

# Learning and Earning: Evidence from a Randomized Evaluation in India \*

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Preliminary Version: Comments Welcome

## Abstract

This paper examines the economic returns from participating in a subsidized vocational education program in stitching and tailoring offered to women residing in certain disadvantaged areas of New Delhi, India. The availability of pre and post-training data in an experimental framework allows us to measure the effects of participating in this program on employment, hours worked, job search, earnings, female empowerment, entrepreneurship and measures of life satisfaction. The program, in less than a year, has generated substantial improvement in labor market outcomes for these women. In particular, we find that women who were randomly offered the training program are almost five percentage points more likely to be employed, six percentage points more likely to look for a job and on an average work two additional hours in the post-training period compared to those who were not offered the training. We find that during the post-training period, women in the treatment group earn more than double that of women in the control group. There is also a large increase in ownership of sewing machine in the post-training period. The program impacts are much larger for women who completed the training program. We also find that the program effects vary with participants' intrinsic preferences for risk, competition, and confidence. Finally, a simple cost-benefit analysis suggests that the program is highly cost effective and there are considerable gains from both continuing the program in the current location and replicating it in different locations.

**Keywords:** Vocational education, Panel data, India, Economic returns, Labor market

**JEL Classification:** I21, J19, J24, O15

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# 1 Introduction

Many countries, faced with nagging unemployment on one hand, and increased demand for specialized labor in manufacturing and service sectors on the other, have promoted vocational training programs (Grubb, 2006).<sup>1</sup> There now exists a fairly large literature that assesses the impact of participating in such programs on earnings and employment opportunities using data from developed countries.<sup>2</sup> The general conclusions that arise from the US and European experiences is that the impacts of job training are generally modest, at best and that the effectiveness of training varies with the characteristics of participants and the type of training (see Heckman, Lalonde, and Smith (1999) and Kluge (2006) for systematic reviews). However, applying these findings to developing countries might be inappropriate as the returns to training may be higher in developing countries due to very low levels of formal education, skill accumulation and full-time employment.

Evidence on the effectiveness of training in developing countries is more limited. Betcherman, Olivas, and Dar (2004), for example, in their review of 69 impact evaluations of unemployed and youth training programs, find only 19 in developing countries. They conclude that training impacts in developing countries are stronger than the impacts of programs in the United States and Europe. Nopo and Saavedra (2003) in their review of training programs in Latin America essentially reach the same conclusion. Even though both LaLonde (1986) and Ashenfelter and Card (1985) make a strong case for the use of experimental evaluation methods; most of the programs analyzed by Betcherman, Olivas, and Dar (2004) and Nopo and Saavedra (2003) are non-experimental with only a few exceptions. Card, Ibarra, Regalia, Rosas, and Soares (2011) using data from a government subsidized training program for low-income youth in urban areas of the Dominican Republic. They find that the program only marginally improved hourly wages and the probability of health insurance coverage, conditional on employment and find no significant impact of the training program on the subsequent employability of trainees.

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<sup>1</sup>Vocational education or vocational education and training (VET) is an education that prepares trainees for jobs that are based on manual or practical activities, traditionally non-academic, and totally related to a specific trade, occupation, or vocation. It is sometimes referred to as technical education as the trainee directly develops expertise in a particular group of techniques. See [http://en.wikipedia.org/wiki/Vocational\\_education](http://en.wikipedia.org/wiki/Vocational_education). Australia, Finland, England, Germany, Netherlands, Austria, Sweden, Switzerland, Norway, Spain, Hong Kong, New Zealand, Paraguay, United States, India, Argentina, Chile, Peru, Uruguay, are some of the countries that have designed such programs. See Annex 2 of Betcherman, Olivas, and Dar (2004) for a complete list of countries and details on skill building and other labor market training programs that they offer.

<sup>2</sup>See Ashenfelter (1978), Ashenfelter and Card (1985) and Card and Sullivan (1988), to more recent work by Hotz, Imbens, and Klerman (2006).

Attanasio, Kugler, and Meghir (2011) find more promising evidence of randomized training program for disadvantaged youth introduced in Colombia in 2005. They find that the program raised earnings and employment for women and using a simple cost-benefit analysis of the results argue that the program generates much larger net gains than those found in developed countries.<sup>3</sup>

This paper adds to this limited literature by examining the impact of participating in a vocational education program in India.<sup>4</sup> There are no experimental evaluations of vocational education programs in Asia and in particular, India. The country provides an interesting setting for this study for two reasons - high economic growth accompanied by rising inequality and skill shortage. The economic transformation that has happened in India over the last two decades has been one of the great success stories of our times. As stifling government regulations have been lifted, entrepreneurship has flourished, and the country has become a high-powered centre for skill based industries. On the back of this development India has been termed as the next economic super power. During the same period India also enjoyed a growth rate of 7 percent per annum, a far cry from the so-called *Hindu rate of growth* that formed the upper bound on the growth rate in the three decades prior to the period of economic reforms. This has been accompanied by significant reduction in rates of poverty across the country. However, it is also now accepted that inequality has increased, indicating that all sections of the population are unable to benefit from the phenomenal growth process that the country as a whole has experienced. It has been argued that individuals, at least in certain sections of the society lack the necessary skills that can enable them to take advantage of the opportunities potentially coming their way. Indeed the World Bank identifies skill shortage as one of the major constraints to sustained growth in the Indian economy (Blom and Saeki, 2011). At the same time entrepreneurs have been complaining of an acute shortage of skilled manpower resulting in supply side bottlenecks that is having a significant negative impact

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<sup>3</sup>Hicks, Kremer, Mbiti, and Miguel (2012) and Field, Linden, and Wang (2012) are currently conducting similar evaluations in Kenya and Mongolia respectively. The results of both these projects are as yet unavailable. Fiala, Martinez, and Blattman (2011) examine the effectiveness of a cash transfer program in Uganda that provided thousands of young people nearly unconditional, unsupervised cash transfers to pay for vocational training, tools, and business start-up costs. They find that despite a lack of central monitoring and accountability, most youth invest the transfer in vocational skills and tools. Second, the economic impacts of the transfer are large: hours of non-household employment double and cash earnings increase by nearly 50% relative to the control group. Macours, Premand, and Vakis (2012) find that in the context of Nicaragua access to vocational training in conjunction with a conditional cash transfer program enable households to insure against weather related shocks. They argue that combining safety nets with productive interventions can help households manage future weather risks and promote longer-term program impacts.

<sup>4</sup>We use the terms *vocational education* and *training program* interchangeably throughout the paper.

on the growth process. In a survey conducted by the Federation of Indian Chamber of Commerce and Industry (FICCI), entrepreneurs indicate the lack of skilled work force as a major bottleneck to growth (see FICCI, 2011).<sup>5</sup>

Despite this excess demand for skilled labor force, it is not clear what are the economic returns from participating in vocational education programs? The objective of this paper is to fill this gap by analyzing the economic and social returns to a specific subsidized, six month long training program in stitching and tailoring conducted by two local NGOs in New Delhi, India. The program was offered to women between ages 18 and 39 years who competed at least five or more grades of schooling and reside in certain disadvantaged areas of New Delhi in India. Every woman residing in these selected areas satisfying the criteria were invited to apply for the program. Those who applied for the program were randomly assigned into two groups - treatment (women who were offered the training) and control (women who were not offered the training). The experimental design along with the availability of pre-and post-training data allows us to estimate the causal effects of this program on labor market outcomes, measures of women's empowerment and entrepreneurship.

The follow-up data was collected six months after the completion of the program and hence the pre and post-training data used here can only measure the short-run gains from being offered the training. We find that the program, even in this very short time has generated substantial improvement in labor market outcomes for these women. In particular, we find that women who were randomly offered the training program are almost five percentage points more likely to be employed, six percentage points more likely to look for a job and on an average work two additional hours in the post-training period compared to those who were not offered the training. We find that during the post-training period, women in the treatment group earn nearly three times that of women in the control group. There is a also a large increase in the ownership of sewing machine in the post-training period. The program impacts are much larger for women who completed the training program. We also find that the program effects vary with participants' intrinsic preferences for risk, competition, and confidence. Finally a simple cost-benefit analysis suggests that the program is highly cost effective and there are considerable gains from both continuing the program in the current location and replicating it in different locations.

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<sup>5</sup>The Economist in a recent article on the state of the Indian economy concur with this view and the specific example they cite to illustrate the extent of skill shortage is garment makers in India not being able to find workers with the basic level of skill (Banyan, 2011).

The rest of the paper is organized as follows. Section 2 provides details on the intervention, sample size, target population, take-up, outcome variables, and sample attrition. The empirical specification is described in section 3. The ITT, TOT, and sub-group average treatment effects are all discussed in section 4. The results from the behavioral data are presented in section 5. A comprehensive cost-benefit analysis is provided in section 6 and concluding remarks follow in section 7.

## 2 Experimental Design

### 2.1 The Program

The vocational education program in stitching and tailoring services was jointly administered by two non-governmental organizations (NGOs): Pratham Delhi Education Initiative (henceforth Pratham) and Social Awakening Through Youth Action (henceforth Satya) in selected disadvantaged areas (or resettlement colonies) in New Delhi, India. Pratham is one of the largest NGO's in India reaching out 3 million underprivileged children with their education initiatives in India. Satya on the other hand is a small NGO which specializes in providing access to vocational education programs to residents in poor communities. Pratham and Satya partnered to provide a rigorous six month long vocational education program in stitching and tailoring services with the aim of making women in these areas adept in making clothes for children, and for adult men and women. Pratham's long-term plan is to provide access to vocational education to women in their program areas and they used this program as a starting point to quantify the economic returns from participating in such a vocational education program.

In May 2010, a complete census was administered in the targeted areas in New Delhi as identified by Pratham. In an extensive advertisement campaign that followed the census and lasted for two-three weeks, the two NGOs targeted all women between ages 18 and 39 years with five or more grades of schooling. While the targeted areas are commonly referred to as *slums*, these are permanent settlements, with concrete houses, and some public amenities (electricity, water, etc.). To be more specific, these are "resettlement colonies", typically 10-20 years old, that have absorbed large in-flows (migrants from other parts of the country) during New Delhi's recent expansion. The program was offered to all eligible women residing in these areas. These women were informed of the program and the

associated details of the program such as, the location of the training centers, the extent of commitment required (participants were required to commit up to two hours per day in a five-day week), the method of selection (random), course content and the expected time-span of the program (six months, starting August 2010). All selected participants were required to deposit Rs 50 per month for continuing in the program. This required participants to be ready to commit a total of Rs 300 for the entire duration of the training program with a promise from the NGOs that women who stayed through the entire duration of the program would be repaid Rs 350.<sup>6</sup> Finally the potential participants were also told that they would receive a certificate on completing the program. The english version of the advertisement for the program is presented in Figure 1. Satya and Pratham employees held joint information sessions, where women had the opportunity to meet with representatives from the two NGOs to discuss and clarify questions about the program. By the end of June 2010, Pratham received 658 applications.

Two-third of all applications were randomly assigned to the treatment group (women who were offered a spot in the program) and the remaining one-third were assigned to the control group (women who were not offered a place in the program). The program was conducted in two areas of New Delhi, South Shahdara and North Shahdara. Randomization was conducted at the area level, ie., two-third of the applicants from each area: that is, 164 of the 244 applicants from South Shadara and 278 of the 414 applicants from North Shahdara were assigned to the treatment group. North Shahdara is a bigger geographical cluster and therefore, received more applications and had 3 training centers; the remaining 2 training centres were in South Shahdara. The self reported average time taken to typically walk from the participants' home to the training center is approximately 13 minutes in North Shahdara and 10 minutes in South Shahdara. Women were assigned to the training center nearest to their home and for classes, allotted their most preferred time, though they had the option of changing both if necessary. The actual program started during the second/third week of August 2010 and continued through the last week of January 2011. The baseline survey was conducted during the period July - August 2010 and the follow-up survey during the same two months in 2011. Figure 2 provides a schematic representation of the chronology of events.

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<sup>6</sup>This feature is unique to the program and was introduced by the implementing NGOs to increase commitment and encourage regular attendance. The amount of Rs 50 per month was around one percent of the average household income for the population. All eligible women were informed of this deposit requirement.

### 2.1.1 Program Take-up

In our sample, 55% percent of all women assigned to the treatment group were program completers, i.e., completed the entire program and received a certificate at the end of the program. On an average program completers (hereafter *TRAINED*) attended more than seventy percent of all classes in comparison to program non-completers who only attended only four percent of all classes during the training period. In panels A and B in Figure 3 we present the average monthly attendance for program completers and non-completers respectively. We find that among program completers, average attendance is typically more than 70%, except in November when it falls to 60% due to the popular religious festival of Diwali. Average monthly attendance among program non-completers starts out at around 16% in the beginning of the program in August 2010 and steadily declines to 3% towards the end of the program in January 2011. This suggests that majority of the drop-outs occurred right at the beginning of the program.

## 2.2 Data - Baseline, Follow-up and Attrition

### 2.2.1 Baseline Data

The baseline socio-economic survey, conducted in July - August 2010 attempted to survey all 658 women who applied to the program; however, survey data could only be collected for 90 percent of the applicants due to respondent's unavailability and occasional refusal to participate in the survey. The completion rates were fortunately, only marginally higher in the treatment group (92 percent) compared to the control group (86 percent). Our baseline data consists of 594 women, of whom 409 belong to the treatment group and the remaining 185 belong to the control group. The household questionnaire was designed to collect detailed information on household demographic characteristics, ownership of household assets and household loans, labor market outcomes, quality of life and measures of bargaining power.

Specifically we consider a number of different outcome variables of interest. The first set of outcome variables relate to labor market outcomes.

**Casual wage employment:** = 1 if the respondent is employed for casual wage; 0 otherwise.

**Full-time employment:** = 1 if the respondent is employed full time; 0 otherwise.

**Self employment:** = 1 if the respondent is self-employed; 0 otherwise.

**Any employment:** = 1 if the respondent is employed (casual, full-time, or self); 0 otherwise.

**Hours worked:** number of hours worked during the last week, where hours worked is a continuous variable, lower bound = 0.

**Job search:** = 1 if the respondent spends any time looking for more work during the last week; 0 otherwise.

**Monthly wage earnings:** total monthly earnings from wages (casual and or full-time) during the last month.

**Earnings from self employment:** total monthly earnings from self-employment during the last month.

Our second set of outcome variables relate to entrepreneurship, empowerment and happiness.

**Own sewing machine:** = 1 if the respondent owns a sewing machine at home; 0 otherwise.

**Control over resources:** = 1 if the respondents says she has the right to choose/decide how to spend the money she has earned; 0 otherwise.

**Rosca membership:** = 1 if the respondent is a member of a Rotating Savings and Credit Association (ROSCA)/chit fund, 0 otherwise.<sup>7</sup>

**Happy at work:** a categorical variable taking the following four values: 4 if very satisfied; 3 if moderately satisfied; 2 if moderately dissatisfied; and 1 if not satisfied.

**Happy at home:** a categorical variable taking the following four values: 4 if very satisfied; 3 if moderately satisfied; 2 if moderately dissatisfied; and 1 if not satisfied.

An immediate implication of our evaluation design is that none of the baseline characteristics must be significantly different between the treatment and the control group. To test this assumption, we report pre-intervention averages of all variables used later in the regression analysis. Columns 2 and 3 of Table 1 report sample averages for the treatment and the control group respectively. Column 4 reports mean differences between the two groups and the statistical significance of this difference. There are no systematic differences in labor market outcomes between the treatment and the control group; the only exception is job search, where women in the control group are more likely to look for a

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<sup>7</sup>Anderson and Baland (2002) propose an explanation of membership of roscas in Kenya (similar to chit funds in India) based on conflictual interactions within the household. In their paper, participation in a rosca is a strategy a wife employs to protect her savings against claims by her husband for immediate consumption. So membership in a rosca could be viewed as a measure of bargaining power of the woman.



job than women in the treatment group. Women in the two groups also exhibit similar levels of happiness and bargaining power. Women in the control group though appear to be significantly more likely to own a sewing machine in the baseline compared to women in the treatment group. The average woman in our sample is 22 years old and more than fifty percent of these women have not completed secondary schooling. About one-third of the women in our sample are married and there is an almost equal distribution of both Hindu and Muslim women in our sample. More than fifty percent of the women belong to scheduled castes. At the baseline, women in the control group appear to be twelve percentage points more likely to have prior experience in stitching and tailoring compared to women in the treatment group. We will be controlling for these baseline characteristics in our main regressions to account for any remaining pre-intervention differences between the two groups.

Table 2 summarizes pre and post training differences in the outcome variables of interest. Here the pre-training sample is restricted to women who are surveyed in both 2010 and 2011. Notice that while pre-training differences between the treatment and control group is small and never statistically significant, the corresponding post-training differences between the groups increases substantially, in particular, for all labor market outcomes and ownership of sewing machines. This difference is corroborated below (see Section 4).

### 2.2.2 Follow-up Data and Attrition

During July - August 2011, approximately 6 months after the training program was completed, we requested all women who completed the baseline survey to participate in a follow-up survey. Attempts were made to track every woman who was in our final 2010 sample. Despite all efforts, we were unable to trace 90 of the 594 women, resulting in an overall attrition rate of 15 percent. Though the attrition rate is not significantly different between the treatment and the control group: 15.6 percent attrition in the treatment group and 14 percent in the control group ( $p - value = 0.6166$ ).<sup>8</sup>

Our identification strategy also relies upon the assumption of non random attrition between the treatment and the control group as any systematic difference in attrition rates

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<sup>8</sup>The attrition rates found here are comparable to other papers in this literature. For example, Atanasio, Kugler, and Meghir (2011) are unable to follow around 18.5 percent of their baseline sample after about 13 – 15 months after the conclusion of their program and Card, Ibarrran, Regalia, Rosas, and Soares (2011) are unable to track around 20 percent of their baseline sample 18 – 24 months after their initial application into the program.

between the two groups can bias program effects. To examine this further, in Table 3 we present the baseline differences in the outcome variables of interest between attritors and non-attritors for both the treatment and the control group. Mean differences in outcome variables between the non-attritors and attritors in the treatment group are not statistically significantly different from average differences between attritors and non-attritors in the control group (see column 7), indicating that there is no evidence of differential attrition between the two groups. To examine how the baseline socio-economic characteristics affect the likelihood of attrition, in Table A-1 in Appendix A.1, we present the marginal effects from a probit regression, where, the dependent variable is *attrite* which takes a value 1 if the woman could not be traced during the follow-up and 0 otherwise. We find that an additional year in age increases the likelihood of attrition by 0.8 percentage point. Women with prior experience in stitching and tailoring (relative to those without prior experience) are 5.5 percentage points less likely to drop out of the sample. The results on attrition are robust to the inclusion of self reported measures of distance to training center. In particular, we find that distance to training center has no impact on the likelihood of attrition.<sup>9</sup>

### 3 Estimation Strategy

The panel dimension of the data along with the randomized evaluation design implemented here allows us to estimate the causal effects of the vocational training program on labor market and other socio-economic outcomes. We estimate the following model to control for baseline differences in the outcome variables and also for any pre-program differences

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<sup>9</sup>We also regress the different outcome variables of interest at the baseline, on the baseline observables, the attrition dummy (*attrite*), the treatment dummy (*treatment*) and a set of interaction terms between the attrition dummy and each of the explanatory variables. The non-interacted coefficients give us the effects for the non-attrited women while the interacted coefficients give us the difference between the attritors and non-attritors at the baseline. A test of the joint significance of the *attrite* dummy and the interaction terms tells us whether the attriting women are different from the non-attriting women. The results are presented in Tables A-2 and A-3 in Appendix A.1. The null hypothesis that the attriting women are no different from the non-attriting women (the joint test of the *attrite* dummy and the interaction terms) is rejected in only 3 out of the 8 labor market outcome variables and for 1 out of the 5 the other outcome variables indicating that in general attriting women are no different from the non-attriting women in terms of the outcome variables of interest at the baseline. Additionally the coefficient estimate associated with the interaction term  $treatment \times attrite$  is never statistically significant in any of the 13 regressions reported in Tables A-2 and A-3.

between the treatment and the control group.

$$Y_i = \beta_0 + \beta_1 TRAINING_i + \sum_{j=1}^K \gamma_j \mathbf{X}_{ij} + \epsilon_i \quad (1)$$

Here  $Y_i$  is an outcome of interest for woman  $i$ ;  $TRAINING_i$  is a dummy variable that takes the value 1 if the woman is offered the training (i.e., is assigned to the treatment group); 0 otherwise. So  $\beta_1$  measures the causal effect of the vocational training program on the outcome variables of interest. Note that even if a woman dropped out through the course of the program, she remains assigned to the treatment group, as a result,  $\beta_1$  captures the intent to treat (ITT) effect of the program.  $\mathbf{X}$  is a set of additional individual and household level characteristics that control for any remaining pre-intervention differences between women in the two groups. The  $\mathbf{X}$ 's also include baseline (lagged) outcome variables to control for path dependence in labor market outcomes which further improves the precision of the estimates. Finally,  $\epsilon_i$  is the random i.i.d. disturbance term. We use a version of equation (1) to estimate heterogeneous program effects by restricting the sample to particular sub-groups (see section 4.2).

The set of pre-treatment (baseline) explanatory variables that we control for in the regressions include: *Age* of the woman in years, *Completed secondary school* (= 1 if the woman completed ten grades of schooling; 0 otherwise), *SC* (= 1 if the respondent belongs to a scheduled caste; 0 otherwise), *Hindu* (= 1 if religion = Hindu; 0 otherwise), *Experience* in stitching and tailoring, a self-reported measure of prior experience in stitching and tailoring service (=1 if the woman had any prior experience; 0 otherwise), *Married* (= 1 if the woman is married; 0 otherwise), *Dependency ratio* defined as the ratio of the number of children under age 5 to the number of adult females in the household, and a dummy for residence in *North Shahdara*.

## 4 Results

### 4.1 ITT Effects

Table 4 report the intent-to-treat (ITT) estimates, capturing the causal effect of being offered the training program on a number of different labor market outcomes. The likelihood of casual employment, self employment, any employment, hours worked, job search and monthly wage earnings are all significantly higher for women who are offered the

*TRAINING*. The program increases the likelihood of casual wage employment and self employment by 5 percentage points, increases the likelihood of any employment by 6 percentage points, increases the likelihood of job search by 6.4 percentage points, hours worked by almost 2 hours and monthly wage earnings by Rs 135. Notice that for women not offered the *TRAINING*, the average hours worked is 1.18 while the average monthly wage earnings is Rs 80. *TRAINING* therefore doubles the hours worked and increased the monthly wage earnings by more than 150 percent.<sup>10</sup> The effect of *TRAINING* on the likelihood of obtaining full-time wage employment and on earnings from self employment are also positive, though the effects are not statistically significant.

*TRAINING* has a positive and statistically significant effect on ownership of capital goods and entrepreneurship - women who receive the *TRAINING* are 15 percentage points more likely to own a sewing machine (see column 1 in Table 5). This increase in the likelihood of owning a sewing machine could be viewed as a measure of entrepreneurship. During informal conversations with program participants, we asked participants as to why they wished to participate in the program and the majority responded saying, “we want to use this skill to increase income or set up our own small businesses”; purchasing a sewing machine can be viewed as the first step in this direction. On the other hand *TRAINING* has no effect on empowerment (see columns 2 and 3 in Table 5 ) and measures of life satisfaction, defined by happiness at home or work (see columns 4 and 5 in Table 5).

The effects on labor market participation and hours worked that we obtain are similar to those obtained for the female sample by Attanasio, Kugler, and Meghir (2011), particularly when we look at the effects on the probability of employment and on hours worked. However we obtain much stronger effects on earnings. The effects are systematically higher compared to those obtained by Card, Ibarrran, Regalia, Rosas, and Soares (2011), who find very small effects on the likelihood of work and about a 10% increase in the average monthly earnings of participants.

## 4.2 Sub-group Average Treatment Effects

The results presented in Tables 4 and 5 give us the ITT estimates of the program for the full sample. However it is worth investigating whether the effects are different across different

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<sup>10</sup>We do need to bear in mind that while in percentage terms these are very large effects on earnings, in absolute terms they are still very small.

sub-groups. For example Field, Jayachandran, and Pande (2010) explore how traditional religious and caste institutions in India that impose restrictions on women’s behavior influence their business activity. Indeed the idea is quite relevant in our context as well. Caste and religion could impose significant restrictions on mobility and social interactions of these women, which in turn can result in significant differences in outcomes. Similarly, one can argue that more educated women or women with prior experience in stitching and tailoring can better internalize the potential benefits of *TRAINING*.

To examine the sub-group average treatment effects we estimate the following equation (this is an extended version of equation (1)):

$$Y_i = \beta_0 + \beta_1 TRAINING_i + \beta_2 (TRAINING_i \times \mathbf{Z}_i) + \sum_{j=1}^K \gamma_j \mathbf{X}_{ij} + \epsilon_i \quad (2)$$

where

$$\mathbf{Z}_i = \{\text{Hindu, SC, Completed secondary school, Experience in stitching/tailoring}\}$$

where  $\beta_1$  gives us the effect of the *TRAINING* program for women not belonging to the sub-group  $z \in \mathbf{Z}$  and  $\beta_2$  gives us the differential (treatment – control) effect for women belonging to sub group  $z$ . The estimated coefficients for  $\beta_1$  and  $\beta_2$  are presented in Table 6. We present the results corresponding to the labor market and entrepreneurship variables.<sup>11</sup>

The interaction terms are almost never statistically significant. The exceptions include - hours worked, which is significantly lower for SC women receiving the *TRAINING*; though the effect is quite weak, significant at 10 percent level of significance. The lower hours worked is however not reflected in lower monthly wage earnings or lower earnings from self employment. On the other hand, a SC woman who receives *TRAINING* is 19 percentage point more likely to own a sewing machine compared to a non SC woman who receives *TRAINING*. Finally experienced women (with prior experience in stitching and tailoring) who receive *TRAINING* are 15 percentage points more likely to search for jobs compared to women without prior experience and receive *TRAINING*.

### 4.3 Treatment on the Treated (TOT)

As described in Section 2.1.1, not everyone assigned to the treatment group completed the program and received the certificate at the end of the program. Program completers

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<sup>11</sup>The results for empowerment and happiness are available on request.

attended on an average 89 days of classes, while the non-completers attended on an average 10 days. This implies that the intensity of the training is likely to be considerably higher for those women who completed the training. The labor market, empowerment, entrepreneurship and life satisfaction measures are also likely to depend on the intensity of training. To examine this issue we estimate a version of equation (1) to obtain the treatment on the treated (TOT) results. Our estimation strategy exploits random assignment to the treatment, i.e., being offered the training program. We examine the impact of program completion (*TRAINED*) and proportion of days attended (*ATTENDANCE*) on outcome variables, instrumenting for *TRAINED* and *ATTENDANCE* using initial assignment to the treatment status and its interaction with age and marital status. The first stage F-statistics on the excluded instruments are always greater than 10 and the Hansen J-statistics are almost never statistically significant indicating that the excluded instruments are both strongly correlated with the endogenous regressor and uncorrelated with the error term in the main specification. The estimated effects for the TOT are presented in Tables 7 and 8.

It is not surprising that the TOT estimates are systematically higher compared to the ITT estimates. The results presented in Table 7 suggest that the effect of being offered the *TRAINING* is significantly higher for the program completers. The *TRAINED* experience a 9 percentage point increase in the likelihood of obtaining casual wage employment and self employment; an 11 percentage point increase in the likelihood of obtaining any employment; an 11 percentage point increase in the likelihood of job search; a 3.5 hour increase in hours worked during the last week and a Rs 245 increase in monthly wage earnings (an increase of more than 300 percent, relative to the control). While the likelihood of obtaining full-time employment and income from self employment are both higher for the *TRAINED* the effects are not statistically significant. Finally the likelihood of owning a sewing machine is 28 percentage points higher for the *TRAINED* (see Table 8).

However even within the set of program completers, there is considerable variation in the number of days attendance (the standard deviation is more than 28 days). However the results are quite consistent when we use *ATTENDANCE* as the relevant explanatory variable. For example, the results suggest that a 1 percent increase in the proportion of classes attended increases the monthly wage earnings by around Rs 3; this corresponds to a Rs 210 increase in monthly wage earnings for the average program completer who attends around 70 percent of the classes, this is close to the Rs 245 increase that we obtain in Panel

A. Again the TOT estimates for *ATTENDANCE* are systematically higher compared to the ITT estimates presented in 4 and 5.

## 5 Behavioral Impacts

The results so far suggest that there are significant gains from participating in a vocational education program. The next question is what are some possible pathways through which training increases labor market outcomes? For instance, it is possible that labor market training programs increase wage earnings not only through skill accumulation but also by increasing participants' overall confidence level and intrinsic competitiveness which can further explain some of the variation in wage earnings. In addition to the presence of such direct effects, training programs could also potentially generate substantial positive externalities by altering participants' behavioral traits, which can influence various other dimensions of well being.

In order to examine if the training program resulted in changes in behavioral characteristics which would imply that the ITT effects of the program would be over estimated; we requested a randomly selected sample of the applicants to participate in a set of behavioral experiments prior to randomization, that is, before learning their treatment status and 6 months after the training program.<sup>12</sup> Due to organizational constraints, the behavioral experiments could only be conducted in South Shahdara. The experiments were conducted in the Pratham office located in South Shahdara, a prominent and convenient place for all the participants. Pratham employees were hired to recruit for the behavioral experiments but the team of recruiters had no information about these experiments. To be more specific, neither of the NGOs involved had any information on the behavioral experiments when they conducted the information sessions to advertise for the training program. Of the 224 women residing in South Shahdara who applied for the program, 153 participated in these behavioral experiments in 2010. However not all the women who participated in the behavioral experiments actually participated in the baseline survey and we have complete baseline data (both experimental and survey) for 146 women. The program participants were later (after the behavioral experiments) randomly allocated into the treatment (99) or the control (47) group.

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<sup>12</sup>The experiments that we conducted fall under the category of artefactual field experiments, using the categorization developed by Harrison and List (2004).

In May-June 2011, approximately five months after the training program was completed, we invited all the women who participated in the experiments in 2010 back to the Pratham office to participate in a similar set of experiments as in the previous year. Attempts were made to track and invite every woman who was in our final 2010 sample. Despite all effort, we were unable to trace around 15% of the participants in 2010. However, there are no systematic difference in the attrition rates across the two groups.

In each year, subjects participated in only one session where an average session lasted for about 2 hours. Each subject participated in two behavioral games. The basic structure of each game is similar to the games used in previous studies (see for example Gneezy, Leonard, and List, 2009). The first game was designed to evaluate subjects' attitudes towards risk (*investment game*). In this game, participants were endowed with Rs 50 and had the option to allocate any portion of their endowment to a risky asset that had a 50 percent chance of quadrupling the amount invested. The invested amount could also be lost with a 50 percent probability. The subjects retained any amount that they chose not to invest. The second game was designed to investigate the intrinsic competitiveness of subjects (*competition game*). The subjects were required to participate in a real-effort task, which determined their payoffs in the experiment. The real-effort task consisted of filling up 1.5 fl oz. zip lock bags with beans in one minute. Prior to the task each subject had to choose one of two possible methods of compensation. First, a *piece-rate* compensation method, which depended solely on their own performance and they would receive Rs 4 for each correctly filled bag. Second, a *competition-rate* compensation method where their earnings would depend on how they performed relative to a randomly chosen subject in the same session. A subject received Rs 16 per bag if she filled more bags than her matched opponent. If she filled fewer bags than her opponent, she received nothing. When choosing their compensation method, the subjects also had to guess their performance in the game, by answering questions on the number of bags they expected to be able to fill (a measure of individual/absolute confidence), and their expected rank based on their performance in the task (a measure of relative confidence).<sup>13</sup> In each session, only one of the games was chosen for payment purposes. We chose the payoffs such that the returns from choosing the riskier alternative were comparable in the two games. In both the games, choosing the riskier outcome gave four times higher payoffs compared to the riskless option.<sup>14</sup>

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<sup>13</sup>See Dasgupta, Gangadharan, Maitra, Mani, and Subramanian (2012) for more details on the experiment.

<sup>14</sup>We made small changes to the above described game in 2011 to disentangle the effect of familiarity with these games to changes in behavior. In the investment game, instead of using a coin toss to determine



The primary question that we examine is: Do the women who receive training behave differently compared to the control group, controlling for pre-training differences in behaviour? As before, the panel dimension of the data on behavioral characteristics along with a randomized evaluation design implemented here allows us to measure the causal effects of the vocational training program on behavioral outcomes. We estimate a variant of equation (1).

$$B_i = \beta_0 + \beta_1 TRAINING_i + \sum_{j=1}^K \gamma_j \mathbf{X}_{ij} + \epsilon_i \quad (3)$$

$B_i$  is decision made woman  $i$  in the behavioral experiment. The remaining variables are defined as in equation (1). We consider a number of different outcome variables:

**Proportion allocated to the risky asset:** proportion allocated to the risky option in the investment game,

**Competition wage scheme:** a dummy variable, which takes a value 1 if the women chose the competition wage scheme in the competition game and zero if she choose the piece rate wage scheme,

**Self assessment:** of the number of bags they could fill in the competition game, is an absolute measure of confidence where women ex ante estimate the number of bags they can fill in the competition game before they begin the task,

**Self Ranking:** relative measure of confidence, that is, it is the subjects' estimate about her relative standing (rank) in the real effort task compared to other participants in the session.

Columns 1 and 2 of Table 9 report sample averages for the treatment and control group respectively. Column 3 reports mean differences between the treatment and the control group. There are very little systematic differences between the treatment and control women in terms of both socioeconomic and behavioral characteristics. Women in the treatment group appear to be older and are more likely to be married though the difference in both these cases is quite weak. Finally women in the treatment group appear to be more confident about their relative abilities, that is, their perceived rank within the group is significantly higher compared to that of women in the control group.

Table 10 report the ITT estimates capturing the causal effect of being offered the *TRAINING* program on behavioral characteristics. These results suggest that there is very little

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the success or failure of the investment, we chose to roll a die where if  $\{1, 2, 3\}$  determined success of the investment and  $\{4, 5, 6\}$  resulted in failure of the investment. In the competition game, we slightly changed the size of the zip lock bag and the type of bean used in the real effort task to make it difficult for participants to use last years' performance as a benchmark.

effect of *TRAINING* on the intrinsic characteristics: proportion invested in the risky asset, choice of the competitive payment option in the competition game and self assessment about the number of bags that the woman can fill (absolute confidence training) is not affected by *TRAINING*. However there is a positive and statistically significant effect on relative confidence (captured by self ranking): women who receive the *TRAINING* expect to do better in the real effort task, relative to the other women in her session. One implication is that the program not only outcomes (through skill accumulation), but also affects certain behavioral traits like relative confidence, which can in the long run have a multiplier effect of labor market performance. This can also influence other aspects of the individual’s well-being.

## 5.1 Do Behavioral Traits Matter?

There now exists a fairly large experimental literature that suggests that behavioral traits like risk preferences, competitiveness and confidence can have potentially strong effects on wage earnings and occupational choice. Niederle and Vesterlund (2007) use differences in competitiveness to explain wage gaps between men and women. Gneezy, Leonard, and List (2009) and Andersen, Ertac, Gneezy, List, and (2010) examine the evolution of gender differences in competitiveness. Castillo, Petrie, and Torero (2010) provide evidence using artefactual field experiments that differences in risk preferences have significant implications for occupational choices. Liu (2008) finds that more risk averse (or more loss averse) farmers in rural China adopt Bt cotton, a relatively newer technological improvement. It has also been documented that the level of confidence can affect wage rates (Fang and Moscarini, 2005) entrepreneurial behavior (Koellinger, Minniti, and Schade, 2007) and behavior in financial markets (Biais, Hilton, Mazurier, and Pouget, 2005). Given this background, it is worth examining whether the returns to *TRAINING* depend on these baseline intrinsic characteristics. To do this we estimate a version of equation (2) where we subdivide the sample on the basis of baseline (pre-program) behavioral characteristics using the experiments conducted in 2010. In this case we estimate the following equation

$$Y_{it} = \beta_0 + \beta_1 TRAINING_i + \beta_2 (TRAINING_i \times \mathbf{Z}_i) + \sum_{j=1}^K \gamma_j \mathbf{X}_{ij} + \epsilon_{it} \quad (4)$$

where

$$\mathbf{Z}_i = \{\text{Risk Averse High, Competitive, Self Assessment High, Self Rank High}\}$$

Here *Risk Averse High* is a dummy variable that takes a value 1 if the proportion invested in the risky asset in the investment game is less than 0.5 and 0 otherwise; *Competitive* is a dummy variable that takes a value 1 if the woman chose the competitive payment scheme in the competition game and 0 otherwise; *Self Assessment High* is a dummy variable that takes a value of 1 if the woman expected to fill 4 or more bags in the competition game and 0 otherwise. Finally *Self Ranking High* is a dummy variable that takes a value 1 if the woman expects her rank in the competition game will be in the top two quantiles and 0 otherwise. The corresponding estimates are presented in Table 11. Again, the coefficient of interest is that associated with the interaction term, which captures the differential impact. While the differential impact with respect to high self assessment is never statistically significant, it is so for women who are less risk averse, more competitive and are more confident of their relative ability at the baseline; they have better labor market outcomes post *TRAINING*. The likelihood of obtaining casual wage employment, full-time employment, self employment, any employment, job search and hours worked, income from self employment and likelihood of owning a sewing machine are all systematically lower for women who are more risk averse. Monthly earnings are also lower for women who are more risk averse, though the effect is not statistically significant. The likelihood of obtaining casual wage employment, full-time employment, any employment and hours worked are all significantly higher for women who are competitive. Likelihood of obtaining full-time employment, self employment, any employment, hours worked and finally the earnings from self employment are significantly higher for women who can be categorized as being confident of their relative ability. The differential effects (where significant) are also quite large. For example more risk averse women who receive the *TRAINING* are 26 percentage points less likely to be employed and work for 4 less hours compared to less risk averse women who receive the *TRAINING* competitive women who receive the *TRAINING* work for 7 more hours compared to the non competitive women who receive *TRAINING*; Women who are more confident of their relative abilities and receive *TRAINING* are close to 20 percentage points more likely to be employed, are likely to work for 4 more hours in the week and earn Rs 500 more from self employment compared to women who are less confident of their relative abilities and receive *TRAINING*.

The results presented in Table 11 suggest that intrinsic traits are important and can have significant impacts on the effectiveness of the *TRAINING* program. In a related paper using the baseline data that is used in this paper, combined with unique survey and experimental data on a set of women who were offered the program but chose not to apply

(the non applicants) Dasgupta, Gangadharan, Maitra, Mani, and Subramanian (2012) find that even after controlling for observables, these behavioral traits at the baseline can have significant impact on the likelihood of applying to the *TRAINING* program. Taken together these results suggest that behavioral traits that can explain selection into programs of this kind can also explain a large part of the heterogeneity in outcomes.

## 6 Cost-Benefit Analysis

We present cost-benefit comparisons under two scenarios - one, for replicating the program at a different location and second, for continuation of the existing program. Under the first scenario, the NGO's total cost of the underlying vocational education program amounts to Rs 1810 per person<sup>15</sup>, including both fixed cost (e.g: machinery) and variable cost (e.g: teacher salary and rent). The ITT effects of the program reported in Table 4 indicate that the program increases annual earnings by Rs 1620. To compute the present discounted value of future earnings, we assume the following - (a) the working life of these women to be 40 years given that the average age of the respondent in our sample is 22 years, (b) 5 percent discount rate, (c) no appreciation or depreciation in annual earnings and (d) zero opportunity cost of participation in the training program given that less than 1 percent of the sample was employed in the pre-training period. Based on our ITT estimates and these assumptions, we obtain the present discounted value of future earnings stream for a participant to be Rs 29160. This amounts to a net benefit of Rs 27350 per participant. The total cost of the program can be recovered in less than two years. The TOT estimates of the program are much larger and generate a greater income stream of Rs 52920 over the participant's working life. Given that approximately 50 percent of all individuals who had access to the training program did not complete the program, the per unit cost of the program increases to Rs 4232 per person and yet the associated net benefit of the program remain substantially higher at Rs 48688. The net benefits computed using both the ITT and TOT estimates suggest that there are huge benefits from replicating this program in other regions as long as the regional labor markets are distant from one another. However, it needs to be noted that that these estimates do not reflect general equilibrium costs and benefits of the vocational education program. Incorporating the general equilibrium impacts are likely to change the returns, though it is not clear in which direction. On the other hand, if returns to training are convex, then not incorporating this kind of

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<sup>15</sup>1USD = Rs 50 (approximately)

non-linearity implies that the returns to the program are likely to be under estimated.

Under the second scenario, the NGO only incurs variable cost such as teacher salary, rent and equipment maintenance; all of which sum up to Rs 1538 per person. Under these new cost calculations, the ITT estimates generate a net benefit of Rs 27622 and the TOT estimates generate a net benefit of Rs 51382. There are considerable gains from both continuing the program in the same location and replicating the program in a different location.

The net benefits summarized here represent low bound benefits of the vocational-education program as they are based on short-run effects of the program, and do not account for gains from savings on clothing expenditure, and empowerment. Increase in women's labor force participation and earnings can have an impact on children's human capital, and these potential intergenerational effects have not been accounted in our computations.

## 7 Discussion

Youth underemployment, especially among less educated populations perpetuates poverty. The situation is particularly dire for women in low income households, despite the fact that it is now well accepted that increasing the income levels of women have strong current and intergenerational impacts. For example children (particularly daughters) of skilled mothers are likely to be more educated and are likely to be healthier. However, little is known about how best to help women in low income households and communities in developing countries to acquire skills, find jobs and increase self employment.

There are a number of potential different policy options. One would be to inject credit and reduce the credit constraints that appear to hamper the ability of women to take advantage of their entrepreneurial skills. Indeed the entire microfinance revolution was built around this model - provide microloans that will serve as working capital for setting up small businesses leading to increased income over time. However recent results are increasingly skeptical of the success of such a model of development (see for example Karlan and Valdivia, 2011). Using a field experiment in Sri Lanka de Mel, McKenzie, and Woodruff (2008) find that while the average returns to capital injection to microenterprises is very high (considerably higher than the average interest rates charged by microlenders), the effects are significantly gender biased. In a related paper de Mel, McKenzie, and

Woodruff (2009) argue that the capital injections generated large profit increases for male microenterprise owners, but not for female owners. Similar gender biased results are obtained by Fafchamps, McKenzie, Quinn, and Woodruff (2011) and Berge, Bjorvatn, and Tungodden (2011). This finding has potentially serious implications for development policy because most microlending organisations target women. They argue that cash injections directed at women could be confiscated by their husbands and other members of their household leading to considerable inefficiencies.

One alternative tool for expanding the labor market opportunities in these settings is vocational education or skills training, which could help individuals learn a trade and acquire the skills needed to take advantage of employment opportunities, and create successful small businesses. One additional advantage to this kind of training is that it results in human capital that is specific to the person undertaking the training. However, little is known about the actual benefits of vocational education in developing countries. This paper adds to this very limited literature by examining the short run impacts (on Labor market outcomes, empowerment, entrepreneurship and happiness) of participating in a voluntary vocational training program. The short-run effects of the program presented in this paper are extremely encouraging. We find that the program in a very short time has generated substantial improvement in labor market outcomes for these women. In particular, we find that women who were randomly offered a place in the training program are 5 percentage points more likely to be self employed compared to women who were not offered the training. This is consistent with the large increase observed in the percentage of women who buy a sewing machine between the two survey rounds. We also find that chosen women are 11 percentage points more likely to look for a job and are on an average working 2 more hours in the post-training period compared to those who were not offered the training. We find some evidence that the program affected entrepreneurship. However we find the training program has limited effects on empowerment and happiness, at least in the short run. These effects are much larger than those observed in developed countries and are consistent with the rather small but growing literature on vocational education and labor market outcomes in developing countries. Finally the program is highly cost effective and there are considerable gains from both continuing the program in the current location and replicating it in different locations.

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Figure 1: The Advertisement Campaign of the Program



**Free Stitching and Tailoring Course for Women**  
Conducted by  
**Social Awakening through youth Action**  
**(SATYA)**

Social Awakening through youth Action (SATYA) is organizing free stitching and Tailoring Course for Women in Your Neighbourhood.

Training will be provided by reputable women trained in the modern techniques of stitching and tailoring

So take advantage of the program.

Duration of the Program: 6 months

Age: 18 – 39 years

Educational Qualification: Completed Grade 5 or Higher

**Main Attractions:**

- Training will be provided by reputable women trained in the modern techniques of stitching and tailoring
- New sewing machine and other materials
- Certificate on completion (only after 6 months)
- Free (SATYA will keep a deposit of Rs 50 per month and return Rs 350 at the completion of the program)

Time: 10 am – 6 pm. Each class is of 2 hours duration.



Figure 2: Chronology of Events

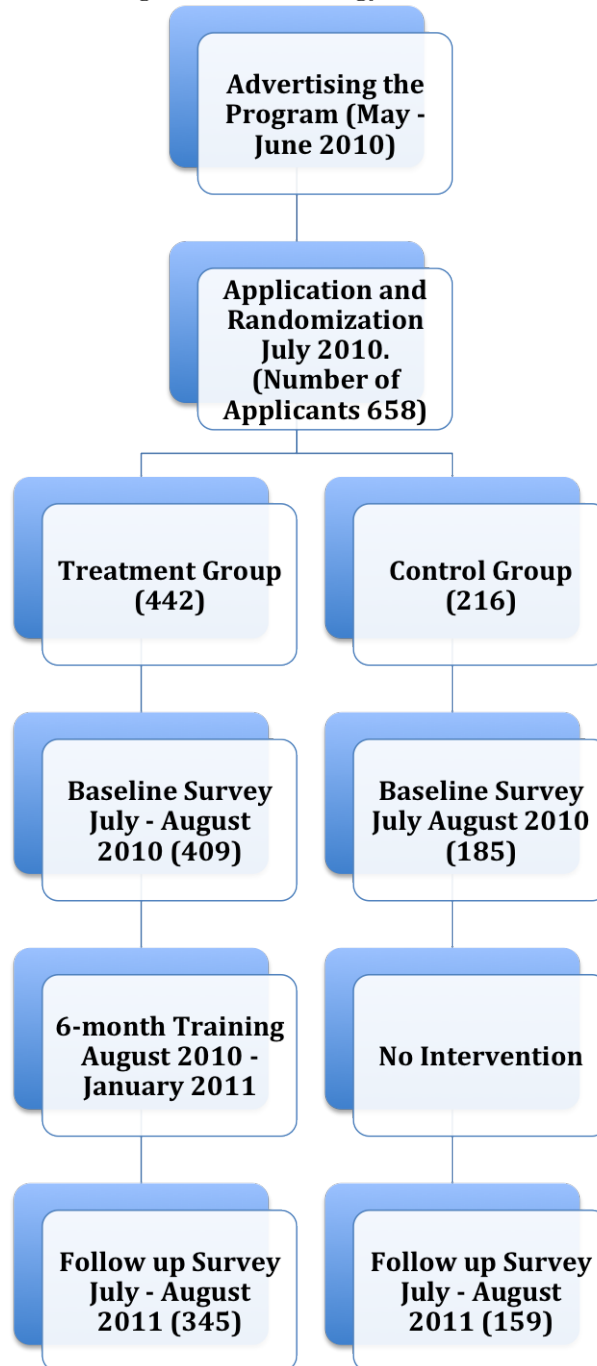


Figure 3: Average Monthly Attendance

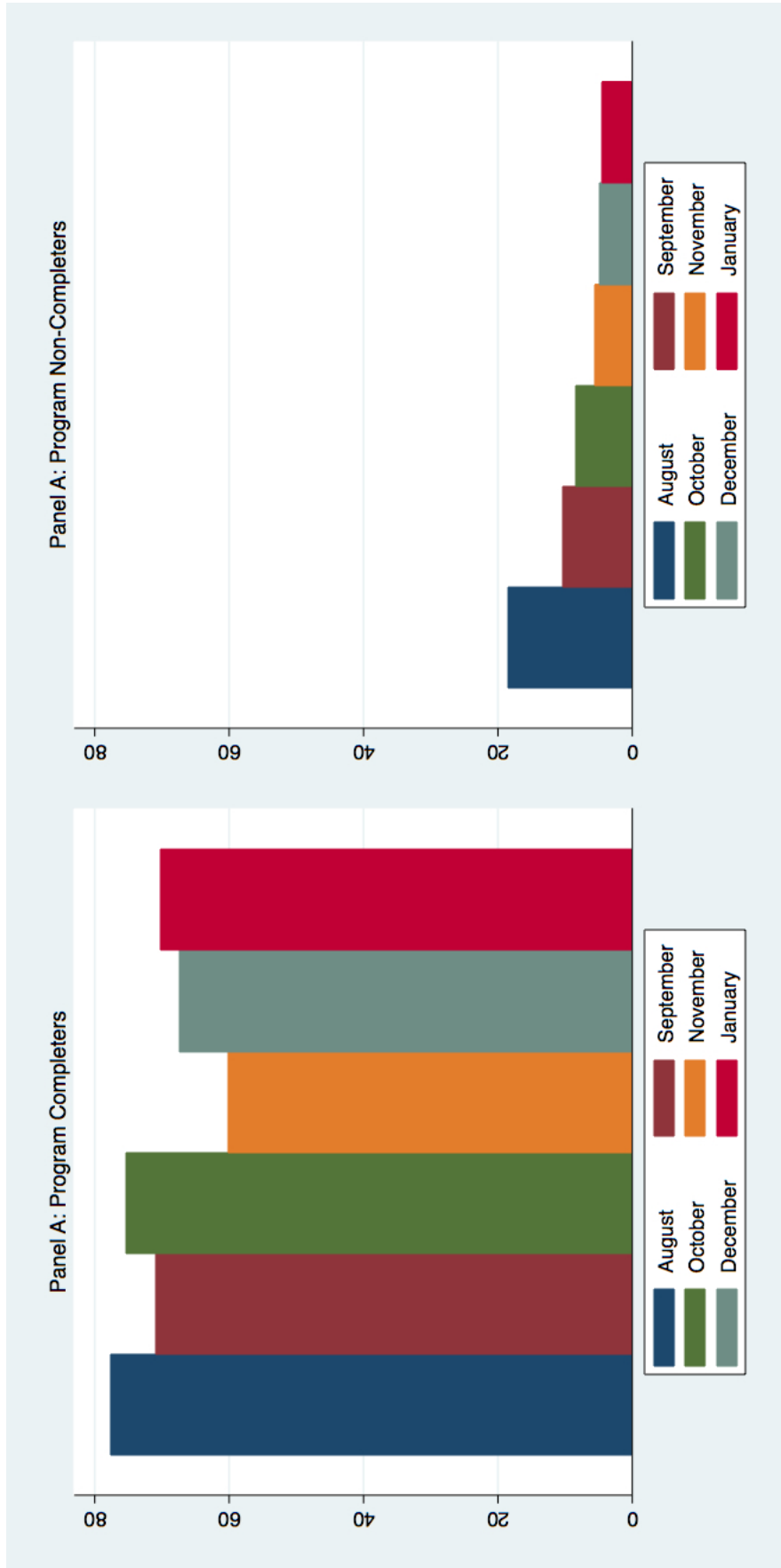


Table 1: Baseline Characteristics

	Full Sample (1)	Treatment (2)	Control (3)	Treatment-Control (4)
<b>Labor Market Outcomes</b>				
Casual wage employment	0.010	0.012	0.005	0.007 (0.008)
Full-time employment	0.032	0.034	0.027	0.007 (0.015)
Self employment	0.023	0.024	0.021	0.003 (0.013)
Any employment	0.049	0.051	0.043	0.008 (0.019)
Hours worked	0.93	1.10	0.53	0.57 (0.48)
Job search	0.074	0.05	0.13	-0.08*** (0.02)
Monthly wage earnings	42.18	49.77	25.40	24.37 (29.51)
Earnings from self employment	27.60	14.87	55.78	-40.91 (38.33)
Monthly wage earnings (if casual/full-time wage employment = 1)	1253	1357.33	940	417.33 (717.67)
Earnings from self employment (if self employment=1)	1171.43	608	2580	-1972 (1538.46)
<b>Welfare Outcomes</b>				
Own sewing machine	0.352	0.313	0.438	-0.125*** (0.04)
Control over resources	0.411	0.41	0.39	0.02 (0.04)
Rosca participation	0.114	0.11	0.10	0.01 (0.02)
Happy at home	1.58	1.584	1.589	-0.004 (0.07)
Happy at work	1.56	1.53	1.64	-0.11 (0.06)
<b>Socioeconomic characteristics</b>				
Age	22.33	22.40	22.19	0.21 (0.51)
Completed secondary schooling	0.446	0.449	0.437	0.012 (0.04)
Experience in stitching/tailoring	0.268	0.22	0.35	-0.13*** (0.03)
Married	0.335	0.34	0.31	0.03 (0.04)
SC	0.51	0.51	0.50	0.01 (0.04)
Hindu	0.471	0.47	0.46	0.01 (0.04)
Dependency ratio	0.263	0.27	0.24	0.03 (0.04)
Sample Size	594	409	185	

Standard errors reported in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 2: Summary Statistics: Pre and Post Training Differences in Outcome Variables

	Pre-Training			Post Training			Diff-Diff (7) [(6)-(3)]
	Treatment (1)	Control (2)	Difference (3)	Treatment (4)	Control (5)	Difference (6)	
Casual wage employment	0.014	0.006	0.008	0.060	0.012	0.048**	0.04** (0.018)
Full-time employment	0.040	0.025	0.015	0.092	0.050	0.042	0.027 (0.03)
Self employment	0.026	0.025	0.001	0.06	0.012	0.048**	0.047** (0.02)
Any employment	0.057	0.044	0.013	0.13	0.06	0.07**	0.057* (0.03)
Hours worked	1.31	0.50	0.81	3.50	1.17	2.33**	1.52* (0.85)
Job search	0.052	0.12	-0.073***	0.122	0.069	0.053*	0.126*** (0.02)
Monthly wage earnings	59.01	23.27	35.74	259.85	79.87	179.98*	144.24* (82.67)
Earnings from self employment	17.62	64.90	-47.28	108.46	69.18	39.28	86.56 (104.38)
Own sewing machine	0.32	0.43	-0.11**	0.59	0.47	0.12**	0.23*** (0.06)
Control over resources	0.42	0.39	0.03	0.45	0.49	-0.04	-0.07 (0.067)
Rosca participation	0.11	0.10	0.01	0.049	0.038	0.011	0.001 (0.03)
Happy at home	1.562	1.566	-0.003	1.72	1.64	0.08	0.083 (0.098)
Happy at work	1.52	1.64	-0.12	1.66	1.63	0.03	0.15 (0.098)
Sample Size	345	159		345	159		

Standard errors reported in parentheses

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

Sample restricted to non attriting households

Table 3: Differential Attrition

	Treatment			Control			
	Non-attriters (1)	attriters (2)	Difference (3)	Non-attriters (4)	attriters (5)	Difference (6)	Diff-Diff (7)
							[(3)-(6)]
Casual wage employment	0.014	0.00	0.014	0.006	0.00	0.006	0.008 (0.009)
Full-time employment	0.041	0.00	0.041	0.025	0.038	-0.013	0.05 (0.04)
Self employment	0.026	0.016	0.010	0.025	0.00	0.025	-0.015 (0.02)
Any employment	0.058	0.016	0.042	0.044	0.038	0.006	0.036 (0.04)
Hours worked	1.31	0.00	1.31	0.50	0.70	-0.20	1.51 (0.82)
Job search	0.052	0.031	0.021	0.126	0.154	-0.028	0.05 (0.08)
Monthly wage earnings	59.01	0.00	59.01	23.27	38.46	-15.19	74.20 (46.06)
Earnings from self employment	17.62	0.00	17.62	64.90	0.00	64.90	-47.28 (63.66)
Own sewing machine	0.328	0.234	0.093	0.434	0.462	-0.028	0.12 (0.12)
Control over resources	0.42	0.40	0.02	0.390	0.423	-0.033	0.05 (0.12)
Rosca participation	0.116	0.125	-0.0090	0.107	0.115	-0.0084	-0.0006 (0.08)
Happy at home	1.56	1.70	-0.14	1.566	1.73	-0.165	0.02 (0.19)
Happy at work	1.52	1.57	-0.05	1.64	1.65	-0.012	-0.04 (0.20)
Sample Size	345	64		159	26		

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4: ITT Estimates of Labor Market Outcomes

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)
<i>TRAINING</i>	0.052*** (0.016)	0.032 (0.022)	0.051*** (0.016)	0.061*** (0.027)	1.96*** (0.75)	0.066** (0.03)	134.751** (69.60)	22.415 (81.92)
Mean Control	0.013	0.050	0.013	0.063	1.176	0.069	79.87	69.18
Sample size	504	504	504	504	504	504	504	504

Region fixed-effects included

Robust standard errors in parentheses

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

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable



Table 5: ITT Estimates of Entrepreneurship, Empowerment and Happiness

	Own sewing machine (1)	Control over resources (2)	Rosca participation (3)	Happy at home (4)	Happy at work (5)
<i>TRAINING</i>	0.153*** (0.046)	-0.048 (0.049)	0.004 (0.019)	0.076 (0.064)	0.031 (0.066)
Mean Control	0.478	0.0491	0.065	1.648	1.635
Sample size	504	504	504	504	504

Region fixed-effects included

Robust standard errors in parentheses

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

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

Table 6: Sub-group average treatment effects

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)	Own sewing machine (9)
<i>TRAINING</i>	0.050** (0.021)	0.034 (0.030)	0.041** (0.021)	0.051 (0.034)	2.212** (1.021)	0.069* (0.036)	50.880 (83.807)	-6.968 (146.141)	0.119* (0.062)
<i>TRAINING</i> × Completed secondary schooling	0.004 (0.032)	-0.006 (0.043)	0.023 (0.031)	0.023 (0.051)	-0.574 (1.516)	-0.006 (0.055)	191.096 (193.385)	67.122 (165.701)	0.077 (0.094)
Joint Test <sup>a</sup>	4.80**	0.77	6.73***	3.40*	2.12	2.11	2.58	1.08	7.78***
<i>TRAINING</i>	0.027 (0.018)	0.015 (0.030)	0.046*** (0.017)	0.035 (0.033)	1.065 (1.067)	0.024 (0.040)	46.228 (63.827)	2.348 (24.265)	0.150** (0.067)
<i>TRAINING</i> × Hindu	0.051 (0.033)	0.035 (0.044)	0.010 (0.032)	0.051 (0.051)	1.824 (1.444)	0.086 (0.053)	180.182 (163.195)	40.915 (158.579)	0.006 (0.094)
Joint Test <sup>b</sup>	8.45***	2.26	4.20**	4.55**	8.00***	8.42***	2.71	0.07	5.72**
<i>TRAINING</i>	0.071*** (0.025)	0.061* (0.035)	0.047* (0.028)	0.068 (0.041)	3.325** (1.296)	0.070 (0.047)	57.044 (97.905)	34.737 (176.545)	0.058 (0.065)
<i>TRAINING</i> × SC	-0.038 (0.033)	-0.057 (0.043)	0.008 (0.033)	-0.015 (0.052)	-2.659* (1.541)	-0.007 (0.059)	151.862 (157.872)	-24.103 (187.629)	0.186** (0.094)
Joint Test <sup>c</sup>	2.7	0.02	9.55***	2.65	0.66	3.40*	3.58*	1.2	13.54***
<i>TRAINING</i>	0.049*** (0.014)	0.018 (0.027)	0.031* (0.016)	0.034 (0.030)	1.777** (0.843)	0.021 (0.034)	160.785* (95.086)	-4.058 (119.249)	0.116** (0.057)
<i>TRAINING</i> × Experience in stitching/tailoring	0.008 (0.042)	0.044 (0.048)	0.064 (0.044)	0.083 (0.060)	0.580 (1.709)	0.145** (0.062)	-82.078 (152.384)	82.588 (165.792)	0.116 (0.098)
Joint Test <sup>d</sup>	2.02	2.34	5.63**	5.05**	2.44	9.77***	0.55	0.65	8.57***
Sample Size	504	504	504	504	504	504	504	504	504

*Continued ...*

Table 6 *Continued*

Casual wage employment (1)	Full-time wage (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)	Own sewing machine (9)
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Region fixed-effects included

Robust standard errors in parentheses

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

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

a:  $TRAINING + TRAINING \times Completed\ Secondary\ School = 0$

b:  $TRAINING + TRAINING \times Hindu = 0$

c:  $TRAINING + TRAINING \times SC = 0$

d:  $TRAINING + TRAINING \times Experienced = 0$

Table 7: TOT Estimates of Labor Market Outcomes

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)
<i>TRAINED</i>	0.092*** (0.028)	0.059 (0.039)	0.090*** (0.030)	0.110** (0.047)	3.483*** (1.341)	0.114** (0.051)	244.411** (118.132)	26.889 (145.664)
First-stage F statistic	66.87	66.25	66.93	66.30	66.16	67.15	66.16	66.65
Hansen J statistic (p-value)	0.20 (0.90)	3.20 (0.20)	2.70 (0.25)	1.66 (0.43)	1.19 (0.55)	4.67 (0.06)	0.53 (0.76)	4.40 (0.11)
Sample size	504	504	504	504	504	504	504	504
<i>ATTENDANCE</i>	0.001*** (0.000)	0.001 (0.001)	0.001*** (0.000)	0.001** (0.001)	0.045** (0.018)	0.002** (0.001)	3.040* (1.649)	0.535 (1.873)
First-stage F statistic	72.47	71.58	71.74	71.75	71.81	72.45	71.68	71.65
Hansen J statistic (p-value)	0.04 (0.98)	3.82 (0.15)	2.21 (0.33)	2.34 (0.31)	1.23 (0.54)	4.85 (0.09)	0.81 (0.66)	4.13 (0.11)
Sample size	504	504	504	504	504	504	504	504

Region fixed-effects included

*TRAINED* and *ATTENDANCE* are both instrumented with treatment (*TRAINING*), and its interaction with age and marital status

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

Robust standard errors in parentheses

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

Table 8: TOT Estimates of Entrepreneurship, Empowerment and Happiness

	Own sewing machine (1)	Control over resources (2)	Rosca participation (3)	Happy at home (4)	Happy at work (5)
<i>TRAINED</i>	0.279*** (0.083)	-0.091 (0.087)	0.008 (0.033)	0.141 (0.114)	0.056 (0.119)
First-stage F statistic	66.31	66.58	66.70	66.90	66.06
Hansen J statistic (p-value)	1.60 (0.45)	3.69 (0.15)	0.45 (0.80)	0.38 (0.82)	3.11 (0.21)
Sample size	504	504	504	504	504
<i>ATTENDANCE</i>	0.004*** (0.001)	-0.001 (0.001)	0.000 (0.000)	0.002 (0.001)	0.001 (0.002)
First-stage F statistic	71.40	71.73	71.60	71.86	71.49
Hansen J statistic (p-value)	2.01 (0.36)	3.79 (0.15)	0.51 (0.77)	0.42 (0.81)	3.12 (0.21)
Sample size	504	504	504	504	504

Region fixed-effects included

Trained and Attendance are both instrumented with TREATMENT

and its interaction with age and marital status

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

Robust standard errors in parentheses

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

Table 9: Baseline Characteristics from Artefactual Field Experiments

Variables	Treatment (1)	Control (2)	Treatment-Control (3)
<i>Socioeconomic Characteristics</i>			
Age	24.34	22.20	2.23** (1.07)
Completed secondary schooling	0.38	0.47	-0.09 (0.09)
SC	0.58	0.59	-0.01 (0.09)
Experience in stitching/tailoring	0.48	0.52	-0.04 (0.09)
Married	0.52	0.36	0.15* (0.09)
Dependency ratio	0.38	0.31	0.07 (0.10)
Hindu	0.98	0.98	0.00 (0.03)
<i>Behavioral Characteristics</i>			
Proportion allocated to risky option in the investment game	51.86	50.90	0.96 (3.72)
Competitive wage scheme in competition game	0.373	0.363	0.010 (0.09)
Self assessment of number of bags they could fill in the competition game	4.21	4.53	-0.32 (0.37)
Perceived rank within group (1=Lowest, 5=Highest)	4.17	3.86	0.31* (0.18)
Number of bags actually filled	1.92	1.79	0.13 (0.12)
Overconfidence	2.64	3.00	0.36 (0.38)
Sample Size	91	44	

Standard errors reported in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 10: ITT effects of the training program on behavioral characteristics

	Proportion allocated to risky option in the investment game (1)	Competitive wage scheme in the competition game (2)	Self assessment of number of bags they could fill in the competition game (3)	Perceived rank within the group in the competition game (4)
<i>TRAINING</i>	-5.312 (4.623)	0.080 (0.103)	0.152 (0.416)	0.460** (0.223)
Mean Control	54.31	0.38	4.12	3.51
Sample Size	121	121	121	121

Robust standard errors in parentheses

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

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

Table 11: Impact of Baseline Intrinsic Characteristics

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)	Own sewing machine (9)
<i>TRAINING</i>	0.104** (0.048)	0.081* (0.042)	0.100** (0.049)	0.116** (0.058)	2.859** (1.379)	0.137** (0.059)	167.444** (76.123)	71.820 (274.116)	0.086 (0.089)
<i>TRAINING</i> × Risk Averse High	-0.151** (0.070)	-0.158** (0.068)	-0.216** (0.066)	-0.265** (0.081)	-6.118** (2.919)	-0.161* (0.085)	-213.114 (132.838)	-985.415* (541.654)	-0.254** (0.101)
Joint Test <sup>a</sup>	0.94	2.06	3.11*	3.32*	2.05	0.10	0.12	2.30	2.09
<i>TRAINING</i>	0.049 (0.046)	0.026 (0.041)	0.088 (0.056)	0.046 (0.062)	0.271 (1.159)	0.142** (0.069)	48.090 (79.319)	-7.200 (325.411)	0.050 (0.096)
<i>TRAINING</i> × Competitive	0.149* (0.078)	0.148* (0.077)	0.025 (0.069)	0.186** (0.091)	7.037** (2.989)	-0.020 (0.088)	327.202 (217.688)	191.833 (373.918)	0.089 (0.090)
Joint Test <sup>b</sup>	6.18***	5.58**	3.11*	6.94***	6.40**	2.37	3.99**	0.31	1.79
<i>TRAINING</i>	0.078 (0.062)	0.127* (0.073)	0.040 (0.055)	0.094 (0.077)	4.241* (2.402)	0.049 (0.066)	135.398 (114.701)	-249.200 (260.821)	0.011 (0.109)
<i>TRAINING</i> × Self Assessment High	0.038 (0.075)	-0.075 (0.086)	0.087 (0.065)	0.029 (0.091)	-2.251 (3.081)	0.130 (0.079)	45.333 (171.352)	478.204 (341.431)	0.111 (0.096)
Joint Test <sup>c</sup>	3.95**	1.18	4.66**	3.13*	1.29	6.45***	2.72	0.44	1.68
<i>TRAINING</i>	0.025 (0.047)	-0.031 (0.058)	-0.040 (0.037)	-0.034 (0.078)	-0.297 (1.789)	0.142 (0.094)	269.651 (246.981)	-315.831 (243.498)	0.047 (0.110)
<i>TRAINING</i> × Self Rank High	0.104* (0.062)	0.150** (0.073)	0.187** (0.051)	0.201** (0.089)	4.185* (2.314)	-0.011 (0.098)	-143.462 (284.316)	514.955* (265.185)	0.047 (0.097)
Joint Test <sup>d</sup>	5.18**	5.80**	6.51***	6.53***	5.56***	4.23**	2.20	0.40	1.00
Sample Size	135	135	135	135	135	135	135	135	135

*Continued ...*



Table 11 *Continued*

Casual wage	Full-time employment	Self employment	Any employment	Hours worked	Job search	Monthly wage earnings	Earnings from self employment	Own sewing machine
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Robust standard errors in parentheses

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

Regressions control for a full set of pre-treatment characteristics and lagged outcome variable

## A.1 Appendix

Table A-1: Likelihood of Attrition: Marginal Effects from a Probit Regression

	Attrition (ME)
	(1)
TREATMENT	0.009 (0.031)
Age	0.008** (0.004)
Completed secondary schooling	0.006 (0.029)
Married	-0.054 (0.047)
Hindu	-0.053 (0.043)
SC	0.010 (0.029)
Experience in stitching/tailoring	-0.055 (0.033)
Dependency ratio	0.019 (0.034)
Sample Size	594

Robust standard errors in parentheses  
Region fixed-effects included  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A-2: Are Attriting Women Different? Labor Market Outcomes at Baseline

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)
<i>Treatment</i>	0.007 (0.010)	0.020 (0.018)	0.006 (0.015)	0.021 (0.021)	0.935* (0.499)	-0.066** (0.028)	41.407 (30.050)	-42.048 (64.545)
Age	0.002 (0.001)	0.005** (0.002)	0.004* (0.002)	0.007*** (0.003)	0.141** (0.071)	0.005 (0.003)	6.714* (3.544)	7.888 (4.838)
Completed secondary schooling	0.004 (0.010)	0.024 (0.017)	-0.014 (0.013)	0.032 (0.020)	0.913* (0.535)	-0.030 (0.023)	66.491* (36.648)	11.721 (36.545)
Married	0.002 (0.018)	-0.042 (0.027)	-0.060** (0.024)	-0.074** (0.033)	-0.925 (0.960)	-0.031 (0.039)	-17.173 (71.604)	-143.892 (89.576)
Hindu	0.009 (0.016)	0.034 (0.028)	0.014 (0.018)	0.042 (0.032)	1.329 (1.068)	0.004 (0.031)	52.772 (79.272)	144.883 (150.022)
SC	-0.015 (0.011)	-0.006 (0.017)	0.011 (0.014)	-0.002 (0.020)	-0.736 (0.528)	0.085*** (0.022)	-12.533 (33.641)	-44.827 (36.767)
Experience in stitching or tailoring	-0.003 (0.012)	0.038* (0.023)	0.036* (0.018)	0.061** (0.027)	1.085 (0.735)	0.078** (0.030)	56.541 (50.299)	4.465 (39.004)
Dependency ratio	0.012 (0.019)	0.016 (0.023)	0.024 (0.019)	0.019 (0.024)	0.192 (0.779)	0.001 (0.027)	10.302 (51.531)	72.022 (50.575)
Residence of North Shabdara	-0.002 (0.016)	0.000 (0.028)	-0.013 (0.017)	-0.000 (0.032)	0.342 (1.039)	-0.016 (0.030)	47.432 (68.784)	123.580 (129.929)
<i>Attrite</i>	0.032 (0.033)	0.256* (0.135)	-0.051 (0.105)	0.181 (0.169)	6.048** (2.915)	0.044 (0.140)	352.783** (168.821)	213.323 (145.268)
<i>Attrite</i> × <i>Treatment</i>	-0.007 (0.010)	-0.055 (0.037)	0.019 (0.028)	-0.032 (0.046)	-1.582** (0.776)	-0.045 (0.073)	-77.358* (44.664)	42.048 (64.545)
<i>Attrite</i> × Age	-0.002 (0.001)	-0.010** (0.005)	-0.004* (0.002)	-0.013** (0.006)	-0.230** (0.109)	-0.003 (0.007)	-11.623** (5.777)	-7.888 (4.838)
<i>Attrite</i> × Completed secondary schooling	-0.004 (0.010)	0.000 (0.029)	0.008 (0.017)	-0.014 (0.033)	-0.470 (0.678)	0.075 (0.062)	-41.901 (43.368)	-11.721 (36.545)
<i>Attrite</i> × Married	-0.002 (0.018)	0.135 (0.089)	0.048 (0.030)	0.155 (0.094)	2.608 (1.808)	0.166 (0.107)	110.649 (111.213)	143.892 (89.576)
<i>Attrite</i> × Hindu	-0.009 (0.016)	-0.027 (0.031)	0.085 (0.089)	0.063 (0.096)	-1.215 (1.095)	-0.143** (0.069)	-46.450 (80.395)	-144.883 (150.022)
<i>Attrite</i> × SC	0.015 (0.011)	0.016 (0.021)	0.015 (0.027)	0.038 (0.033)	0.919 (0.573)	-0.057 (0.053)	22.709 (35.875)	44.827 (36.767)
<i>Attrite</i> × Experience in stitching/tailoring	0.003 (0.012)	-0.058* (0.030)	0.028 (0.059)	-0.017 (0.066)	-1.433* (0.815)	0.025 (0.094)	-75.849 (53.965)	-4.465 (39.004)
<i>Attrite</i> × dependency ratio	-0.012 (0.019)	-0.052 (0.040)	-0.028 (0.021)	-0.058 (0.042)	-0.831 (0.975)	0.094 (0.074)	-45.814 (60.963)	-72.022 (50.575)

*Continued ...*

Table A-2 *Continued*

	Casual wage employment (1)	Full-time employment (2)	Self employment (3)	Any employment (4)	Hours worked (5)	Job search (6)	Monthly wage earnings (7)	Earnings from self employment (8)
<i>Attrite</i> ×Resident of	0.002	-0.026	0.104	0.066	-0.810	0.017	-73.441	-123.580
North Shahdara	(0.016)	(0.039)	(0.084)	(0.093)	(1.147)	(0.064)	(73.903)	(129.929)
Constant	-0.032	-0.123**	-0.054	-0.154**	-3.665*	-0.030	-220.393*	-213.323
	(0.033)	(0.058)	(0.044)	(0.067)	(1.914)	(0.068)	(116.488)	(145.268)
F-test	0.60	1.59	1.01	1.97**	1.61*	1.90**	1.02	0.52
Observations	594	594	594	594	594	594	594	594

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table A-3: Are Attriting Women Different? Empowerment, Entrepreneurship and Happiness at Baseline

	Own sewing machine (1)	Control over resources (2)	Rosca participation (3)	Happy at home (4)	Happy at work (5)
<i>Treatment</i>	-0.039 (0.043)	0.032 (0.046)	0.022 (0.031)	0.005 (0.074)	-0.109 (0.072)
Age	-0.000 (0.006)	-0.003 (0.006)	0.001 (0.004)	0.006 (0.009)	0.012 (0.010)
Completed secondary schooling	0.017 (0.038)	0.058 (0.042)	0.057* (0.029)	-0.193*** (0.072)	-0.094 (0.070)
Married	-0.016 (0.069)	0.164** (0.081)	-0.027 (0.043)	-0.231* (0.123)	-0.241* (0.123)
Hindu	0.032 (0.060)	0.064 (0.061)	0.042 (0.043)	0.247** (0.118)	0.197* (0.116)
SC	-0.002 (0.039)	0.017 (0.041)	0.058** (0.029)	0.030 (0.073)	0.103 (0.070)
Experience in stitching/tailoring	0.515*** (0.045)	0.122** (0.052)	0.108*** (0.037)	-0.032 (0.084)	0.030 (0.084)
Dependency ratio	-0.002 (0.044)	-0.029 (0.053)	-0.003 (0.027)	0.062 (0.087)	0.076 (0.078)
Resident in North Shahdara	0.047 (0.060)	-0.226*** (0.064)	0.058 (0.042)	0.251** (0.120)	0.082 (0.120)
<i>Attrite</i>	-0.161 (0.319)	-0.910*** (0.314)	0.159 (0.217)	0.593 (0.786)	0.607 (0.801)
<i>Attrite</i> × <i>Treatment</i>	-0.108 (0.105)	0.020 (0.115)	0.019 (0.082)	-0.021 (0.199)	0.023 (0.203)
<i>Attrite</i> × Age	-0.001 (0.013)	0.020 (0.013)	-0.002 (0.008)	-0.011 (0.028)	-0.029 (0.028)
<i>Attrite</i> × Completed secondary schooling	0.099 (0.089)	0.163 (0.104)	0.006 (0.073)	-0.256 (0.180)	-0.273 (0.177)
<i>Attrite</i> × Married	0.050 (0.175)	0.010 (0.198)	-0.154 (0.108)	0.577 (0.360)	0.639* (0.371)
<i>Attrite</i> × Hindu	0.068 (0.158)	0.043 (0.172)	0.009 (0.094)	-0.119 (0.357)	0.016 (0.349)
<i>Attrite</i> × SC	0.010 (0.101)	0.186* (0.110)	-0.017 (0.078)	0.005 (0.208)	-0.050 (0.219)
<i>Attrite</i> × Experience in stitching/tailoring	0.102 (0.119)	0.224* (0.126)	0.144 (0.128)	0.075 (0.251)	-0.143 (0.256)
<i>Attrite</i> × Dependency ratio	-0.036 (0.102)	0.107 (0.115)	0.051 (0.055)	-0.052 (0.181)	-0.096 (0.178)
<i>Attrite</i> × Resident of North Shahdara	0.204 (0.154)	0.329* (0.177)	-0.127 (0.105)	-0.313 (0.366)	0.093 (0.360)
Constant	0.205 (0.135)	0.433*** (0.144)	-0.063 (0.087)	1.295*** (0.222)	1.257*** (0.233)
F-test	0.87	2.02**	0.81	1.31	0.64
Observations	594	594	594	594	594

Robust standard errors in parentheses

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