied - class of social policy experiments. Due to data availability, however, evaluations of such programs have been limited mostly to developed countries ({{1275 Lynch,Lisa M. 1992;1276 Bartel,Ann P. 1995;1277 Heckman,James J. 1998;1278 Frazis,Harley 2005/f for the United States ;1144 Kluve,Jochen 2010/f for European countries, for example}}. Moreover, these studies typically rely on non-experimental methods, including conditioning on observables to limit selection bias {{1146 Friedlander,Daniel 1997; 1147 Heckman,James 2000}}, parametric selection correction methods (Heckman et al., 1998), and propensity score matching and duration analysis (Bring and Carling, 2000; Gerfin & Lechner, 2002; Sianesi, 2004; Chong & Galdo, 2006; Biewen et al., 2007; Jespersen et al., 2008).

This paper reports the results of a randomized controlled trial to evaluate an *entrepreneurship* and *vocational* training program for youth in Malawi. Over 80 percent of workforce is engaged in self-employment in Sub Saharan Africa, working in small scale business and household enterprises.[1] Supporting the self-employed through entrepreneurship training may be important in such environments. In Banerjee and Duflo (2007)'s 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 a non-agricultural business. This paper provides experimental evidence on the effects of a training program that targeted the poorest, most vulnerable orphaned youth in a poor African country. Entrepreneurship training is arguably most relevant for this sub-population, because these youth often lack formal education or skills required to access salaried employment. The program was designed to provide

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[1] Gindling and Newhouse (2012) using the Bank's International Income Distribution Database (I2D2) .

apprenticeship rather than classroom-based training. Apprenticeships are common in African countries but rarely evaluated. Our evaluation therefore generates evidence on a very different type of program and population than other papers using experimental methods to estimate the effects of training in other developing countries (Colombia, Uganda and the Dominican Republic, studied in Attanasio et al., 2011; Blattman et al., 2011; Card et al., 2011).[2]

An important contribution of this paper lies in our treatment and analysis of program drop-outs. Most high-profile published experimental evaluations of job training programs report high rates of program drop-out, which complicates the program evaluation. A large fraction of beneficiaries randomly assigned to receive training fail to show up, or discontinue training after a short period, and this undermines the experimental integrity of those evaluations. The Card et al. (2011) study of a youth training program in Dominican Republic experiences a 17% drop-out rate among individuals assigned to treatment. Drop-outs are typically not tracked in the follow-up surveys, and this further complicates the analysis. In another well-known and intensively studied US Job Training Partnership Act (JTPA), the combination of drop-outs and availability of substitute programs leads to a treatment-control training differential of only 19%, rather than the theoretically desirable 100% (Heckman et al., 2000). The lack of follow-up data on dropout forces these studies to resort to non-experimental methods for selection correction even if the studies start with an experimental sample. In our Malawi study, we experience similarly high rates of drop-out among youth randomly assigned to receive training, but we anticipated the 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 drop-out decision) that are closer to the pure experimental estimates.

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[2] Enabling wage employment was the main target in the Latin American programs studied in this literature. The Ugandan program provides in-class training in training institutes.

Furthermore, we can examine the determinants and the consequences of dropping out of training with our data. Since drop-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 estimating the results, 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 drop-outs in training are positively or negatively selected. We also collect data on alternative opportunities and unanticipated shocks around the time of program inception to understand better the conditions under which people choose to not partake in the training program. These opportunities and constraints affect men and women differently, and this in turn allows us to better understand why vocational training programs may have heterogeneous effects across gender. Exploring the determinants of drop-out and their consequences is our third major contribution to this literature that has repeatedly observed non-trivial drop-out rates, and has wrestled with its implications for estimation.

We find that the entrepreneurship training led to large, significant increases in the self-reported skills and knowledge that the training was meant to impart, and also in trainees' subjective measures of well-being. These effects are not sensitive to the way drop-outs are handled. The significant positive effects are present in an intent-to-treat analysis with all individuals initially randomly assigned to the treatment group (both individuals who ultimately attend training and those who drop out), and those effects get larger in magnitude when training participation is instrumented with treatment assignment. In our short-run follow-up survey conducted only a few months after completion of the apprenticeship period, we do not observe any effects on labor market outcomes.

Using follow-up data on people who dropped out, we observe that the drop-outs simply missed out on the benefits the program conferred to participants. Their outcomes are comparable to those in the control group, and there is no indication that they were positively selected (i.e. that they dropped out to take advantage of some better alternative opportunity). About half of "drop-outs" report that they were never invited to training, implying that their non-participation is related to an administrative error on the part of the implementing organization, while the other half chose to stop attending training sessions. Girls drop out due to adverse shocks (severe illness or injury) and are more likely to participate when alternative opportunities disappear (e.g. they get fired). Boys' participation decisions are not affected by these external conditions. Participating in training is expensive and trainees – especially girls - have to draw down their savings to do so. Accordingly, having friends and relatives close to the training site, or proximity of girl trainees' homes to the training site prevent drop-out.

Overall, the results suggest that women are significantly more constrained in their decision-making relative to men. Outside constraints and opportunities determine drop-outs for women but not for men. Male trainees also exhibit greater improvement in subjective measures of well being, like their confidence and their satisfaction with life, compared to women. The negative outcomes of treatment we observe tend to be associated with women – reduced savings and decreased earnings activities following treatment. This discrepancy may be due to the differences in the training experience: men are more likely to have received financial support from the Master Craftspersons (MCs, who are the trainers) during the training, more likely to attend regularly, and three times as likely to receive a paid job offer from the MC following the training period. These results shed light on the differential constraints under which poor girls have to make decisions in developing countries, and how these inhibit skill acquisition.

Why potential participants drop out and do not take advantage of a program designed to build their human capital, and offered to them at deeply discounted rates (or even for free) is interesting in and of itself. Card et al. (2011) remarks that despite the high rates of "no-shows" in training programs, little is known why potential trainees fail to show up for the training. In addition to labor market and welfare outcomes that are normally the focus of evaluation, the decision to participate provides an alternative "revealed preference" based measure of users' perceptions of program benefits. The low take-up of "apparently beneficial" products, programs, behaviors and technologies has become a ubiquitous observation across many different sectors in developing countries (Meredith et al 2012, Miller and Mobarak 2012). Examples span health (insecticide treated bed nets, improved cook-stoves), agriculture (fertilizer, cash crops, new seed varieties), and finance (insurance, savings). In many instances, the low take-up may signal that the product or service does not work as well as anticipated (e.g. see Ashraf et al., 2009 for crop choice; Hanna et al., 2012 for cook-stoves; Duflo et al. 2010 for fertilizer), or that spillover effects and general equilibrium effects reduce the benefits accruing to treated households (Miguel & Kremer, 2004). Alternatively, low take-up could indicate a high level of heterogeneity in returns across users (Suri 2011), implying that the program is simply not suitable for a subset of the population. Our data indicate that young women are forced to make decisions under a more constrained environment, which both inhibits their access to skills development programs and reduces the benefits that accrue from such programs.

2. Context and Experimental Design

2.1. Background

Malawi is one of the world's poorest countries, with a poverty head-count ratio above 50% (World Development Indicator 2010). As in many other Sub-Saharan African countries, many

youth in Malawi rely on low-productivity subsistence self-employment to sustain themselves and their families. They often have no other options: less than a third of all children enrolled in public primary education complete it and less than one percent of secondary school graduates are able to enroll in post-secondary institutions. Every year, almost 500,000 young people abandon primary or secondary education and attempt to enter the workforce (Malawi NAC, 2007). Youth face significant obstacles to their development and lack formal employment opportunities: many of them are unemployed, or work in agriculture or household labor. [3] Orphans, vulnerable and affected youth (OVAY) are particularly vulnerable as they often possess fewer productive alternatives and are at greater risk of falling into risky sexual behaviors either in order to meet their basic economic needs or due to limited knowledge of the consequences of their behavior.[4]

To address the employability issues and promote productive self-employment, the Government of Malawi introduced a pilot apprenticeship training program in 2009, aiming to empower vulnerable youth by training them in marketable skills in various trades and providing support for entrepreneurship.

2.2. Technical and Vocational Skills Training

The apprenticeship program was implemented by the Technical Education and Vocational Education and Training Authority (TEVETA). TEVETA asked each district and Traditional Authority (TA) to identify vulnerable groups of youth defined as orphaned school dropouts.

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[3] Among out of school youth between ages 15 and 24, the majority reports themselves as farmers (56percent), household workers (21percent), or the unemployed (5percent), according to the Integrated Household Survey conducted in 2005-2006.

[4] About 930,000 Malawians (11.9 percent of adults aged 15-49) live with HIV or AIDS. An estimated 550,000 children under 17 are AIDS orphans (UNAIDS, 2008). Women are disproportionately affected, with 57% of all infections (UNAIDS, 2008). Young adolescent girls 15-19 years of age are more than four times more likely to be infected than their male counterparts because they become sexually active earlier. Socio-economically disadvantaged women are more likely to engage in transactional sex than those with stable incomes.

TEVETA then investigated the family status, household assets and wealth, and school attendance for each of the nominated individuals from each locality to verify their eligibility.

A pool of potential trainers, known as mastercraft persons (MCs), was identified in each district. The trades practiced by the MCs were selected based on demand from beneficiaries. The MCs were carefully selected from this pool based on their expertise and business performance in the neighborhood, but without any formal assessment of their skills. MCs were compensated for their work, and may have also liked the free labor that the apprenticeship program brought. Our survey indicated that 164 MCs from 23 districts in 17 different occupations participated and that they had an average of 14 years of practical experience in their specific field. 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. They were encouraged to follow this curriculum; our surveys showed that approximately X% did so (see Appendix A).[5]

During the apprenticeship, each MC trained between 1 and 8 trainees at their workshops. The curriculum and the duration of training varied by trade: for example, training for auto mechanics lasted more than three months, while training for hairdressing only lasted 3 weeks. 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.

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[5] TEVETA's original implementation plan included delivering "life skills training" focusing on HIV/AIDS and health related issues, and some start-up tool kits following the training period (e.g. scissors to those who trained in hairdressing). Ultimately, the life-skills module was not delivered as planned due to program limitations, and only a small number of trainees received the tool-kits.

2.3 Experimental Design

TEVETA selected 1,900 youth for participation in the program after verifying their eligibility. Two-thirds of the youth were randomly assigned to receive the training immediately, while the other third was assigned to a "control" group which would receive the training after follow-up data collection. The implementation constraint implied that we had to collect follow-up data very soon after the treatment group received training.

Prior to the start of the training, in March and April of 2010, we conducted a baseline survey on a random subset of the youth selected. From the original 1,900, we surveyed 1,122 people, of whom 363 were in the control group and 759 were in the treatment group (see Figure 1). Summary statistics from the baseline survey indicate that randomization was successful in achieving balance across treatment and control groups (Table 1). Two-thirds of all trainees are male, and trainees are 21 years old on average. Individuals in the sample live in 5-person households on average and more than 30 percent are orphans. More than 60 percent of their dwellings have a grass roof, which is an indicator for poverty. About 17 percent of trainees are married or live with a partner. Trainees possess low levels of formal schooling – slightly more than 20 percent completed secondary education and 10 percent are still students. Food security appears to be a significant concern: one third of respondents report that they have to skip a meal "often" because of lack of money for food and more than 50 percent have to skip a meal "sometimes".

Trainees reported to training between August 2010 and May 2011; the specific start date varied by district and by MC. Training lasted for three months on average, but varied depending on the type of skill being taught. Table 2 provides the breakdown of occupations by gender of trainees.

Vocational training may have positive effects on employment not just through direct skill development, but also indirectly through improvements in self-esteem and goal identification. To disentangle these different pathways, we selected a random subset of the trainees to receive a "pep-talk" in addition to their regular training. Members of the research team visited to meet with each selected trainee personally, discussed their performance under their MC and their future employment opportunities, and encouraged them to keep up. In total, 178 trainees received this additional encouragement.[6] The script used to guide the pep talk conversation is in Appendix A. This experiment was designed to isolate one specific mechanism by which a job training program may change labor market outcomes beyond the immediate and mechanical effects of skills acquisition: that participating in training and interacting with successful individuals in a trade may change the trainees' perceptions and outlook about the value of effort and performance. Since the pep-talk was randomly assigned within the set of trainees that chose to attend classes, the analysis is not affected by any attrition.

Between June and August of 2011, we returned to the villages to conduct a follow-up survey. The follow up survey included questions on time use, employment, and changes in behavior and self-esteem. Trainees were also given the opportunity to assess the quality of training that they received. In order to increase the sample size for the follow-up survey, we returned to the original pool of 1,900 youth who had been selected to participate in the study. As previously stated, we had chosen to interview 1,122 people at baseline, leaving 778 people who had been assigned to either treatment or control but who had not been previously interviewed. From these, we selected 274 people (181 treatment, 93 control) to interview at follow-up. However, as discussed below, we were unable to track down a large percentage of those who

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[6] We have also verified that the randomization of the pep talk treatment led to groups that were statistically comparable at baseline (results not shown).

participated in the baseline. Thus the sample at follow-up is composed of the 755 people who we were able to find at the time of follow-up, plus 274 new participants, for a total of 1,029 respondents.

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

2.4. Attrition and Dropout

Like many development programs, the TEVETA program suffered from several administrative setbacks which affected the implementation of the program. For example, 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 went by. 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). In addition, owing to administrative errors, a large number (about 30%) of those who were supposed to be invited to participate in the training report in our follow-up that they never received the invitation. Lastly, even among those who were invited to the training and who chose to participate, not all completed the training. We treat all of these (not invited, did not participate, or did not complete) as dropouts (as labeled in Figure 1), as they were assigned to treatment but did not participate. For analysis purposes, however, we distinguish between those who dropped out because of administrative error (not invited) and those who chose to drop out. More than half of all people who dropped out did so due to the administrative error.

In addition to people who dropped out of the training, there was also survey attrition between the baseline and endline surveys. Specifically, about 1/3 of the respondents in the baseline survey could not be found for the endline survey (242 from the treatment group, and 126 from the control group). This poses identification issues, since attrition from the survey is correlated with participating in training, and therefore with our outcome variables. People who participated in training were very easy for us to track since we conducted our follow-up survey very soon after the completion of training. Thus it is likely that, of the attriters in the treatment group, most are "drop-outs." This attrition is particularly problematic if we only successfully tracked a non-random sample of the drop-outs. In Table 1a, we examine whether the attriters are statistically different from the drop-outs who we were able to track in terms of their baseline characteristics. It is encouraging to note that the two groups are statistically similar across most dimensions, which indicates that our extra efforts in tracking dropouts may have reduced some of the selection bias introduced by non-random attrition. This is especially true when we restrict our attention to drop-outs who chose to stop participating (and not the administrative errors). It appears that TEVETA ultimately chose to not invite a few participants who were originally selected but turn 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 are older, have more dependents, and are less likely to be currently enrolled in school. In our analyses, we report evaluation results controlling for these baseline differences. We also conduct a bounding exercise, which confirms the direction of our results within a range of possible values for the missing observations.

It is crucial to investigate whether individuals assigned to treatment versus control group attrite at different rates since such voluntary exit can threaten the validity of our randomized design. In Table 3, we estimate a linear probability model where attrition is a function of initial randomized assignment to receive training. The results indicate that there is no relationship between initial assignment to training and the likelihood of continuing in the sample. The coefficient on "Assigned to Treatment" is -0.017, with a standard error of 0.025. When we break up the sample by gender, treatment assignment is completely irrelevant for men in their likelihood of attrition (a coefficient of 0.000), but it is relevant for women (coefficient of -0.082, but not statistically significant at conventional levels). We will therefore present results separately by gender throughout the paper, and attrition bias will be a bigger concern in the female sample.

3. Determinants of dropping out

The rates of program drop-out were clearly very high, both because of administrative errors by the implementers, and because some trainees chose not to attend or complete the program. We tracked down many of the dropouts, and collected data on adverse shocks and new opportunities that potential trainees faced in the period prior to program inception for the entire follow-up sample, in order to identify the determinants of drop-out. Although drop-outs are a common phenomenon in training programs and a challenge to evaluation studies, this study is one of the few to have extensive data on dropouts. 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 drop-outs when follow-up data on them are

missing. In our case, follow-up data on a large fraction of drop-outs implies that we can get closer to reporting pure experimental (intent-to-treat) estimates of training program effects.

Drop-out rates varied a little across occupations in which training was offered. Almost a third of all participants invited to training for auto mechanic jobs chose not to complete. Drop-out rates were lowest (16%-20%) in beauty-care, electronics, metalwork and construction.[7]

Table 5 examines the determinants of drop-out. Specifically, 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. We use two definitions of drop-outs. The first definition includes those who report that they were never invited to training, and the second definition excludes them, in order to focus on the trainees' decisions to not attend training sessions.[8] The equations are estimated separately for males and females.

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 trainees – both males and females - can complete training. Female trainees are more likely to drop out if they live over 4 kilometers away from the training center. Females are also more likely to drop out due to severe illness or injury.

In general, female participation appears to be much more sensitive to external constraints imposed on them compared to their male counterparts. Not only do females drop out more due to distance, illness or injury, but on the flip side, females who are fired from a job are more likely to complete the program. In other words, they stick with the program in cases where alternative

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[7] It is possible that dropouts in the auto industry are particularly high because the subject requires substantially more technical skills to practice than other occupations; however, we are not able to confirm this.

[8] Since we could not confirm that the administrative error of not inviting individuals who should have been invited was 'random' and not based on some observable characteristics of participants, we do not present results using alternative definition of drop-outs, which excludes individuals who were not invited due to administrative error (201 individuals).

opportunities disappear. These variables do not have a significant effect on the drop-out

propensity of male trainees. Ignoring drop-outs due to administrative errors, males are more

likely to drop out if they migrate to take advantage of an alternative employment opportunity.

The gender difference in drop-out patterns mirrors the findings from the analysis of attrition, in

that selection concerns are more significant for women.

4. Estimation Strategy

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.[9] 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.

We will therefore estimate the effects of training on time use: hours worked in paid labor and

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[9] See Owolabi and Pal (2011).

self-employment (on family farm or self-employed), and also hours devoted to human capital investment beyond the training period. We will also measure downstream outcomes such as earnings; total expenditures (as a proxy for income); business start-up, and migration.

We also examine the effects of training on self-reported (subjective) outcomes related to the skills that the vocational training program were meant to impart to study whether (a) the training program achieved its intended objectives focusing on skills and labor market outcomes, and (b) whether psycho-social well-being of participants improved as a result. The "pep talk" intervention was specifically intended to improve psycho-social well-being of participants, instill optimism in future opportunities, and facilitate positive thinking and attitudes. In addition, we look into intermediate outcomes such as condom use and pregnancy, which may affect youth's wellbeing and labor activities.

4.2 Estimating Equations

Randomizing the offer to attend the training allows us to overcome the selection bias into training. We will report both the effect of offering the training, based on random assignment (intent-to-treat estimates) and the effect of receiving training among those who actually participated in the training, with participation instrumented by the random assignment. The discrepancy between random assignment and program participation is almost entirely due to drop-outs (control group individuals did not have any opportunity to participate in training). Tracking down a large fraction of the drop-outs therefore allows us to report estimates closer to the pure experimental estimates.

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

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

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)* and d_j captures time-invariant district-level characteristics; 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*. In some specifications we include a set of baseline characteristics X_{ij} to increase the precision of the estimates and to control for any pretreatment imbalances. These control variables include household size (squared), number of children under 18, acres of land owned, age, gender, and indicator variables for whether the respondent is married, if he/she is currently a student, if he/she has friends or family living close to the training site, and whether a household member who was contributing to household income died in the past 12 months.

The effect of training for those who attended the training is estimated using IV techniques, 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)[10] in a first stage:

$$Outcome \ _{t+1,ij} = \alpha_0 + \alpha_1 \ Attended \ Training_{ij} + \alpha_2 \ X_{ij} + d_j + v_{ij} \qquad (2a)$$

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

The estimate of α_1 (2a) yields the local average treatment effect of the training – i.e, effect for those who was 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.

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[10] *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 similar, and we prefer the former specification.

In order to estimate additional effects of pep talk on subjective well-being, we consider a sub-sample of individuals who were randomly assigned to receive training and report results from estimating the following equation:

$$Outcome_{t+1,ij} = \alpha + \theta PepTalk_{ij} + d_j + r_{ij} \mid Invited\ Training_{ij} = 1 \tag{3}$$

where $PepTalk_{ij}$ is an indicator variable equal to 1 if individual i in district j was randomly assigned to receive a pep-talk, among individuals randomly assigned to receive training (*Invited Training_{ij}=1*).

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 impart, according to the trainees' own assessment. Specifically, we focus on the following proxies for skill development: (i) self-assessment of skills in a particular trade (estimated on the scale from 1 to 10); (ii) knowledge of how to calculate profits; (iii) An indicator that the individual knows how to start a business (self-assessed). Both intent-to-treat and the IV estimates of the training participation presented in Table 6 indicate that the training was very successful in improving the self-assessed practical skills of the young people in our sample.

Being invited to attend the training (ITT estimate) increases self-assessed skill score in a specific area of expertise by 2.6 points on a 10-point scale, or 1.1 points when district dummies and baseline control variables are added. The mean value for this variable is 2.6 in the control group, so the effect of training represents a substantial increase. We also observe positive and strongly significant effects of training on the other two self-assessed categories of skill

development. Being invited to the training increases the subjective business-profit-calculation

ability by 37% of control group mean (or 14% with district dummies and baseline controls).

Training also increases the likelihood that a respondent knows how to start a business by 24

percentage points (or 9 percentage points with controls, representing a 20 percent increase from

the mean in the control group).

There are two important further points to note from table 4. First, IV estimates where

training participation is instrumented by the random assignment to training are always larger

than the intent-to-treat estimates, which is expected, since almost all non-compliers are drop-outs

from the treatment group. Second, controlling for district dummies only does not affect the

magnitude or statistical significance very much, but adding controls for baseline characteristics

that were related to the drop-out decision and imbalance at baseline does compress the

magnitude of treatment effects. We will therefore report this conservative specification

alongside the pure experimental estimates in all subsequent tables.

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

Table 7 examines another first-order effect: how training changed the participants' time

use relative to the control group during and immediately after training. We examine outcomes at

four distinct points in time: a) month before the training (as a placebo outcome); b) the period of

training; c) month after the training; and d) a week before the follow-up survey (which was, on

average, 4 months after completion of training). Constructing time periods this way in our

follow-up survey allows us to measure time use consistently among respondents engaged in a

variety of activities (training in different sectors, and then either working, studying, self-

employed). An important drawback is that the survey timing does not allow us to capture the

longer run effects of training. Card et al. (2010) and Cho and Honorati (2012), both of whom

report on a similar context and study design, argue that it probably takes longer for labor market effects to materialize.

Table 7 presents ITT and IV results on (i) hours worked in paid labor (which includes any paid employment, including paid labor in agriculture); (ii) hours worked in self-employment, which includes both work on family-owned land and in own business; and (iii) hours spent in human capital development such as school, job or trade training for each of the time periods (before, during, after training) described above. Reassuringly, there are no statistically significant effects of treatment assignment on time use in the month prior to training (the placebo outcome). 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 170-343 extra hours of training, and those who actually attended invested an extra 636-773 hours in training according to IV estimates. Since training in most professions lasted over three months (the average training duration was 13-14 weeks), this is a reasonable estimate, and suggests that the training kept all trainees quite busy over the entire training period.

Investing all this time in training displaced many hours of work in both paid labor and in self-employment (e.g. decreases of 32 hours and 76 hours respectively in the ITT estimate). The magnitude of the IV estimates suggest that participating in training led to 21 less hours in paid labor per month (or half a week less per month) and 49 hours less in self-employment per month (of slightly more than a week less per month). This is an important result because it shows that the opportunity cost of attending the training in terms of both time and forgone earnings may be substantial. This may explain some of the drop-out decisions, which we will explore more in our gender-disaggregated analysis. Even so, the displacement of paid labor and self-employment

accounts for about 31% of the extra time invested in training in both the ITT and the IV specifications. This suggests that training kept many youth who would otherwise be unemployed, under-employed, in school, or enjoying leisure busy during the training period.

Turning our attention to the effects of treatment assignment on time use *after* the training is completed, we see that the most important consequence of the training program is continued investment in human capital. This is promising, because this may have significant and lasting implications for labor market opportunities in the long run. In some cases, this is because the trainee forms a longer-term relationship with the master craftsmen, something we will explore below.

Training participation increases total hours spent on skill development (through school, or other job training) by 6 hours (ITT) or 14-24 hours (IV) one month after the training. This is large relative to how the control group spends their time, and relative to how all individuals spent time prior to the start of training. In the week preceding the survey, those who completed the training program continued to spend 3-6 hours per week in additional human capital development activities. We do not observe strong significant effects in hours worked in the period after training, except for some effect on self-employment that is sensitive to the inclusion of control variables, and therefore not robust.

In Table 8 we see that all this extra time spent on training and on further human capital development post-training comes at a financial cost to the trainees. Trainees have to draw down their savings by 1600-3000 Kwatcha (US$10-20)[11], which is a substantial amount in this sample. Importantly, we will see below that this effect is largely driven by female trainees, who face even more drastic decreases in savings (of about US$38). Anecdotally, our trainees report that the

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[11] The exchange rate used is MWK 1 = 0.0065 USD (from http://www.oanda.com/currency/historical-rates/).

stipend provided for the participants (of 4300 MWK, or US$28 on average) was not sufficient to cover transportation and lodging costs.

Given that we do not find any significant changes in hours worked in the short run, it is not surprising that we also do not find a discernible impact of training on the total earnings (last week) and on total monthly expenditure. The estimated effects are negative, but generally not statistically significant. Consistent with the human capital investment results both during and post training, we also see that training participants were significantly less likely to start a business in the previous 12 months. Trainees are also significantly less likely to migrate away in search of employment, which is again consistent with trainees making some longer-run investments, often in collaboration with the master craftsmen trainer's at their location of origin.

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

In Table 9 we investigate the impacts of training on non-market outcomes including psychosocial well-being, self-esteem, and sexual behavior. Subjective measures of well-being are a useful complement to the time use and labor market data we collect to paint a more comprehensive picture of the overall effects of the training intervention. Such measures are increasingly used in the economics and evaluation literatures (Devoto et al 2012; Ashraf et al 2011).

Participating in training had strong positive effects on subjective measures of well-being. Specifically, random assignment to training increases the share of respondents happy and satisfied with life and agreeing that life has improved during the last year by 5 and 7 percentage points respectively (22 and 29 percentage point effect in the IV – TOT specification). These are sizeable increases relative to the control group means. Additionally, related to the prior discussion on skills acquisition, trainees report being more confident in their ability to switch

away from agriculture and earn money in other sectors. We don't observe any significant effects on health behaviors. However, there is important heterogeneity by gender across all these outcome variables, which we will explore below.

5.3. Gender differences in outcomes

Both the dropout and the attrition analysis indicated that girls are significantly more constrained in their decision-making than boys (unlike boys, girls participate in training when other opportunities disappear, drop out due to illness or injury, and attrite when they are not assigned to treatment). Table 10 reports results disaggregated by gender to explore whether these apparent constraints lead to differential gender incidence of benefits and costs of training. The sub-sample analysis also helps to establish the robustness of our results in the male sample, where attrition bias is less of a concern.

Trained boys and girls report very similar gains in self-reported skills, but that is where their similarity ends. Boys spend more time in training (probably due to the occupations they select into), and this extra time comes from boys' hours in self-employment. In the full sample, the only significant treatment effect on time use post-training was that trainees continue to invest in human capital development. The gender-disaggregated results show that this comes entirely from the sample of boys. Boys spend 11 extra hours (21 hours in TOT) in further skills development in the month after training, continue to do so in the week prior to the survey, and these hours reflect over 100% increases relative to the control group. Among girls, there is no treatment effect on any category of time use in the period after training ends.

Attending training was evidently much more costly for women. They experience a much larger decline in personal savings (of MWK 5600, or US$36) by participating in training. This extra depletion of personal savings among female participants may indicate that women are more

credit constrained and do not have other sources of financing. We will explore this further by examining data on the trainees' experience during the training program. Only women (and not men) experience other statistically significant negative effects of training on employment and business activities. Trained women's earnings are lower and they are less likely to have started a business.

Next, we see that the positive gains to subjective measures of well-being and confidence (that we reported on earlier) accrue exclusively to men. This is consistent with the heterogeneity in the all the real effects of training across gender, and the extra constraints under which women appear to make participation decisions. Only male trainees are significantly more likely to report that they are "satisfied with life", that "life has improved in the past year", and that they feel confident in their ability to earn money outside of farming. Treatment is associated with smaller positive effects in the female sample also, but they cannot be statistically distinguished from a zero effect.

One positive effect of the vocational training program on women is that they are significant less likely (7 percentage points in ITT, 14 percentage points in TOT) to have given birth in the past year. 19 percent of young women in the control group had a child in the past year, so this signifies a very significant decline. Ozler (2011) also found that a schooling intervention resulted in delays in childbirth and marriage. Early sexual experience, marriage, and childbirth are often associated with lower investment in education and lower future earnings potential,[12] so the reduced incidence of childbirth is an encouraging result. The rate of condom

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[12] Baird et al. (2010), Ozler (2008)

use also increases with treatment in the female sample, but this effect is not statistically significant.[13]

Why are the effects of vocational training much more positive for men than they are for women? Is it that the nature of the training, and the way men and women experienced the program was very different? To investigate this further, we analyze:

(a) The details of the training program and the experience as reported by male and female trainees in the treatment group, and

(b) Summary statistics on the baseline conditions faced, to identify whether females were differentially constrained based on their domestic situation.

Overall, male and females report similar experiences during training. Trainings are of similar length, and male and female trainees receive stipends of roughly the same size. However, although differences are not statistically significant, the direction of the differences is suggestive: women's MCs are more likely to miss days of training, women are more likely to report that the necessary tools were not available, they are less likely to feel encouraged by their MC (significant at the 10% level), and they are less likely to receive an offer of paid work following training. While inconclusive, this suggests that women have a more negative experience with the training, which may be related to the dropout and attrition results discussed above.

In terms of the differential conditions faced by women at baseline before the training is implemented, comparison of summary statistics indicate that women live in households with fewer adults and more dependent children. Women report spending almost twice as much time as men on household and agricultural chores. Men, on the other hand, are older, more likely to

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[13] Results should be treated with caution because of a high number of missing responses to the question about condom use.

be the head of household, and less likely to still be living with at least one parent. They are more likely to have completed secondary school, and they spend more time in paid labor. 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. In contrast, women's responsibilities may directly prevent them from taking advantage of the training: when we asked dropouts why they had chosen to not participate, 21% of women mentioned family obligations, while no men did.

However, as we saw in Table 2, the types of industries/occupations that men and women are trained in are highly segregated. Around 85% of training in auto mechanics, metalwork, and construction goes to men, while women are more likely to be trained in clothing fabrication or beauty. The explanation for the gender differences in training effects that we observe could also be underlying differences in how lucrative these professions are or in employment conditions.

In summary, baseline characteristics and the attrition and drop-out analyses indicate that women participate in training in a more constrained environment. They get less financial support which puts greater pressure on their personal funds. Their attendance is slightly worse, drop-out risk is higher, and in turn MCs treat male trainees a little better during and after training. All of this accumulates to worse treatment effects for girls compared to boys, and lower levels of (subjective) satisfaction with life after training.

5.4 Effects of the Pep Talk intervention

Next we turn to the effects of the "pep talk" intervention designed to build confidence among a subset of trainees, in order to isolate whether increased optimism about the future leads to improved post-training outcomes. The results of estimating equation (3) separately by gender are presented in Table 12. The regression is run on only a sample of trainees.

Overall, the pep talk has more significant effects on male trainees than on females, in two dimensions. First, the pep talk increases self-reported satisfaction with life among boys, and increases the likelihood that both boys and girls report that they see themselves as entrepreneurs. Second, the pep talk appears to give only boys the confidence to not engage in paid work immediately after training, and their post-training earnings suffer as a result. Longer term data is needed to uncover whether this is due to the male trainees who received the confidence-building script investing in their longer-term career prospects. In the short-run, there is no discernible effect of the pep talk on further investments in human capital development.

6. Examining Dropout and Attrition Bias using Follow-up Data on Drop-outs

The follow-up data we collected on dropouts yields another strategy to examine whether drop-outs 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 drop-out decision to be associated with better post-training outcomes. We estimate a simple OLS model, separately by gender, in which we compare outcomes for those who chose to drop out with 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 should not be interpreted as causal effects. Nevertheless, the conditional correlations reported in Table 13 are still helpful in identifying the likely direction of

bias, if any, associated with drop-outs. This is a potentially useful exercise given the high drop-out rates experienced in many training evaluations around the world.

In general, we find that drop-outs – when compared to training participants – seem to have simply missed out on the benefits of training that we estimated by comparing trainees to the control group. In other words, the drop-outs look very much like the control group in terms of their follow-up comes. Individuals who dropped out have a statistically significantly lower level of skills development, and are significantly less likely to think that their life has improved during last year, perceive themselves as entrepreneurs, or have confidence that they can secure a job outside of farming. These are mirror images of the training effects we have observed in all the main regressions, and even the magnitudes are similar to the main treatment effects. This implies that the outcomes for drop-outs are similar to those for the (randomly assigned) control group.[14] This suggests that drop-outs do not appear to be systematically selected in either a positive or negative direction. To reiterate, the drop-out decision is not randomly assigned, and these results are therefore only suggestive.

7. Conclusions

This study makes three important contributions. First, we are among the first to provide experimental evidence on the effects of vocational and entrepreneurship training in a country where the majority lack access to formal education and skills development. Apprenticeship training is particularly relevant in the Sub Saharan Africa setting, as programs that foster entrepreneurship provide alternatives to highly rationed wage employment. Second, we shed

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[14] Indeed, when we compare summary statistics for the control group with those of the group of dropouts, controls are slightly older and also marginally more likely to be numerate than dropouts, but otherwise there are no statistically significant differences between the two groups (see Appendix Table 1).

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, and the resulting differences in the nature of their experiences during the training program. Third, by tracking a large fraction of program drop-outs at follow-up, we are able to both examine 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 drop-outs introduces selection biases.

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 during the post-training period, but there were no significant effects on labor market outcomes in the short run. Participating in training was expensive, particularly for girls who had to draw down their savings and did not receive as much help from the trainers as the boys did. External constraints (such as illness and getting fired) more strongly affected girls' participation decisions. Girls could not attend as regularly as boys and were less likely to end up with job offers from their trainers. Overall, the experience led to more positive effects on self-reported well-being among male participants.

Given the continued investments in skills development that we observe among trainees, it would be valuable to follow this sample up over a longer period to identify whether the additional human capital leads to improved labor market outcomes in the long run. In this context, an important shortcoming of our analysis is that the follow-up survey was conducted only 4 months after the completion of the training program (on average). However, conducting the follow-up quickly allowed us to track down many of the drop-outs, which was valuable.

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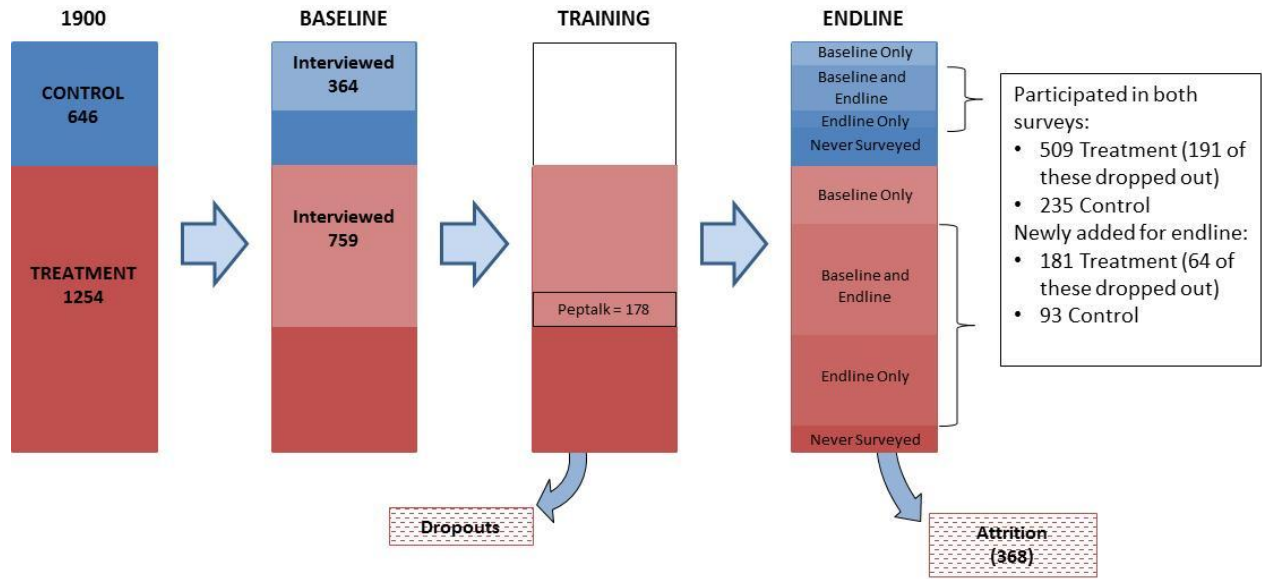
Figure 1. Sample Distribution

Table 1a: Summary Statistics at Baseline - Difference between dropout and attrition						
	Dropped out (inc. administrative dropouts)	Attrited	P-value of difference	Dropped out (not inc. administrative dropouts)	Attrited	P-value of difference
N	230	367		70	367	
Household Characteristics						
Household size	5.70	5.15	0.01	5.53	5.15	0.21
Number of adults	2.83	2.58	0.04	2.70	2.58	0.48
Number of children <18	2.43	2.14	0.05	2.47	2.14	0.15
Number of respondent's dependents (in or out of hh)	0.62	1.06	0.00	0.64	1.06	0.03
Owns home=1	0.88	0.85	0.25	0.87	0.85	0.63
Number of acres of land owned	1.90	1.87	0.90	2.17	1.87	0.43
Value of assets (in MWK)	35,298.70	22,808.99	0.00	24,975.00	22,808.99	0.66
Construction of walls						
Unburnt bricks	0.38	0.40	0.59	0.34	0.40	0.37
Burnt bricks	0.48	0.49	0.85	0.53	0.49	0.56
Construction of roof						
Grass	0.63	0.57	0.16	0.54	0.57	0.65
Iron sheets	0.35	0.41	0.15	0.41	0.41	0.96
Source of water						
Unprotected well	0.08	0.10	0.30	0.06	0.10	0.23
Communal tap	0.16	0.21	0.12	0.19	0.21	0.61
Borehole	0.54	0.50	0.35	0.63	0.50	0.05
Individual Characteristics						
Gender:Male=1	0.66	0.66	1.00	0.63	0.66	0.65
Age	20.36	23.26	0.00	20.29	23.26	0.00
Head of household=1	0.15	0.24	0.01	0.20	0.24	0.47
Married or living with partner=1	0.17	0.20	0.24	0.13	0.20	0.14
Neither parents are alive (orphan)=1	0.35	0.35	0.88	0.35	0.35	0.94
Educational Attainment						
Completed primary	0.04	0.05	0.75	0.01	0.05	0.19
Some secondary	0.46	0.52	0.16	0.46	0.52	0.33
Completed Secondary	0.23	0.24	0.76	0.16	0.24	0.14
Currently a student=1	0.16	0.05	0.00	0.14	0.05	0.00
Previously received vocational	0.15	0.12	0.38	0.11	0.12	0.85
Previously started a business=1	0.30	0.39	0.03	0.27	0.39	0.06
Economic Variables						
Annual personal income	15,974.95	30,202.99	0.09	8,795.68	30,202.99	0.14
Number of loans in past 12 months	0.37	0.38	0.87	0.36	0.38	0.78
Amount of loans in past 12 months (in MWK)	2,223.99	2,834.19	0.26	2,413.91	2,834.19	0.65
Number of cash and in-kind grants from social programs in past 6 months	0.66	0.73	0.28	0.61	0.73	0.27
Amount of cash grants from social programs in past 6 months (in MWK)	16,019.21	5,133.32	0.02	13,016.67	5,133.32	0.11
How often do you/other adults skip meals?						
Often	0.31	0.29	0.48	0.37	0.29	0.15
Sometimes	0.55	0.54	0.81	0.53	0.54	0.83
Not at all	0.13	0.17	0.23	0.10	0.17	0.13

Table 2: Occupations in which participants received training

	Total Trained	% Men	% Women	Average Months of Training
Auto	119	81%	19%	3.19
Beauty	44	19%	81%	2.91
Clothing	167	38%	62%	2.99
Construction	158	94%	6%	3.00
Electronics	56	69%	31%	3.00
Food	20	36%	64%	3.09
Metalwork	73	83%	17%	2.99
Other	36	67%	33%	3.33

Table 3: Effect of treatment assignment on likelihood of attrition (surveyed at baseline but not at follow-up)

	All			Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment Assignment	-0.026	-0.017	-0.009	0.000	0.015	0.010	-0.082	-0.089*	-0.062
	[0.030]	[0.025]	[0.024]	[0.036]	[0.031]	[0.029]	[0.055]	[0.049]	[0.045]
Household size			-0.009*			-0.004			-0.019**
			[0.005]			[0.007]			[0.009]
Number of dependents (in or out of hh)			0.009			0.013			0.001
			[0.009]			[0.011]			[0.015]
Owns home=1			-0.083**			-0.120**			-0.016
			[0.039]			[0.051]			[0.068]
Value of assets (in MK)			-0.000**			-0.000***			0.000
			[0.000]			[0.000]			[0.000]
Age			0.052***			0.054***			0.051***
			[0.004]			[0.005]			[0.007]
Head of household=1			0.005			0.027			-0.029
			[0.036]			[0.046]			[0.077]
Married or living with partner=1			-0.061*			-0.072*			-0.074
			[0.035]			[0.044]			[0.069]
Currently a student=1			0.035			0.027			0.053
			[0.037]			[0.045]			[0.070]
Previously started a business=1			0.004			0.006			0.004
			[0.025]			[0.030]			[0.049]
District Dummies?	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Constant	0.344***	0.261**	-0.687***	0.320***	0.072	-0.928***	0.398***	0.189	-0.768**
	[0.025]	[0.106]	[0.129]	[0.030]	[0.060]	[0.147]	[0.046]	[0.223]	[0.313]
Observations	1,122	1,122	1,117	753	753	748	369	369	369
R-squared	0.001	0.291	0.419	0.000	0.287	0.425	0.006	0.320	0.437
F-test			23.70			18.17			6.565
F-test pvalue			0			0			1.25e-08

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

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

Table 4: Dropouts by Training Industry

	% Dropped out (inc. admin. dropouts)	% Dropped out of those who were invited	% Not invited (of those who dropped out)
Auto	60.2%	30.9%	82.1%
Beauty	38.6%	18.2%	75.0%
Clothing	38.9%	24.4%	69.8%
Construction	39.9%	15.9%	81.7%
Electronics	56.9%	19.4%	88.1%
Food	45.0%	26.7%	69.2%
Metalwork	30.3%	19.7%	61.0%
Other	67.6%	29.4%	91.4%
Total	45.1%	22.2%	78.4%

Table 5: Effects of shocks on likelihood of dropping out (OLS)

	Dropped out (inc. administrative dropouts)				Dropped out (not inc. administrative dropouts)			
	Men		Women		Men		Women	
Fired in past 12 months	0.019	0.031	-0.243*	-0.240**	0.127	0.127	-0.290***	-0.277***
	[0.106]	[0.108]	[0.136]	[0.115]	[0.127]	[0.132]	[0.088]	[0.091]
Incapacitated in past 12 months (severe illness or injury)	-0.109	-0.113	0.104	0.149*	-0.095	-0.108	0.163	0.169
	[0.074]	[0.079]	[0.075]	[0.082]	[0.078]	[0.085]	[0.113]	[0.119]
Someone in hh was incapacitated in past 12 months	-0.011	-0.002	-0.034	-0.033	0.023	0.038	-0.057	-0.039
	[0.038]	[0.039]	[0.054]	[0.054]	[0.046]	[0.047]	[0.068]	[0.068]
Household member died in past 12 months	0.009	0.013	-0.016	-0.012	0.016	0.024	-0.024	-0.022
	[0.064]	[0.065]	[0.067]	[0.069]	[0.082]	[0.082]	[0.100]	[0.103]
Had child in past year	0.023	0.036	0.063	0.086	0.109	0.120	0.095	0.133
	[0.085]	[0.090]	[0.095]	[0.096]	[0.100]	[0.103]	[0.122]	[0.125]
Married within the last year	0.020	0.016	0.074	0.082	-0.029	-0.041	0.049	0.077
	[0.061]	[0.068]	[0.071]	[0.071]	[0.071]	[0.080]	[0.107]	[0.106]
Migrated permanently or temporarily, for work, school or other	0.057	0.066	0.040	0.038	0.119**	0.125**	0.032	0.029
	[0.042]	[0.044]	[0.054]	[0.057]	[0.053]	[0.054]	[0.073]	[0.074]
Lives more than 4 km from training center	-0.082	-0.083	0.077	0.086	-0.006	-0.009	0.096	0.127
	[0.070]	[0.069]	[0.103]	[0.102]	[0.077]	[0.077]	[0.124]	[0.126]
Has close friends or relatives at training site	-0.676***	-0.676***	-0.614***	-0.596***	-0.325***	-0.327***	-0.326***	-0.310***
	[0.036]	[0.036]	[0.053]	[0.056]	[0.067]	[0.068]	[0.084]	[0.085]
Hours worked in paid labor in month before training	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Hours worked in self employment in month before training	-0.000	-0.000	0.000	0.000	-0.000	-0.000	0.001	0.001
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]
Hours spent in human capital development (school, job or trade	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Number of respondent's dependents (in or out of hh)		-0.010		0.010		-0.014		0.007
		[0.010]		[0.016]		[0.011]		[0.024]
Value of assets (in MK)		0.000		0.000**		-0.000		0.000**
		[0.000]		[0.000]		[0.000]		[0.000]
Age		-0.003		-0.012		-0.002		-0.015
		[0.003]		[0.009]		[0.004]		[0.012]
Head of household=1		0.016		0.077		0.039		0.103
		[0.049]		[0.091]		[0.060]		[0.111]
Neither parents are alive (orphan)=1		-0.029		-0.059		-0.027		-0.059
		[0.037]		[0.055]		[0.046]		[0.069]
Always healthy		0.000		0.058		-0.013		0.003
		[0.051]		[0.064]		[0.058]		[0.077]
_cons	0.832***	0.897***	0.739***	0.894***	0.431***	0.513***	0.445***	0.676***
	[0.041]	[0.091]	[0.066]	[0.193]	[0.079]	[0.122]	[0.096]	[0.260]
Number of observations	436	432	236	235	304	303	168	168
Adjusted R2	0.438	0.430	0.380	0.384	0.101	0.091	0.085	0.094

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets.

Table 6: Effects of training on skills development [1]

	ITT - Invited to Training			IV - Attended Training			Mean of Dependent variable in Control group
	No controls	+District Dummies	+Controls and District Dummies[2]	No controls	+District Controls	+Controls and District Dummies	
Skill in area/tradetoday (1:Poor/None 10:master craftsmen)	2.636***	2.718***	1.108***	4.890***	5.086***	4.969***	2.578
	[0.181]	[0.169]	[0.198]	[0.316]	[0.284]	[0.790]	
Knows calculate profits of a business (today, 1-10)	1.632***	1.659***	0.578**	2.970***	3.046***	2.450**	4.272
	[0.207]	[0.200]	[0.233]	[0.377]	[0.355]	[0.996]	
Knows how to start a business(today)=1	0.241***	0.235***	0.093**	0.446***	0.439***	0.422**	0.438
	[0.033]	[0.033]	[0.040]	[0.061]	[0.061]	[0.173]	

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets. Sample size = 975.

[1] Dependent variables in first column. Coefficient is on the dummy variable *Invited Training* for ITT estimates and on *Attended Training* for IV estimates.

[2] Controls include: household size squared, number of children under 18 in hh, acres of land owned, age, gender, and dummy variables for married, currently a student, has friends/relatives near training site, and whether a hh member who was contributing to hh income died in the past 12 months.

Table 7: Effects on Time Use - Before, During and After Training [1]

	ITT - Invited to Training		IV - Attended Training		Mean of Dependent variable in Control group
	No controls	+Controls and District Dummies[2]	No controls	+Controls and District Dummies	
Hours worked in paid labor in month before training	-4.867	-0.237	-7.833	1.471	30.491
	[3.966]	[4.173]	[7.347]	[18.653]	
Hours worked in self employment in month before training	-3.670	0.760	-6.249	5.379	53.256
	[4.012]	[4.556]	[7.476]	[20.427]	
Hours spent in human capital development (school, job or trade training) in month before training	1.116	3.161	2.084	14.171	14.384
	[2.897]	[2.954]	[5.442]	[13.320]	
Hours worked in paid labor during training	-32.320***	-10.995	-56.857***	-43.441	57.959
	[8.555]	[11.152]	[15.696]	[49.431]	
Hours worked in self employment during training	-75.983***	-22.500**	-140.998***	-101.437**	131.803
	[10.384]	[10.786]	[19.035]	[46.261]	
Hours spent in human capital development (school, job or trade training) during training	342.679***	170.471***	636.212***	772.875***	41.097
	[16.110]	[19.562]	[26.046]	[69.638]	
Hours worked in paid labor in month after training	-3.271	1.041	-6.350	4.194	19.606
	[3.504]	[4.532]	[6.570]	[20.322]	
Hours worked in self employment in month after training	-0.366	7.477*	-0.028	36.092**	41.747
	[3.551]	[3.878]	[6.630]	[17.948]	
Hours spent in human capital development (school, job or trade training) in month after training	6.513**	5.391	12.232**	24.369	10.456
	[2.967]	[3.536]	[5.579]	[15.744]	
Hours worked in paid labor in past week	0.493	1.551	1.158	7.516	6.150
	[1.015]	[1.228]	[1.888]	[5.564]	
Hours worked in self employment in past week	-0.464	-0.553	-0.530	-1.596	9.325
	[0.927]	[1.071]	[1.728]	[4.777]	
Hours spent in human capital development (school, job or trade training) in past week	1.562**	1.488**	2.838**	6.177*	1.978
	[0.635]	[0.724]	[1.196]	[3.212]	

note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Sample size = 975.

[1] Dependent variables in first column. Coefficient is on the dummy variable *Invited Training* for ITT estimates and on *Attended Training* for IV estimates.

[2] Controls include: household size squared, number of children under 18 in hh, acres of land owned, age, gender, and dummy variables for married, currently a student, has friends/relatives near training site, and whether a hh member who was contributing to hh income died in the past 12 months.

Table 8: Effects of training on Economic Outcomes [1]

	ITT - Invited to Training		IV - Attended Training		Mean of Dependent variable in Control group
	No controls	+Controls and District Dummies[2]	No controls	+Controls and District Dummies	
Personal savings	-1,571.551*	-1,332.252*	-2,956.059*	-6,168.389*	2,272.813
	[852.771]	[757.558]	[1,605.566]	[3,477.858]	
Total earnings from work (last week)	-305.274	-195.244	-579.030	-898.751	995.469
	[266.610]	[224.848]	[504.245]	[1,023.489]	
Started business during last 12 months	-0.047*	-0.071**	-0.082*	-0.307**	0.188
	[0.026]	[0.029]	[0.048]	[0.133]	
Total monthly expenditure	-251.925	-616.123	-497.868	-2,852.917	3,936.331
	[366.602]	[382.149]	[688.935]	[1,750.311]	
Migrated permanently or temporarily, for work, school or other	-0.061*	-0.069*	-0.120**	-0.340**	0.319
	[0.031]	[0.036]	[0.058]	[0.167]	

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets. Sample size = 975.

[1] Dependent variables in first column. Coefficient is on the dummy variable *Invited Training* for ITT estimates and on *Attended Training* for IV estimates.

[2] Controls include: household size squared, number of children under 18 in hh, acres of land owned, age, gender, and dummy variables for married, currently a student, has friends/relatives near training site, and whether a hh member who was contributing to hh income died in the past 12 months.

	ITT - Invited to Training		IV - Attended Training		Mean of Dependent variable in Control group	N
	No controls	+Controls and District Dummies[2]	No controls	+Controls and District Dummies		
Household rarely or never skips meals	-0.029	-0.007	-0.048	-0.026	0.815	848
	[0.029]	[0.032]	[0.054]	[0.138]		
Happy and satisfied with life (Str Agree/Agree)=1	0.075***	0.053*	0.132***	0.225	0.775	975
	[0.027]	[0.031]	[0.050]	[0.138]		
Life has improved during last year(Str Agree/Agree)=1	0.119***	0.067*	0.218***	0.292*	0.613	975
	[0.032]	[0.038]	[0.060]	[0.168]		
Sees self as entrepreneur	0.019	-0.015	0.036	-0.067	0.856	975
	[0.023]	[0.029]	[0.044]	[0.131]		
Able to earn money outside farming(Str Agree/Agree)=1	0.095***	0.057	0.172***	0.239	0.625	975
	[0.032]	[0.038]	[0.060]	[0.168]		
Used condom almost every time or every time with most recent sexual partner	-0.016	-0.062	-0.041	-0.278	0.267	525
	[0.040]	[0.041]	[0.076]	[0.178]		
Married within the last year	-0.014	-0.003	-0.029	-0.027	0.125	975
	[0.022]	[0.021]	[0.041]	[0.096]		
Had child in past year	-0.030	-0.027	-0.050	-0.108	0.116	975
	[0.021]	[0.023]	[0.039]	[0.104]		

note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. Sample size = 975, except for "Household rarely skips meals", for which there was a high number of missing responses, and "Used condom", for which many responses were "Not applicable" due to the fact that not all respondents were sexually active

[1] Dependent variables in first column. Coefficient is on the dummy variable *Invited Training* for ITT estimates and on *Attended Training* for IV estimates.

[2] Controls include: household size squared, number of children under 18 in hh, acres of land owned, age, gender, and dummy variables for married, currently a student, has friends/relatives near training site, and whether a hh member who was contributing to hh income died in the past 12 months.

Table 10: Effects of training, by gender [1]

	Men			Women			P-value of dif. btwn. men and women	
	ITT	TOT	Mean of dep. var. in control	ITT	TOT	Mean of dep. var. in control	ITT	TOT
Skill in area/trade today (1:Poor/None 10:master craftsmen)	2.768*** [0.225]	5.061*** [0.390]	2.580	2.386*** [0.304]	4.553*** [0.540]	2.575	0.313	0.446
Knows calculate profits of a business (today, 1-10)	1.654*** [0.259]	2.963*** [0.466]	4.430	1.582*** [0.346]	2.970*** [0.634]	3.982	0.867	0.993
Knows how to start a business(today)=1	0.244*** [0.041]	0.448*** [0.075]	0.444	0.233*** [0.056]	0.443*** [0.105]	0.425	0.876	0.972
Hours worked in paid labor during training	-35.811*** [12.161]	-60.698*** [21.870]	68.652	-26.273*** [9.131]	-50.207*** [17.648]	38.372	0.531	0.709
Hours worked in self employment during training	-96.271*** [14.004]	-174.867*** [25.378]	153.633	-38.891*** [13.632]	-76.347*** [25.562]	91.814	0.003	0.006
Hours spent in human capital development (school, job or trade training) during training	364.503*** [20.360]	666.042*** [33.035]	33.952	301.989*** [26.127]	578.051*** [41.610]	54.186	0.059	0.098
Hours worked in paid labor in month after training	-2.768 [4.843]	-5.426 [8.936]	23.502	-4.405 [4.294]	-8.536 [8.292]	12.469	0.800	0.799
Hours worked in self employment in month after training	-4.032 [4.798]	-7.262 [8.827]	46.536	6.296 [4.789]	13.730 [9.176]	32.973	0.128	0.099
Hours spent in human capital development (school, job or trade training) in month after training	11.446*** [3.245]	21.175*** [6.031]	7.266	-2.609 [5.906]	-5.060 [11.403]	16.301	0.037	0.042
Hours worked in paid labor in past week	1.480 [1.340]	3.107 [2.454]	6.903	-1.368 [1.467]	-2.652 [2.836]	4.770	0.152	0.125
Hours worked in self employment in past week	0.157 [1.179]	0.447 [2.177]	9.879	-1.639 [1.478]	-2.458 [2.801]	8.310	0.342	0.413
Hours spent in human capital development (school, job or trade training) in past week	2.342*** [0.793]	4.401*** [1.490]	1.865	0.113 [1.055]	-0.179 [2.002]	2.186	0.091	0.066
Personal savings	-851.092 [940.754]	-1,576.879 [1,740.238]	1,643.478	-2,895.749* [1,690.151]	-5,608.688* [3,286.013]	3,425.664	0.290	0.278
Total earnings from work (last week)	-192.645 [382.170]	-375.498 [713.202]	1,043.116	-515.942* [282.734]	-973.780* [549.506]	908.186	0.496	0.506
Started business during last 12 months	-0.007 [0.030]	-0.013 [0.056]	0.155	-0.120*** [0.046]	-0.215** [0.091]	0.248	0.041	0.058
Total monthly expenditure	-21.396 [417.465]	-58.433 [770.657]	3,957.976	-686.446 [703.468]	-1,364.300 [1,366.970]	3,896.681	0.416	0.405
Migrated permanently or temporarily, for work, school or other	-0.078** [0.038]	-0.144** [0.071]	0.314	-0.028 [0.053]	-0.072 [0.103]	0.327	0.452	0.561
Household rarely or never skips meals	-0.043 [0.035]	-0.067 [0.063]	0.823	-0.002 [0.051]	-0.004 [0.103]	0.800	0.514	0.598
Happy and satisfied with life (Str Agree/Agree)=1	0.082** [0.034]	0.142** [0.062]	0.773	0.063 [0.046]	0.113 [0.087]	0.779	0.745	0.787
Life has improved during last year(Str Agree/Agree)=1	0.146*** [0.040]	0.262*** [0.073]	0.604	0.068 [0.055]	0.132 [0.105]	0.628	0.249	0.310
Sees self as entrepreneur	0.021 [0.027]	0.039 [0.050]	0.874	0.015 [0.043]	0.028 [0.083]	0.823	0.900	0.912
Able to earn money outside farming(Str Agree/Agree)=1	0.103*** [0.039]	0.191*** [0.072]	0.638	0.078 [0.055]	0.134 [0.106]	0.602	0.707	0.654
Used condom almost every time or every time with most recent sexual partner	-0.035 [0.053]	-0.081 [0.100]	0.316	0.018 [0.059]	0.032 [0.112]	0.182	0.506	0.451
Had child in past year	-0.007 [0.022]	-0.004 [0.040]	0.077	-0.070* [0.042]	-0.137* [0.082]	0.186	0.183	0.145

note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. N=647 for men, and N=347 for women, except for 'condom use' (338 men and 201 women) and 'skips meals (582 men and 283 women).

[1] Dependent variables in first column. Coefficient is on the dummy variable *Invited Training* for ITT estimates and on *Attended Training* for

Table 11: Differential Contraints by Gender

	Women	Men	P-value of Difference
Trainees' Experiences			
N	240	450	
Months of training	2.865	2.921	0.434
Missed no days of training	0.483	0.519	0.480
Amount of stipend received for training per month (MWK)	4,268.707	4,148.973	0.458
Stipend was sometimes insufficient to cover needs	0.490	0.481	0.863
Received food or money from MC	0.476	0.529	0.297
MC always attended training	0.776	0.812	0.364
Tools were always available for practice	0.646	0.717	0.131
Felt encouraged by MC	0.884	0.932	0.094
Received paid work from MC following training	0.014	0.031	0.279
Baseline Characteristics by Gender			
N	369	753	
Household Characteristics			
Household size	5.46	5.42	0.80
Number of adults	2.50	2.79	0.00
Number of respondent's dependents (in or out of hh)	1.01	0.75	0.00
Owns home=1	0.85	0.89	0.02
Number of acres of land owned	1.76	1.91	0.33
Individual Characteristics			
Age	21.10	21.66	0.01
Head of household=1	0.12	0.20	0.00
Married or living with partner=1	0.13	0.18	0.02
Neither parents are alive (orphan)=1	0.31	0.38	0.03
Lives with at least one parent	0.45	0.38	0.02
Educational Attainment			
Completed primary	0.06	0.05	0.58
Some secondary	0.51	0.47	0.22
Completed Secondary	0.19	0.25	0.03
Currently a student=1	0.09	0.11	0.38
Received vocational training=1	0.11	0.14	0.15
Previously started a business=1	0.36	0.34	0.56
Economic Variables			
Annual personal income	17,227.47	26,820.08	0.33
Number of loans in past 12 months	0.37	0.37	0.97
Amount of loans in past 12 months (in MK)	2,869.76	2,370.47	0.26
Number of cash and in-kind grants from social programs in past 6 months	0.64	0.70	0.21
Amount of cash grants from social programs in past 6 months (in MK)	3,340.90	7,717.29	0.08
Time Use			
Hours per year spent on agriculture or domestic chores	764.58	425.26	0.00
Hours per year spent on paid labor	105.74	203.79	0.00
Hours per year spent in own business	48.22	51.59	0.80
Hours per year spent on other activities	26.15	15.71	0.05

	Men			Women		
	No controls	+District Dummies	Mean of dep. var. in control	No controls	+District Dummies	Mean of dep. var. in control
Happy and satisfied with life (Str Agree/Agree)=1	0.123***	0.117***	0.834	0.041	0.058	0.831
	[0.031]	[0.034]		[0.060]	[0.066]	
Life has improved during last year(Str Agree/Agree)=1	0.106**	0.107**	0.737	0.026	0.075	0.692
	[0.049]	[0.051]		[0.079]	[0.095]	
Felt confident to solve problems last month(Str Agree/Agree)=1	-0.008	-0.016	0.508	-0.005	-0.035	0.517
	[0.065]	[0.071]		[0.088]	[0.094]	
Sees self as entrepreneur	0.104***	0.112***	0.881	0.108**	0.123**	0.815
	[0.022]	[0.026]		[0.051]	[0.063]	
Able to earn money outside farming(Str Agree/Agree)=1	0.088*	0.086	0.726	0.077	0.106	0.667
	[0.052]	[0.054]		[0.078]	[0.077]	
Had child in past year	0.017	0.011	0.069	-0.047	-0.084	0.124
	[0.036]	[0.038]		[0.049]	[0.056]	
Personal savings	-301.892	-312.211	854.749	-140.834	-178.509	539.552
	[349.425]	[311.407]		[240.079]	[242.614]	
Total earnings from work (last week)	-353.162**	-295.872*	922.280	-60.010	-33.405	402.189
	[158.120]	[162.857]		[218.104]	[280.748]	
Started business during last 12 months	-0.021	-0.040	0.150	-0.029	-0.033	0.132
	[0.044]	[0.053]		[0.054]	[0.063]	
Migrated permanently or temporarily, for work, school or other	0.040	0.044	0.232	-0.047	-0.060	0.303
	[0.058]	[0.062]		[0.077]	[0.094]	
Hours worked in paid labor in month after training	-2.504	-4.752	21.190	0.378	-5.342	7.801
	[5.531]	[5.714]		[5.138]	[4.614]	
Hours worked in self employment in month after training	-10.722*	-13.570**	45.464	-4.277	1.183	39.328
	[5.650]	[6.412]		[6.880]	[8.000]	
Hours spent in human capital development (school, job or trade training) in month after training	0.634	-2.129	18.237	1.021	-15.436	13.184
	[6.756]	[6.719]		[9.025]	[14.980]	
Hours worked in paid labor in past week	-3.796**	-3.740**	8.840	1.125	0.599	3.234
	[1.514]	[1.763]		[2.474]	[2.759]	
Hours worked in self employment in past week	-3.192**	-2.391	10.729	-0.520	-2.031	6.776
	[1.373]	[1.503]		[1.718]	[1.662]	
Hours spent in human capital development (school, job or trade training) in past week	-0.915	-1.451	4.263	-0.333	-1.276	2.358
	[1.476]	[1.770]		[1.749]	[1.152]	

note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in brackets. For men, N = 449. For women, N = 240.

[1] Dependent variables in first column. Coefficient is on the dummy variable *PepTalk*

	Dropped out (inc. administrative dropouts)		Dropped out (not inc. administrative dropouts)	
	Men	Women	Men	Women
Skill in area/tradetoday (1:Poor/None 10:master craftsmen)	-3.481***	-3.775***	-2.432***	-3.006***
	[0.248]	[0.310]	[0.394]	[0.478]
Knows calculate profits of a business (today, 1-10)	-2.541***	-2.800***	-1.832***	-2.597***
	[0.266]	[0.351]	[0.390]	[0.476]
Knows how to start a business(today)=1	-0.269***	-0.437***	-0.155**	-0.357***
	[0.044]	[0.057]	[0.066]	[0.085]
Hours worked in paid labor in past week	4.211**	-0.489	4.396	0.416
	[1.734]	[1.411]	[3.027]	[1.988]
Hours worked in self employment in past week	-1.985	-1.310	-1.588	-0.438
	[1.273]	[1.502]	[2.002]	[1.918]
Hours spent in human capital development (school, job or trade training) in past week	-0.189	-0.862	1.892	-1.712*
	[1.175]	[1.073]	[2.162]	[1.014]
Personal savings	75.041	-46.098	183.850	-246.312
	[308.938]	[250.366]	[392.220]	[252.337]
Total earnings from work (last week)	113.933	-104.544	19.920	74.925
	[175.531]	[152.583]	[247.188]	[293.423]
Started business during last 12 months	0.010	-0.066	0.054	-0.037
	[0.035]	[0.043]	[0.056]	[0.061]
Total monthly expenditure	-493.182	-1,091.667*	-841.640	-929.478
	[458.018]	[659.644]	[596.657]	[840.741]
Migrated permanently or temporarily, for work, school or other	0.011	0.045	0.135**	0.023
	[0.041]	[0.060]	[0.067]	[0.082]
Household rarely or never skips meals	0.018	0.056	-0.002	0.018
	[0.042]	[0.058]	[0.063]	[0.083]
Happy and satisfied with life (Str Agree/Agree)=1	-0.085**	-0.067	-0.109*	-0.019
	[0.035]	[0.048]	[0.056]	[0.063]
Life has improved during last year(Str Agree/Agree)=1	-0.204***	-0.151**	-0.218***	-0.103
	[0.042]	[0.061]	[0.067]	[0.084]
Sees self as entrepreneur	-0.099***	-0.179***	-0.122**	-0.213***
	[0.031]	[0.049]	[0.052]	[0.076]
Able to earn money outside farming(Str Agree/Agree)=1	-0.121***	-0.153**	-0.139**	-0.209**
	[0.043]	[0.061]	[0.066]	[0.088]
Used condom almost every time or every time with most recent sexual partner	-0.005	-0.021	0.035	-0.051
	[0.061]	[0.070]	[0.089]	[0.089]
Married within the last year	0.008	0.056	0.006	0.035
	[0.029]	[0.046]	[0.043]	[0.062]
Had child in past year	0.016	0.053	0.052	0.075
	[0.025]	[0.043]	[0.044]	[0.065]

note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in brackets. When including administrative dropouts, N=421 for men, 230 for women, except for 'skips meals' (381/189) and 'condom' (214/132). Not including administrative dropouts, N=298 for men, 164 for women, except for 'skips meals' (276/131) and 'condom' (152/94).

[1] Dependent variables in first column. Coefficient is on the dummy variable *Droppped Out*