

Elsayed, Ahmed; Roushdy, Rania

Working Paper

Empowering Women under Social Constraints: Evidence from a Field Intervention in Rural Egypt

IZA Discussion Papers, No. 11240

Provided in Cooperation with:

IZA – Institute of Labor Economics

Suggested Citation: Elsayed, Ahmed; Roushdy, Rania (2017) : Empowering Women under Social Constraints: Evidence from a Field Intervention in Rural Egypt, IZA Discussion Papers, No. 11240, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/177044>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

DISCUSSION PAPER SERIES

IZA DP No. 11240

**Empowering Women under Social
Constraints: Evidence from a Field
Intervention in Rural Egypt**

Ahmed Elsayed
Rania Roushdy

DECEMBER 2017

DISCUSSION PAPER SERIES

IZA DP No. 11240

Empowering Women under Social Constraints: Evidence from a Field Intervention in Rural Egypt

Ahmed Elsayed

IZA and ROA, Maastricht University

Rania Roushdy

American University of Cairo

DECEMBER 2017

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Empowering Women under Social Constraints: Evidence from a Field Intervention in Rural Egypt*

Women in the MENA region are economically and socially disempowered. High youth unemployment rates together with discriminatory social norms drive them to limit their investment in human capital. We evaluate a large-scale intervention attempting to relax human capital constraints for women by offering vocational, business and life skills training in 30 villages in rural Egypt. Relative to women in the control villages, the intervention increased the likelihood of treated women engaging in income-generating activities, driven by an increase in self-employment. Treated women also became more likely to have future business aspirations. However, their intra-household decision-making and gender equality attitudes were not affected by the intervention. We show that these results mask heterogeneous effects in terms of background characteristics and initial levels of social empowerment. We find no evidence of positive spillover effects for the program within treated villages and, more importantly, no evidence of different pre-trends in employment between the treated and control groups prior to the intervention.

JEL Classification: I25, J24, O12

Keywords: empowerment of women, field intervention, Egypt

Corresponding author:

Ahmed Elsayed
Institute of Labor Economics (IZA)
Schaumburg-Lippe-Straße 5-9
53113 Bonn
Germany
E-mail: elsayed@iza.org

* We thank Ali Rashed and Ahmed Al-Haddad for help with data cleaning and preparation. We acknowledge the comments of Patrick Arni, Ragui Assaad, Jonas Bausch, Deborah A. Cobb-Clark, Drew Gardiner, Daniel Hamermesh, Peter J. Kuhn, David McKenzie, Helena Skyt Nielsen, Daniel Rodriguez, Mark R. Rosenzweig, Elie Murard, Ingo E. Isphording, Rafael Lalive, Cristian Pop-Eleches, Roland Rathelot, Meltem Dayioglu Tayfur, Basit Zafar, Ulf Zoelitz, participants of the IZA brown bag seminar, the ERF 23rd conference in Amman, and the 2017 PAA annual meeting in Chicago. Financial support from the ILO Taqeeem initiative is gratefully acknowledged.

1 Introduction

Compared to their peers in advanced countries, women in several developing countries suffer from lower levels of economic and social empowerment, poorer investment in human capital and restricted access to labor markets. The pattern is extremely notable in the Middle East and North Africa (MENA), where social norms together with the high unemployment rates among young people discourage women from investing in human capital and enforce their dependence on men.¹ Although recent decades have witnessed a massive increase in the number of different microfinance and employment intervention programs that typically targeted women in developing countries to help them become more economically and socially independent (e.g. Bandiera et al. 2016; Field et al. 2010; Groh et al. 2016a; 2016b), only little evidence comes from the MENA region (e.g. Groh et al. 2016a; 2016b). The literature from different parts of the world shows mixed evidence on how successful these interventions are. Some studies have found a strong positive impact in terms of labor market (as well as other social) outcomes (e.g., Bandiera et al. 2016; Pitt et al. 2006; Jensen 2012), while several other studies have found hardly any evidence of improvement for women relative to men (e.g. Berge et al. 2015; De Mel et al. 2008; 2009; 2014; Fafchamps et al. 2014; Gine and Mansuri 2014; Klinger and Schundeln 2011).

One reason for the inability of several interventions to achieve the planned goals for women is the extreme focus on physical capital support without considering human capital. Gender differences in education and access to business networks could limit women’s ability to benefit from physical support (Field et. al 2010). Due to these gender differences, women — relative to men — often lack basic business knowledge and are less informed about investment opportunities (Karlan and Valdivia 2011). This pattern is more pronounced in rural areas, where women have relatively lower access to schooling and the scarcity of non-agriculture waged employment opportunities drives them into self-employment (Emran et al. 2011). Moreover, norms governing women’s roles in

¹Figure 1 shows gender differences in labor force participation across different regions. The figure clearly shows that Arab and North African countries, together with Southern Asia, account for most of the global gender gap in labor force participation, with little improvement over the 1995-2015 time period.

society could restrict their perceptions concerning what is achievable in the workplace, thus limiting their motivation to invest in human capital (Field et al. 2010). Therefore, a key question is whether relaxing women’s human capital constraints could help them towards achieving better economic and social outcomes, or whether gender norms are too binding to be relaxed by public policy interventions.

This paper aims to answer this question by evaluating the impact of a large-scale women empowerment intervention in the conservative setting of rural upper Egypt.² *Neq-dar Nesharek* (NEQDAR) -We can participate- program provides an integrated approach to female economic and social empowerment to enhance the transition to work for young marginalized women in rural upper Egypt. The program provides business, vocational and life skills training in addition to actual support in starting a business or becoming employed (Ramadan et al. 2014).³

Using a quasi-experimental design including a mid-line and end-line survey, this paper evaluates the impact of the program on young women’s employment outcomes and aspirations, intra-household decision-making and gender roles attitudes. The impact of the program is assessed using a strategy of difference-in-difference (DD) and propensity score matching (PSM) by comparing end-of-program responses to mid-line survey responses for treated women and women in control villages. Spillover effects are also estimated through comparing the responses of the untreated in NEQDAR villages with those in control villages. The large size of the intervention allows studying the heterogeneous effects of the intervention. In order to account for the possibility that differences in empowerment outcomes between treated and control groups could be due to endogenous factors potentially affecting women’s empowerment differently for the treated and control groups, data on women’s employment history has been used to estimate differences in prior trends in employment between treated and control groups.

We find that relative to women in control villages, the program increased the likelihood of treated women engaging in income-generating activities (driven by an increase in

²Upper Egypt refers to the south of the country, while Lower Egypt is the north. The terminology “upper” and “lower” derives from the flow of the river Nile from the highlands of East Africa northwards to the Mediterranean Sea.

³To gain a better feeling of the NEQDAR project, watch this video: <https://www.youtube.com/watch?v=-7VBRZdZnI8>

self-employment), as well as increasing the share of women planning to set up their own businesses. However, social aspects of empowerment (namely intra-household decision-making and gender equality attitudes) were not affected. In order to investigate the extent to which there are spillover effects of the intervention, we compare the change in outcomes for untreated women in the intervention villages with those in control villages. We find no significant difference, suggesting the absence of spillover effects within treated villages. Importantly, we find no evidence of different pre-trends in employment across the treated and control groups prior to the intervention, thus suggesting that the intervention is caused the change for the treated group. The findings suggest that the economic situation of women in conservative societies could be enhanced by relaxing human capital constraints. However, this does not translate directly into better social outcomes.

The paper builds on a growing body of economic literature exploring the impact of training on the labor market outcomes of women (e.g., De Mel et al., 2014; Field 2010; Karlan and Valdivia 2011; McKenzie and Puerto 2017). Most of these studies focus on existing entrepreneurs and evaluate the impact of trainings alone or in combination with microfinance on the performance of small firms as well as women’s outcomes. Only few studies focus on bringing women to the labor market in the first place, in the form of either self- or wage employment (e.g. Banderia 2015; Groh et al. 2016a; 2016b; Maitra and Mani 2017). The findings of these papers differ with the context and the type of training. Our study has the advantage of being one of the first studies to use a holistic approach in empowerment by providing women with a bundle of trainings including business, vocational and life skills training.⁴ Moreover, the paper is one of the first studies to explore the conservative settings of rural upper Egypt.

The remainder of this paper is organized as follows. Following this introduction, Section 2 provides a brief background to the situation of women in Egypt. Section 3 provides an institutional background to the NEQDAR program goals, training components and key implementation activities. Section 4 explains the empirical strategy, after which Section 5 explains the data analyses. Concluding remarks are provided in Section 6.

⁴The study by Banderia et al. (2015) adopts a similar approach, where adolescent women in Uganda combined vocational training and soft skills training on health, reproduction and marriage. For a detailed review of the studies on the training interventions, see McKenzie and Woodruff (2014), and for detailed overview of the female empowerment interventions, see Buvinic (2014).

2 Context of women in Egypt

In Egypt — as in many countries in the developing world — women face several forms of gender inequality. The 2016 Global Gender Gap Report ranked Egypt 132nd out of 144 countries in terms of relative disparities between women and men in four key areas: economic opportunity, educational attainment, political participation and health and survival. The domain in which Egypt is performing relatively poorly is economic opportunity, for which it is ranked 132nd compared with 95th in the health and survival domain, 112th in terms of education attainment and 115th for political participation (World Economic Forum 2016). Egypt’s ranking has not changed much since its inclusion in the Gender Gap Index in 2006, where it was ranked 109th out of 115.

Despite improvements in literacy and school enrollment rates over recent decades (Assad and Krafft 2015), the gender disparity in terms of economic opportunity is not much narrower among the younger cohort of the population. Young women have been persistently facing a disadvantaged position on the Egyptian labor market. Based on the 2014 Survey of Young People in Egypt, only 13.3% of young women (aged 15-29) participate in the labor force, compared to 57.8% among their male peers. The unemployment rate among female youth (32.3%) is more than triple that of young males (9.3%) (Roushdy and Sieverding 2015). Young women’s employment expectations continue to be based on the flexible working conditions of the public sector, and the private sector has failed to offer sufficiently attractive conditions to encourage long-term labor force participation among female youth. The entrepreneurship rate among youth remains very low, particularly among females: only 5.7% of employed female youth reported establishing their own business in 2014, compared to 13.1% of their employed male peers. Furthermore, young people throughout the country — and particularly women — face difficulties in starting and running their own business due to a lack of business information, as well as lacking information on marketing outlets and financial services (Assaad and El-Hamidi 2009; Roushdy and Selwaness 2015).

The situation is even worse for young women in the rural settings of upper Egypt, which is the most conservative and traditional region of the country, and vicious cycles of low education and severe poverty still persist (Assaad and Roudi-Fahimi 2007). Upper

Egypt is culturally distinguished relative to other parts of the country regarding values and gender roles. It is characterized by distinct patriarchal values that underscore the power of men over women, the influence of elders over youth and the prevalence of tribal feud (Hopkins and Saad, 2004). This cultural restriction greatly limits young women’s mobility, education attainment, economic opportunity and participation in the public sphere, as the arrival of puberty reduces girls’ access to friends and freedom to move around the community (Baldwin 2011; Sieverding and Elbadawy 2016). Young women in rural upper Egypt also stand out as the largest group of those who are left behind in education. Almost 22.6% of young women in rural upper Egypt have never attended school, as compared to only 7% among young men (Krafft 2015).⁵ In these rural communities, where employment in the non-agricultural private sector is very limited, both small enterprise development and the expansion of female-friendly employment in existing enterprises are essential for job creation and generating employment opportunities.

3 The intervention

3.1 Background

The NEQDAR program was launched by the Population Council-Egypt office in September 2011 with funds from USAID, with the goal of enhancing young women’s transition to work in the rural communities of upper Egypt. The training activities of the program started in January 2013 and continued until mid-2014.⁶ NEQDAR targeted women in 30 villages in the upper Egyptian governorates of Fayoum, Suhag and Qena, and was implemented in partnership with local NGOs and 30 village-level community development associations (CDAs).

The program was designed to be implemented in 30 villages chosen *a priori* in upper Egypt. During the preparatory phase prior to implementation, propensity score matching

⁵In other regions of the country, the rates of youth aged 13-34 who have never been to school ranges between 3% and 8% among young men and 4% to 13% among young women (Krafft 2015).

⁶For more details on the program description, see Ramadan et al. (2014). Figure 2 shows an overview of the timeline of the project activities. The preparatory activities before the actual training started included gaining governmental approvals for implementing the program, village selection, CDAs selection, curriculum development, recruitment and training of promoters and other project staff.

was used to select a group of 15 control villages from the same three governorates that are comparable to the 30 treated villages. The control and intervention villages were matched in terms of village size, poverty level, education prevalence and labor market-related variables using the 2006 census of Egypt.⁷ Table A1 in the Appendix shows a comparison between the characteristics of treated and control villages drawn from the 2006 census of Egypt. The table clearly shows no significant differences in observable characteristics between treated and control villages.⁸

Following the preparatory phase, registration was open in the intervention villages at the local CDAs' premises. The main eligibility criterion is being a woman in the age range 16-29, who could read and write. Outreach activities included advertisements and community events in the treated villages. Despite the large community outreach and advertising efforts conducted by the program staff before the project registration period, the number of women who registered and were eligible for the program equaled approximately the targeted number of women in each village. Hence, the women were not randomly selected for participation in the program.

3.2 Trainings

During the preparatory phase before the start of the NEQDAR training, 240 promoters (eight in each treated village) — who are young educated women (with at least secondary education) — were recruited from the same local community and trained to mentor, teach, coach, guide and provide moral support to the program participants during the training period. The promoters also served as role models of women's achievements in areas where girls face many social and economic restrictions.

The NEQDAR training program comprised three main training components: (I) business skills training, (II) vocational training, and (III) life skills, legal rights and civic education. The business skills curriculum was delivered in 12 weeks, meeting three times

⁷ Using propensity score matching alleviates the potential selection bias at the village level. See Aiken (1998), Arceneaux et al. (2006); Bifulco (2012), and Dehejia and Wahba (2002) for a discussion on how experimental and matching methods may lead to similar results.

⁸The intervention did not aim to make a difference at the village level. As shown in Table A1, it ran in large-size villages, and only had capacity for a maximum of 150 women per village. The take-up rate was on average about 6% of those women who were eligible for the intervention.

a week for a two-hour session (i.e. a total of 72 hours). During the business training, beneficiaries started either directly searching for employment opportunities (while attending the program classes) or preparing a market study, with guidance from promoters. The aim of the market study was to map existing local businesses and assess the potential for small businesses that they are interested in setting up. Based on the market study, beneficiaries who were interested in starting their own business submitted their business plans and market assessments for their proposed projects, and accordingly their vocational training needs.

Vocational training started right after the business skills training. With the help of local training institutes and businesses, beneficiaries received a variety of training options, including accessory making, sewing, hair dressing, livestock raising, dairy-product making, perfume making, cleaning-supplies making, mobile repair and computer hard/software training, first aid/paramedic and dessert/food catering services. Simultaneously, beneficiaries who were seeking employment were helped to apply for employment opportunities in various factories, shops, schools and pharmacies, etc.

Along with the vocational training and business start-up or employment phase, beneficiaries received life skills trainings (eight two-hour sessions), health-awareness classes (four two-hour sessions), legal rights and civic engagement (two two-hour sessions). It is worth noting that all the NEQDAR trainings took place in safe public spaces offered by the local NGOs at the village level. Trainings took place in the afternoons, so that girls enrolled in school could attend.

Parallel to the trainings, beneficiaries were supported in obtaining proper identification, since this is vital to apply for loans, formalize businesses, find employment, etc.⁹. Moreover, beneficiaries were helped to open personal saving accounts at local post offices and banks.

3.3 Data collection and outcome variables

The implementation of NEQDAR started before securing sufficient funds for a baseline impact evaluation survey. Accordingly, when funds were available, a late-baseline (a

⁹A total of 402 beneficiaries were helped to obtain their national ID cards

mid-line survey) as well as an end-line survey were implemented to assess the impact of the program (Ramadan et al. 2014). Data was collected for all treated women, a random sample of the untreated women in intervention villages, and a random sample of women in control villages. The mid-line survey was conducted in December 2013/January 2014 and an end-line survey was conducted in November/December 2014 (See Figure 2). Before the mid-line survey, the business skills classes were almost completed, and the vocational training was just starting. The life skills, health and legal trainings were still to be implemented following the mid-line evaluation. Hence, following the mid-line data collection, many changes were expected to occur regarding the program participants' outcomes.¹⁰

The mid-line and end-line surveys collected detailed information on work and financial independence, business and marketing knowledge, participation in decision-making, and gender roles (including views on women's work, women's rights and gender equality), as well as individual information on age, marital status, education, work information and parents' education.

We investigate the effect of the program on labor market outcomes, women's economic aspirations, and social empowerment. *Labor market outcomes* are estimated by the following four factors: (1) income-generating activity, measured by a dummy variable whether a women was engaged in any economic activity with the goal of generating income over the three months prior to the survey; (2) wage employment, measured by a dummy variable taking the value of one if the woman worked for a wage over the week prior to the interview, and zero otherwise; (3) self-employment, with a dummy variable taking the value of one if the woman was self-employed over the week prior to the interview, and zero otherwise; and (4) business knowledge index, on a scale from zero to one based on an unweighted index of six items capturing women's business knowledge. Table A2 in the Appendix displays the individual components of the scale.

Economic aspirations are estimated by women's economic goals for the future. Women are asked about whether they have plans (1) to set up/continue a project, and/or

¹⁰The results of an interim survey — compared to that for the baseline — could under-estimate the effects of the program, although a significant share of the effect of the program on women's economic and social outcomes could still be captured by comparing the results of the mid-line and end-line surveys.

(2) to secure wage employment. Each of the two items is a dummy variable that takes the value of one if the woman has the plan in mind, and zero otherwise. The two items are not mutually exclusive (i.e. individuals can choose more than one item), whereby each item is considered a separate question on its own.

Social empowerment is estimated using two indexes. (1) Gender equality index (GEI): women were given different statements about the role of women and asked if they agree with each statement. Table A3 shows the statements. A scale ranging from zero to one based on the unweighted average of these statements is calculated, where zero is the lowest in terms of perception toward gender equality, and one is the highest. (2) Decision-making index (DMI): women are asked whether they usually have the final say in making different decisions within the family (see Table A4). The unweighted average of these items is calculated and then an index that ranges from zero to one is calculated, where zero is the lowest in terms of intra-household decision-making, and one is the highest.¹¹

3.4 Sample size, attrition, and descriptives

Among the 7,028 women who were interviewed in the first round of the survey, and for whom we have complete information about background characteristics, labor market outcomes, and social outcomes, 5,704 women (3,483 treated, 1,225 untreated, and 996 in control villages) were tracked in the end-line survey, corresponding to a tracking rate of 81%. Figure 3 shows the number of observations in each group. Table A5 shows a comparison of observable characteristics between the group that remained across the two waves and the group that dropped out in the second wave. Although some differences exist between the two groups in observable (and outcome) characteristics, attrition does not seem to be driven by the treatment status.¹²

The analysis in this paper is limited to a balanced sample of 5,704 women who

¹¹The GEI is adopted from the composite index of discriminatory gender social norms at the micro level, created by Tuccio and Wahba (2015). The DMI is adopted from the large body of literature on intra-household decision-making. See, for example, Pitt et al. (2006) and Ashraf et al. (2010). Our results are robust to using a linear combination determined through a factor analysis of the individual responses to each question.

¹²We repeated all the analyses after accounting for non-random attrition using inverse probability weights, see Wooldridge (2002). This gives similar results.

completely filled both the mid-line and end-line surveys and have complete information on all relevant variables.¹³ Table 1 shows descriptive statistics of the three groups from the mid-line survey. About 20% of women across the three groups are still enrolled in education. Among those who finished education, 57% of the treated women have less than secondary education, 38% have secondary education, and 5% have higher than secondary education. The average age of treated women is 22, and 35% of the treated sample are married. About 13% of the treated women had been engaged in income-generating activities over the three months prior to the survey, 8% are currently in wage employment, and 3% are self-employed.¹⁴ The table shows clear significant differences between the treated group and both untreated and control groups. Treated women are less likely to be married and have children, are more likely to be working, and have less conservative attitudes towards gender roles. However, normalized differences are below the rule of thumb of 0.25 (Imbens and Wooldridge 2009).¹⁵

Among those who took up the training, participation rate was high. Table A6 documents participation in the program and shows that among those who took up the intervention 94% attended at least one session of the business training, 68% attended at least half of the business classes, 74% attended the vocational training sessions, and 61% attended the life skills trainings.

4 Empirical Strategy

To evaluate the impact of the intervention while accounting for the unobserved heterogeneity of individuals, we use a difference-in-difference approach (DD). The design of the

¹³A different sample size with different subsets of variables was investigated for robustness checks and yielded similar results.

¹⁴Table A7 shows the descriptive statistics for the whole sample of 7,028 women.

¹⁵Given that the mid-line survey took place six months after the start of the training, these differences could be driven by the intervention. In Section 5.3, we estimate pre-trends in employment using data on employment history to test the possibility that these differences precede the intervention. We find no evidence for differences prior to the implementation of the program, thus suggesting that these differences could indeed be driven by the intervention. Given the difficulty in estimating retrospective data for other outcomes (e.g. social empowerment measures), there remains a chance that they are already affected by the intervention in the mid-line survey, and therefore the impact of the intervention on them is under-estimated. However, the finding that the intervention improved labor market outcomes would enable us to expect similar positive impacts on other social outcomes as a result of the better economic opportunities generated for women.

intervention enables estimating the impact of the program and the spillover effect in one single equation. We evaluate the impacts of the NEQDAR program on several outcomes for treated and untreated groups compared to the control group. For this purpose, we estimate the following DD specification:

$$Y_{it} = \beta_0 + \beta_1 T_{it} + \beta_2 U_{it} + \beta_3 W_t + \beta_4 [T_{it} * W_t] + \beta_5 [U_{it} * W_t] + \beta_6 X_{it} + \varepsilon_{it} \quad (1)$$

where Y_{it} is the outcome of woman i at time t , T_{it} is a dummy variable that takes the value of one if the respondent is treated and zero otherwise, U_{it} is a dummy variable that takes the value of one if the respondent is untreated and zero otherwise, W_t is a dummy variable that takes the value of one if the observation is from the second wave of the study (at the follow-up) and zero otherwise, the parameter β_4 for the interaction between T_{it} and W_t is our measure of change in treated women's outcomes compared to that of women in control group, β_5 captures the change in the outcome for untreated women compared to control group and therefore provides an estimate of the spillover effect within NEQDAR villages, X_{it} is a set of controls including age, a dummy for being married, a dummy for having children, education, father's education, household size, household wealth, and region fixed effects, and ε_{it} is a time-varying error term.

Our main empirical problem with the analysis above is the self-selection of participants arising from the voluntary nature of the program participation. To account for the selective nature of the intervention, we also combine DD with propensity score matching (PSM). PSM is based on two main assumptions: first, conditional independence (i.e. the existence of no selection on unobservable characteristics), which is a strong assumption to make; and second, common support, which means that for each value of mid-line variables, there is a positive probability of being either treated or untreated. A combination of DD and PSM allows us to circumvent the self-selection problem by drawing on the assumption that, conditional on observable characteristics of women, unobservable characteristics that might affect self-selection into the program and subsequent changes in outcomes are similar between treated and control groups.

To illustrate the approach that we use to combine DD and PSM, let $T = 1$ if a woman is treated and $T = 0$ if she is in the control group. The outcome of being

treated by the NEQDAR program and the counterfactual outcome at time t can be denoted by (Y_t^T, Y_t^C) . The gain from treatment is $(Y_t^T - Y_t^C)$, and we are interested in estimating the average effect of treatment on the treated (ATT), $(Y_t^T - Y_t^C|T = 1)$. The inability to observe the counterfactual outcome for treated women prevents us from directly estimating the ATT. Using data from mid-line and end-line, we control for the individual fixed effects. With $(t = 0)$ denoting the mid-line and $(t = 1)$ denoting the end-line, we can re-write the standard DD estimator as:

$$DD = E(Y_1^T - Y_0^T|T = 1) - E(Y_1^C - Y_0^C|T = 0) = E(Y_1^T - Y_1^C|T = 1) + B_1 - B_0 \quad (2)$$

where B_t is the selection bias in period t and $B_t = E(Y_t^C|T = 1) - E(Y_t^C|T = 0)$. If the initial individual characteristics that affect subsequent changes to the outcome variables are distributed differently between the treatment and control groups, the condition $B_1 = B_0$ will not hold. To allow for this situation, we use PSM to balance these variables. The assumption underlying PSM is that, conditional on observable characteristics, changes in outcome variables — if untreated — are independent of actual treatment, $[(Y_1^C - Y_0^C) \perp T|X]$. This assumption implies $[(Y_1^C - Y_0^C) \perp T|P(X)]$, where $P(X)$ is the propensity score defined as $P(X) = Prob(T = 1|X)$. This justifies balancing on $P(X)$ to remove selection bias based on X . Note that this only addresses time-varying selection bias based on observables, while a bias will remain if there are any time-varying factors correlated with the changes in counterfactual outcomes (see Rosenbaum and Rubin 1983; Chen et al. 2009). In the empirical estimations, we use a PS-weighted regression method proposed by Hirano et al. (2003), which produces an estimate of the ATT as the parameter in a weighted least square regression of the form: $Y_{it} - Y_{i,t-1} = \alpha + \beta T_i + u_i$ where $E(u_i|T_i) = 0$, and the weights equal one for treated observations and $\hat{P}(X)/[(1 - \hat{P}(X))]$ for control observations. We use various methods for assuring balance on $P(X)$. One method is to limit comparisons to a trimmed sub-sample with sufficient overlap in propensity scores (Crump et al. 2007). This trimming method minimizes the variance of the estimated ATT under homoscedasticity.

As a robustness check, we also estimate the coefficients applying regular propensity score-matching techniques (Heckman 1997; 1998) using the non-parametric kernel

matching in which all non-participants are used as controls and weights are assigned according to a kernel function of the predicted propensity score, whereby we assure valid bootstrapped standard errors (Chen et al. 2009)

5 Results

5.1 DD estimates

Table 2 shows the simple DD estimates from Equation (1). The table shows a significant increase in the labor market outcomes of the treated group relative to the control group. To benchmark the magnitude of the effects, we report the effects in percentage of the treated group mean in the mid-line period. The table shows that the probability of engaging in an income-generating activity increased by 4.4 percentage points for the treated group compared to the control group. This marks an increase of 33% for the treated group across the two waves. Most of the change comes from self-employment, which witnessed an increase of 3 percentage points (86% increase from the mid-line level for the treated women); however, wage employment was not affected by the treatment. Although the mid-line survey started after most women had finished the business skills component, business knowledge showed a significant increase of 6 percentage points (15% increase from the mid-line level for the treated women). Economic aspirations show a similar pattern to actual labor market outcomes: the share of women who plan to set up their own businesses increased significantly by 9.8 percentage points (36% increase from the mid-line level), while the share of women who aim to start wage employment was not affected. The social empowerment aspects of GEI and DMI witnessed no change. Comparing the change in outcomes between the untreated and control groups, the table shows no evidence of spillover effects.¹⁶

¹⁶As a robustness check, to account for individual unobserved heterogeneity, we re-estimate the model using the individual FE model. Table A8 shows the coefficients for the FE model, which are very similar to those obtained in Table 2.

5.2 PSM estimates

Table 3 shows the coefficients of the propensity score estimates using the PS-weighted approach and Kernel PSM for both untrimmed and trimmed samples (Equation 2). Panel A shows the main effect of comparing the treated group to the control group and Panel B shows the spillover effect comparing the untreated to the control group. The table confirms the pattern of results obtained using the DD approach in Table 2. This suggests that selection on observable characteristics does not drive the results. Table A9 in the Appendix shows the probit estimates used for calculating the propensity score.

5.3 Pre-trends in employment

Given the lack of randomization in the intervention, there is a chance that the difference in labor market outcomes between treated and control groups is not a result of the intervention, but could instead be due to endogenous factors that affect outcomes differently for the treated and control groups. To account for this possibility, we need to investigate whether the differences in labor market outcomes existed prior to the intervention. For this purpose, we exploit a detailed section on the mid-line survey on the employment history of the women. We update the section with data from the end-line survey where the same section of questions was asked to cover the period between the two surveys.¹⁷ Women were asked about all spells of work (waged or self-employment) of six months or longer with dates of start and finishing. This gives us an idea whether a woman was working or not in each year. We estimate the probability of employment in each year controlling for the mid-line characteristics specified in Equation (1). Figure 4 shows the difference in employment probability in each year between the treated and control groups (left side) and between the untreated and control groups (right side). The table shows no evidence of differences between the treated and control groups in each year prior to the start of the intervention in 2013. In 2013 — the year that marked the start of the training — the difference started to appear and became very clear in 2014 after the in-

¹⁷The same section in the end-line survey enables a comparison of retrospective information across the two waves. The results are robust to using the data from the end-line survey only. However, our preferred strategy is to use data from the mid-line survey and update it with the end-line survey because the mid-line is closer in time to pre-intervention spells of work and the answers are less likely to be affected by the intervention.

tervention was completed. This suggests that the difference in employment between the two groups is not due to different pre-trends in employment and rather is a direct result of the intervention.¹⁸

5.4 Heterogeneity analysis

Table 4 examines the extent of heterogeneity of the impact of the NEQDAR program with respect to the mid-line characteristics of age, education, marriage, children (and their gender) and wealth. The table also reports the heterogeneity with respect to mid-line levels of social empowerment measures of GEI and DMI. The table shows that older women (above 21) benefited more from the training by starting to be engaged in income-generating activities and setting up their own business. Highly-educated women are more likely to be engaged in income-generating activities and be self-employed after the program. They also became more likely to be engaged in wage work relative to their low-educated counterparts, although the coefficient is statistically insignificant. This suggests that training could be complimentary to formal education, enabling girls with a knowledge background to join the labor market. However, the low educated benefited more in terms of business knowledge, given their lower initial level relative to the highly educated. Married women and those from poorer households were more likely to benefit from the intervention. Conditional on being married, women who have children benefited more than those who did not have children. To examine how the gender of children makes a difference for the impact of the intervention, we run the analysis separately for those who have a higher share of daughters compared to sons, and those who have a lower share of daughters.¹⁹ The table shows that women who have more daughters are more likely to benefit from the program. Given the preference of sons in the context of Egypt (Al-Qudsi 1998; Chakravarty 2015), this suggests that women with more daughters feel the urge to

¹⁸The estimates from the employment history should not be compared with those from the main analysis in Table 2 due to the different nature of the questions and the different time periods that they cover (i.e. the income-generating activity in the main analysis covers the last three months, while spells of six months or longer are asked about in the employment history part). Given the difficulty in asking retrospective questions regarding attitudes, we can show pre-trends for employment only. However, these estimates could provide strong suggestive evidence of a lack of different pre-trends prior to the implementation of NEQDAR.

¹⁹We control for the number of children in this regression.

support the family by joining the labor market. Mothers with more daughters also could act as a role model for their daughters. The table further shows that if a woman has higher levels of social empowerment a priori (i.e. in the mid-line period), she is more likely to benefit from the program. This suggests that the social empowerment of women is a pre-condition for training interventions to be successful. Socially disempowered women are less likely to gain economically from trainings.²⁰

5.5 Potential impact of the program on schooling

Given that school-enrolled girls were eligible for the program, one potential negative spillover effect of the program is that it might affect the girls' enrollment at school and/or their school performance. To test this possibility, we estimate the impact of the program on the enrollment at school for treated girls relative to those in control villages. Table A10 shows that the program does not drive school drop outs among treated girls compared to the untreated ones.²¹ We also test the potential negative impact on the qualitative aspect of students' performance by investigating the impact of the program on the time that they spent studying.²² Table A10 (Column 2) shows that the program did not affect girls' schooling activity. These findings suggest that economic gains from the program do not come at the cost of girls lowering their investment in formal education.

6 Conclusion

Women in several developing countries face enormous challenges due to a lack of economic and social empowerment. This paper has aimed to show the extent to which relaxing

²⁰Given the variation in the impact of the intervention with social empowerment indicators, we re-estimated the effect of the intervention on labor market outcomes shown in Table 2 after controlling for mid-line levels of social empowerment. We also re-estimated the PSM analyses shown in Table 3 for labor market outcomes including mid-line levels of social empowerment as one of the matching characteristics. The results of the two robustness checks show similar results to the main analysis.

²¹Given the inexistence of baseline data, treated women could have already dropped out before the mid-line survey. However, Table 1 shows no difference in the share of girls enrolled at school across the three groups. Moreover, we do not find school enrollment at mid-line to be a significant determinant of enrollment in training: this is as expected, given that trainings operate out of school hours.

²²The mid-line and end-line contain detailed information on time use and the different activities that the woman undertook during one day (the day prior to the survey). We create a dummy variable for educational activities including study, home work and other schooling activities.

the human capital constraint for women could enhance their empowerment perspectives. Using a difference-in-difference approach together with propensity score-matching techniques, we evaluate the impact of a large-scale female empowerment interventions in upper Egypt, where women in 30 treated villages were offered extensive vocational, business and life skills training. Changes in women’s employment outcomes and aspirations, intra-household decision-making and gender roles attitudes are assessed by comparing end-of-program responses to mid-line survey responses for treated women and those in control villages. Spillover effects are also estimated through comparing the responses of the untreated women in the intervention villages to those in the control villages. To account for the possibility that differences in empowerment outcomes between treated and control groups could be due to endogenous factors that affect empowerment outcomes differently for the two groups, data on employment history has been used to estimate differences in prior trends in employment between the treated and control groups.

The paper shows that while the labor market outcomes, economic aspirations and business knowledge of the treated women improved relative to women in the control villages, social empowerment (measured by their decision-making and gender equality attitudes) was not affected. The paper shows no evidence for spillover effects within treated villages. Employment history data suggests no differences between treated and control groups prior to the intervention, suggesting that the effects found are due to the intervention. The findings of the paper show that while training interventions could help women to achieve economic empowerment, binding constraints arising from social norms could still hinder social empowerment. The lack of effect on social empowerment is in line with the literature, which shows that in conservative societies intra-household decision-making and attitudes towards the general role of women in society are generally at a higher threshold and are not easily affected by empowerment interventions (Beath et al. 2013).

One possible reason why the intervention had no significant impact on the social empowerment of women could be the scope of the training program, which emphasized business, vocational and life skills training, and touched only briefly upon gender issues. However, the effect on social empowerment is expected to be indirect in the sense that economically-empowered women are more likely to become socially independent based on

the literature that finds a link between women's earnings and intra-household decision-making (e.g. Majlisi 2016). The short period of time over which the impact of the program was evaluated could be another reason why there is no impact on intra-household decision-making. Despite becoming more likely to set up their own businesses, treated women might have not yet collected sufficient earnings to feel economically empowered. Long-term impact evaluation is needed for a better understanding of the impact of training interventions on the social empowerment of women.

References

- [1] Aiken, L. S., West, S. G., Schwalm, D. E., Carroll, J., and Hsuing, S. (1998). Comparison of a randomized and two quasi-experimental designs in a single outcome evaluation: Efficacy of a university-level remedial writing program. *Evaluation Review*, 22, 207-244.
- [2] Al-Qudsi, S. (1998). The demand for children in Arab countries: Evidence from panel and count data models. *Journal of Population Economics*, 11(3), 435-452.
- [3] Arceneaux, K., Gerber, A. S., and Green, D. P. (2006). Comparing Experimental and Matching Methods Using a Large-Scale Voter Mobilization Experiment. *Political Analysis*, 14, 37-62.
- [4] Ashraf, N., Karlan, D., and Yin, W. (2010). Female empowerment: Impact of a commitment savings product in the Philippines. *World Development*, 38(3), 333-344.
- [5] Assaad, R. and F. Roudi-Fahimi. (2007). Youth in the Middle East and North Africa: Demographic Opportunity or Challenge? MENA Policy Brief. Population Reference Bureau (PRB).
- [6] Assaad, R. and F. El-Hamidi. (2009). Women in the Egyptian Labor Market: An Analysis of Developments, 1988- 2006. In Ragui Assaad (Ed.), *The Egyptian Labor Market Revisited*, Cairo: American University in Cairo pp. 219-257.
- [7] Bandiera, O., Burgess, R., Goldstein, M., Buehren, N., Gulesci, S., Rasul, I., and Sulaiman, M. (2015). Women's empowerment in action: evidence from a randomized control trial in Africa, Mime.
- [8] Bandiera, O., Burgess, R., Das, N., Gulesci, S., Rasul, I., & Sulaiman, M. (2017). Labor markets and poverty in village economies. *The Quarterly Journal of Economics*, 132(2), 811-870.
- [9] Baldwin, W. (2011). Creating "safe spaces" for adolescent girls: promoting healthy,

safe, and productive transitions to adulthood. New York: Population Council brief No. 39.

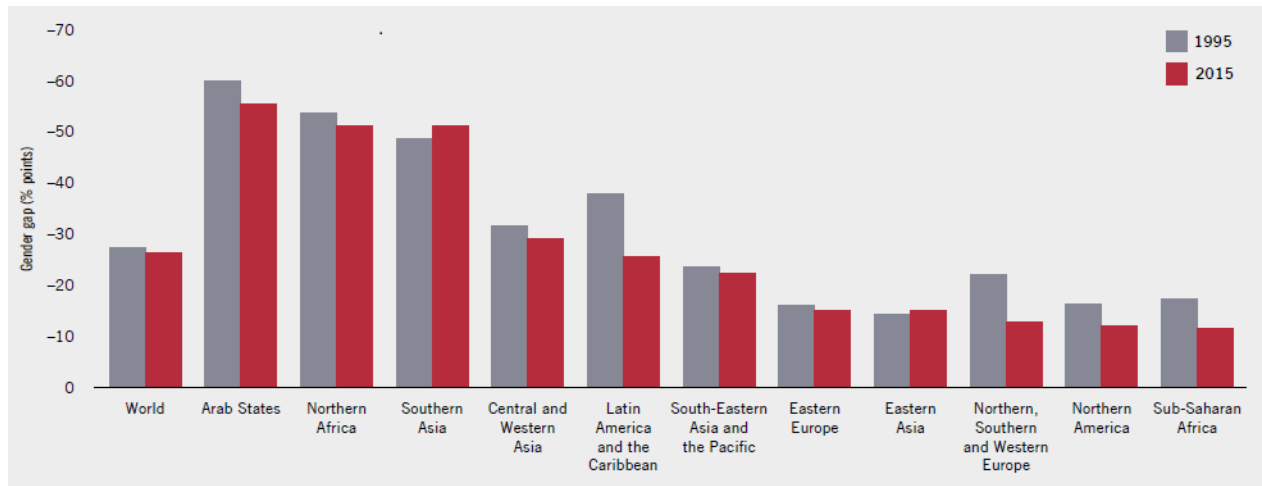
- [10] Beath, A., Christia, F., & Enikolopov, R. (2013). Empowering women through development aid: Evidence from a field experiment in Afghanistan. *American Political Science Review*, 107(3), 540-557.
- [11] Berge, L. I. O., Bjorvatn, K., & Tungodden, B. (2014). Human and financial capital for microenterprise development: Evidence from a field and lab experiment. *Management Science*, 61(4), 707-722.
- [12] Bifulco, R. (2012). Can Nonexperimental Estimates Replicate Estimates Based on Random Assignment in Evaluations of School Choice? A Within-Study Comparison. *Journal of Policy Analysis and Management*, 31(3), 729-751.
- [13] Chakravarty, A. (2015). Gender-Biased Breastfeeding in Egypt: Examining the Fertility Preference Hypotheses of Jayachandran and Kuziemko (2011). *Journal of Applied Econometrics*, 30(5), 848-855.
- [14] Chen, S., Mu, R., & Ravallion, M. (2009). Are there lasting impacts of aid to poor areas?. *Journal of Public Economics*, 93(3), 512-528.
- [15] Crump, R., Hotz, V. J., Imbens, G., & Mitnik, O. (2006). Moving the goalposts: Addressing limited overlap in the estimation of average treatment effects by changing the estimand. NBER No. 330, Cambridge.
- [16] Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *The Review of Economics and Statistics*, 84(1), 151-161.
- [17] De Mel, S., McKenzie, D., & Woodruff, C. (2008). Returns to capital in microenterprises: evidence from a field experiment. *The Quarterly Journal of Economics*, 123(4), 1329-1372.
- [18] De Mel, S., McKenzie, D., & Woodruff, C. (2008). Are Women More Credit Constrained? Experimental Evidence on Gender and Microenterprise Returns. *American Economic Journal: Applied Economics*, 1(3), 1-32.

- [19] De Mel, S., McKenzie, D., & Woodruff, C. (2014). Business training and female enterprise start-up, growth, and dynamics: Experimental evidence from Sri Lanka. *Journal of Development Economics*, 106, 199-210.
- [20] Emran, M. S., Morshed, A. K. M., & Stiglitz, J. E. (2011). Microfinance and missing markets. *Mimeo*.
- [21] Fafchamps, M., McKenzie, D., Quinn, S., & Woodruff, C. (2014). Microenterprise growth and the flypaper effect: Evidence from a randomized experiment in Ghana. *Journal of Development Economics*, 106, 211-226.
- [22] Field, E., Jayachandran, S., & Pande, R. (2010). Do traditional institutions constrain female entrepreneurship? A field experiment on business training in India. *The American Economic Review*, 100(2), 125-129.
- [23] Giné, X., & Mansuri, G. (2014). Money or ideas? A field experiment on constraints to entrepreneurship in rural Pakistan. *Mimeo*.
- [24] Groh, M., Krishnan, N., McKenzie, D., & Vishwanath, T. (2016). Do Wage Subsidies Provide a Stepping-Stone to Employment for Recent College Graduates? Evidence from a Randomized Experiment in Jordan. *The Review of Economics and Statistics*, 98(3), 488-502.
- [25] Groh, M., Krishnan, N., McKenzie, D., & Vishwanath, T. (2016). The impact of soft skills training on female youth employment: evidence from a randomized experiment in Jordan. *IZA Journal of Labor & Development*, 5(1), 9.
- [26] Heckman, J. J., Ichimura, H., & Todd, P. E. (1997). Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme. *The Review of Economic Studies*, 64(4), 605-654.
- [27] Heckman, J., Ichimura, H., Smith, J., & Todd, P. (1998). Characterizing selection bias using experimental data. NBER No. 6699.
- [28] Hirano, K., Imbens, G. W., & Ridder, G. (2003). Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica*, 71(4), 1161-1189.

- [29] ILO (2016). Women at Work: Trends 2016, International Labour Office?. ILO-Geneva.
- [30] Imbens, G. W., & Wooldridge, J. M. (2009). Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47(1), 5-86.
- [31] Jensen, R. (2012). Do labor market opportunities affect young women's work and family decisions? Experimental evidence from India. *The Quarterly Journal of Economics*, 127(2), 753-792.
- [32] Karlan, D., & Valdivia, M. (2011). Teaching entrepreneurship: Impact of business training on microfinance clients and institutions. *Review of Economics and statistics*, 93(2), 510-527.
- [33] Klinger, B., & Schündeln, M. (2011). Can entrepreneurial activity be taught? Quasi-experimental evidence from Central America. *World Development*, 39(9), 1592-1610.
- [34] Krafft, C. (2015). Increasing educational attainment in Egypt: The impact of early childhood care and education. *Economics of Education Review*, 46, 127-143.
- [35] Maitra, P., & Mani, S. (2017). Learning and earning: Evidence from a randomized evaluation in India. *Labour Economics*, 45, 116-130.
- [36] McKenzie, D., & Puerto, S. (2017). Growing Markets through Business Training for Female Entrepreneurs. IZA Discussion Paper 10615.
- [37] Majlesi, K. (2016). Labor market opportunities and women's decision making power within households. *Journal of Development Economics*, 119, 34-47.
- [38] Pitt, M. M., Khandker, S. R., & Cartwright, J. (2006). Empowering women with micro finance: Evidence from Bangladesh. *Economic Development and Cultural Change*, 54(4), 791-831.
- [39] Ramadan N., Abdel-Tawab N., El Sayed K., and Roushdy R. (2014). Enhancing livelihood opportunities for young women in rural Upper Egypt: the Neqdar Ne-sharek program. Population Council.

- [40] Roushdy, R., & Selwaness, I. (2015). Young people's labor market outcomes during a period of transition. Panel Survey of Young People in Egypt 2014: Generating Evidence for Policy, Programs and Research.
- [41] Roushdy, R., and Sieverding, M. (2015). Panel survey of young people in Egypt 2014: Generating evidence for policy, programs, and research. Cairo: Population Council.
- [42] Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.
- [43] Sieverding, M., & Elbadawy, A. (2016). Empowering adolescent girls in socially conservative settings: impacts and lessons learned from the Ishraq program in rural Upper Egypt. *Studies in family planning*, 47(2), 129-144.
- [44] Tuccio, M., & Wahba, J. (2015). Can I have permission to leave the house? Return migration and the transfer of gender norms. IZA Discussion Paper 9216.
- [45] Wooldridge. J. M. (2002) *Econometric Analysis of Cross Section and Panel Data*. MIT Press.
- [46] World Economic Forum (2016), *The Global Gender Gap Report 2016*.

Figure 1: Gender gaps in labor force participation rates by region, 1995 and 2015



Source: ILO (2016, p.7). The gender gap is measured as the difference between women's and men's labor force participation rates

Figure 2: Timeline of the Neqdae Nesharek project

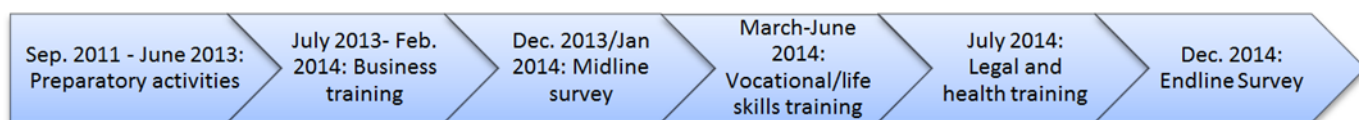


Figure 3: Design of the intervention

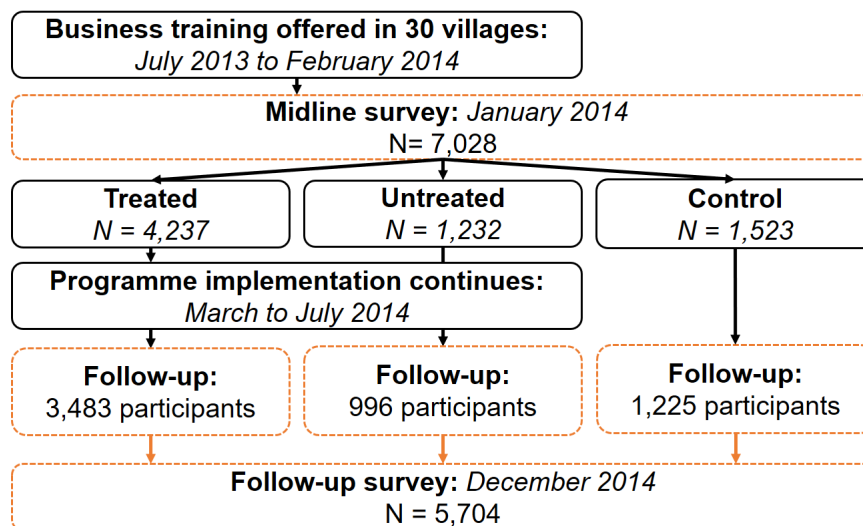
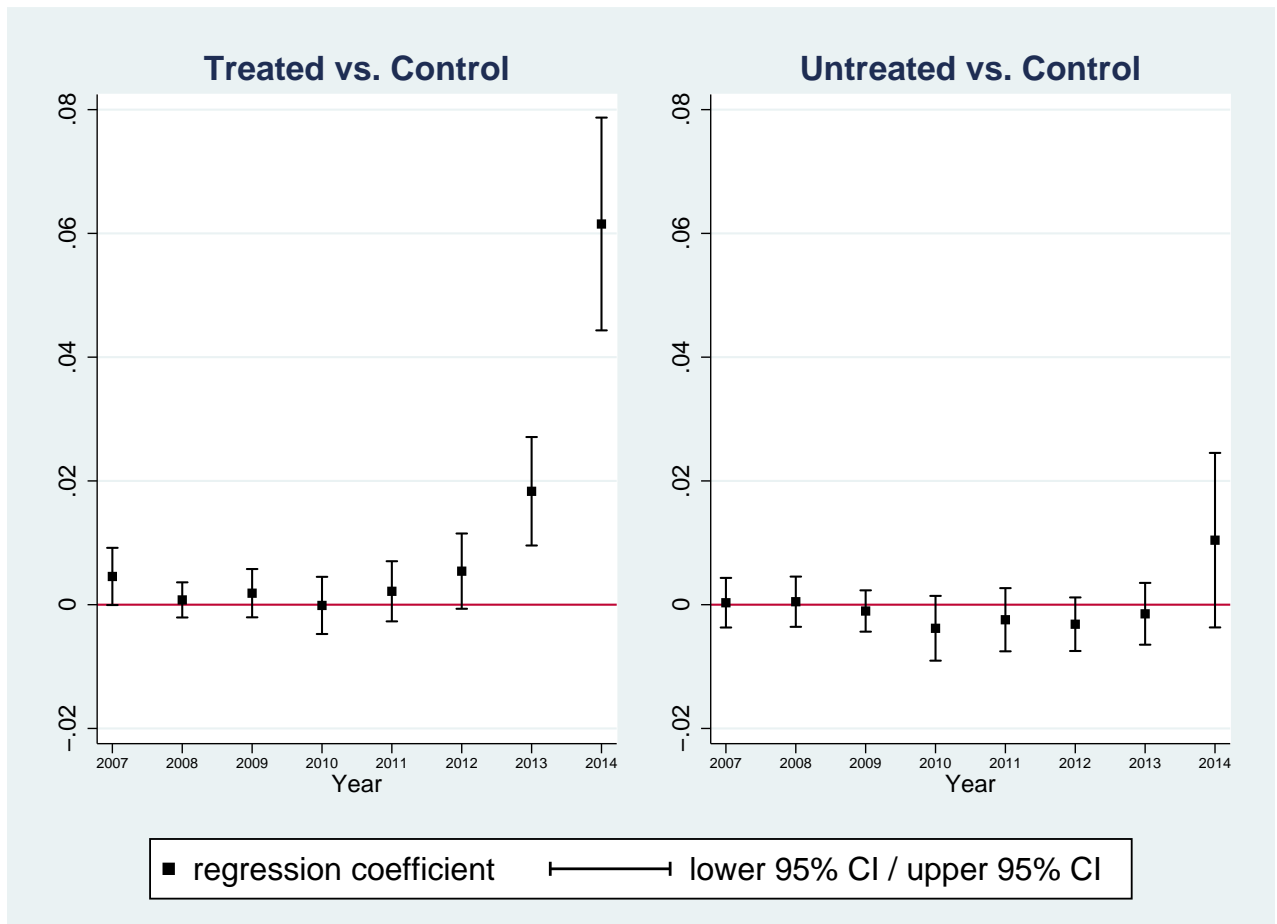


Figure 4: Difference in pre-trends in employment



Note: Based on separate regressions for each year, where the probability of work in this year is regressed on treatment dummy and pre-treatment characteristics with clustering at the village level

Table 1: Descriptive Statistics on Estimation Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NEQDAR villages		Control villages						
	Treated	Untreated		P value (1)=(2)	Normalized diff. (1) and (2)	P value (1)=(3)	Normalized diff. (1) and (3)	P value (2)=(3)	Normalized diff. (2) and (3)
Women empowerment									
Income-generating activity	0.13	0.06	0.06	0.00	0.06	0.00	0.06	0.93	-0.00
Waged work	0.08	0.03	0.04	0.00	0.05	0.00	0.05	0.26	-0.01
Self-employment	0.03	0.01	0.01	0.00	0.03	0.00	0.04	0.08	0.01
Business knowledge index	0.43	0.24	0.31	0.00	0.14	0.00	0.11	0.00	-0.04
Wishes to set up/continue a project	0.27	0.08	0.08	0.00	0.11	0.00	0.12	0.98	-0.00
Wishes to get employed	0.29	0.21	0.26	0.00	0.05	0.02	0.02	0.00	-0.02
Role of women index	0.39	0.40	0.44	0.17	-0.01	0.00	-0.07	0.00	-0.04
Decision-making power index	0.40	0.37	0.35	0.00	0.03	0.00	0.05	0.06	0.02
Background characteristics									
Currently enrolled in school	0.20	0.20	0.19	0.94	-0.00	0.92	0.00	0.98	0.00
Less than secondary education	0.57	0.52	0.50	0.01	0.02	0.00	0.04	0.22	0.01
Secondary education	0.38	0.41	0.42	0.06	-0.02	0.03	-0.02	0.87	-0.00
Above secondary education	0.05	0.06	0.09	0.11	-0.01	0.00	-0.04	0.05	-0.02
Age	22.37	22.00	21.86	0.29	0.01	0.04	0.02	0.24	0.00
Married	0.35	0.60	0.54	0.00	-0.13	0.00	-0.11	0.04	0.02
Number of children	0.71	1.02	0.87	0.00	-0.06	0.00	-0.04	0.01	0.03
Household size	5.26	4.45	4.47	0.00	0.10	0.00	0.11	0.56	-0.00
Father can read and write	0.16	0.24	0.25	0.00	-0.05	0.00	-0.06	0.49	-0.01
1st wealth quantile	0.22	0.17	0.18	0.00	0.03	0.00	0.03	0.27	-0.01
2nd wealth quantile	0.22	0.17	0.20	0.00	0.03	0.15	0.01	0.10	-0.02
3rd wealth quantile	0.18	0.20	0.23	0.09	-0.01	0.00	-0.03	0.14	-0.01
4th wealth quantile	0.19	0.22	0.19	0.01	-0.02	0.98	0.00	0.04	0.02
5th wealth quantile	0.19	0.23	0.20	0.00	-0.03	0.28	-0.01	0.04	0.02

Note: The table provides descriptive statistics from the mid-line survey on the balanced estimation sample. The normalized difference is computed following Imbens and Wooldridge (2009).

Table 2: The impact of the intervention on empowerment of women

VARIABLES	(1) Income-generating activity	(2) Waged work	(3) Self-employment	(4) Business knowledge index	(5) Wishes to set up/ continue a project	(6) Wishes to get employed	(7) Gender equality index	(8) Decision-making power index
Treated group x Follow-up round	0.044** (0.020)	0.003 (0.013)	0.029** (0.012)	0.062** (0.025)	0.098*** (0.032)	0.019 (0.043)	0.022 (0.021)	-0.011 (0.031)
Untreated group x Follow-up round	0.002 (0.016)	0.000 (0.010)	-0.004 (0.008)	0.026 (0.026)	0.046 (0.029)	0.030 (0.046)	0.016 (0.025)	0.014 (0.033)
Treated group	0.069*** (0.016)	0.038*** (0.011)	0.027*** (0.008)	0.130*** (0.022)	0.189*** (0.021)	0.027 (0.034)	-0.046** (0.019)	0.041* (0.021)
Untreated group	0.002 (0.016)	-0.003 (0.010)	0.002 (0.008)	-0.053*** (0.019)	-0.003 (0.020)	-0.030 (0.038)	-0.032 (0.021)	0.024 (0.021)
Follow-up round	-0.007 (0.013)	-0.002 (0.009)	0.004 (0.007)	0.120*** (0.021)	0.037 (0.024)	0.025 (0.039)	-0.024 (0.017)	-0.022 (0.027)
R-squared	0.086	0.076	0.050	0.270	0.105	0.050	0.014	0.106
Mean of outcome	.135	.079	.034	.432	.268	.295	.393	.401
Effect size %	33	3	86	14	36	7	6	-3
Sample size	11412	11412	11412	11412	11412	11412	11412	11412

Note: *** denotes significance at the 1%, ** 5% and * 10% levels. Standard errors are clustered by village. Control variables include a dummy variable for having secondary education or higher, age, age square, marital status, number of children, household size, a dummy variable that takes the value of one if the girl's father is educated, household wealth index, and region (markaz) FE.

Table 3: PSM estimates of the impact of the intervention on the empowerment of women

	PS-weighted DD		Kernel matched DD	
	Untrimmed sample	Trimmed sample	Untrimmed sample	Trimmed sample
A) Main effect				
Income-generating activity	0.047*** (0.011)	0.047*** (0.013)	0.043*** (0.011)	0.043*** (0.012)
Waged work	0.000 (0.007)	0.001 (0.009)	0.002 (0.008)	-0.001 (0.008)
Self-employment	0.032*** (0.007)	0.031*** (0.008)	0.031*** (0.007)	0.029*** (0.007)
Business knowledge	0.105*** (0.022)	0.108*** (0.023)	0.088*** (0.012)	0.088*** (0.012)
Wishes to set up a project	0.088*** (0.017)	0.080*** (0.018)	0.092*** (0.017)	0.096*** (0.018)
Wishes to get employed	0.145 (0.164)	-0.156 (0.166)	0.007 (0.021)	0.003 (0.023)
Gender equality index	-0.005 (0.01)	-0.006 (0.01)	0.003 (0.01)	0.001 (0.01)
Decision-making power index	0.029 (0.025)	0.022 (0.028)	0.006 (0.014)	-0.001 (0.014)
B) Spillover effect				
Income-generating activity	0.003 (0.011)	-0.001 (0.012)	0.000 (0.010)	0.000 (0.010)
Waged work	0.000 (0.008)	-0.002 (0.007)	0.001 (0.008)	0.001 (0.009)
Self-employment	0.006 (0.007)	-0.006 (0.007)	0.007 (0.005)	-0.005 (0.006)
Business knowledge	0.025 (0.015)	0.020 (0.015)	0.017 (0.016)	0.018 (0.017)
Wishest to set up a project	0.031 (0.019)	0.028 (0.018)	0.026 (0.016)	0.025 (0.016)
Wishes to get employed	0.045 (0.034)	0.038 (0.026)	0.040 (0.029)	0.048 (0.037)
Gender equality index	0.001 (0.010)	0.006 (0.012)	-0.002 (0.010)	0.000 (0.009)
Decision-making power index	0.024 (0.015)	0.028* (0.017)	0.020 (0.022)	0.018 (0.023)

Note: *** denotes significance at the 1%, ** 5%, and * 10% levels. Standard errors are clustered by village. Control variables include a dummy variable for having secondary education or higher, age, age square, marital status, number of children, household size, a dummy variable that takes the value of one if the girl's father is educated, household wealth index and region FE. Similar to Crump et al. (2007) and Chen et al. (2009), a trimmed sample is calculated based on a common support interval between 0.1 and 0.9.

Table 4: Heterogeneity of the impact of the intervention on empowerment of women

VARIABLES	(1) Income-generating activity	(2) Waged work	(3) Self-employment	(4) Business knowledge index	(5) Wishes to set up/ continue a project	(6) Wishes to get employed	(7) Gender equality index	(8) Decision-making power index
Age								
Young (21 or below)	0.029* (0.017)	0.005 (0.011)	0.017* (0.009)	0.072*** (0.025)	0.056* (0.029)	-0.011 (0.046)	0.018 (0.023)	0.001 (0.029)
Old (above 21)	0.061** (0.029)	-0.001 (0.019)	0.044** (0.018)	0.051* (0.027)	0.137*** (0.045)	0.050 (0.052)	0.025 (0.022)	-0.025 (0.039)
Education								
Low education (below sec.)	0.028 (0.019)	-0.007 (0.011)	0.021** (0.010)	0.082** (0.041)	0.095*** (0.026)	0.016 (0.048)	0.003 (0.022)	0.008 (0.042)
High education (secondary or above)	0.060** (0.029)	0.011 (0.022)	0.039** (0.016)	0.049 (0.039)	0.094** (0.045)	0.024 (0.049)	0.006 (0.025)	-0.006 (0.034)
Wealth								
Below median wealth	0.051* (0.026)	-0.002 (0.016)	0.037*** (0.014)	0.065 (0.042)	0.101*** (0.037)	0.045 (0.053)	0.004 (0.025)	-0.020 (0.040)
Above median wealth	0.036* (0.020)	0.004 (0.014)	0.021 (0.013)	0.072* (0.036)	0.089** (0.037)	-0.004 (0.044)	0.004 (0.021)	0.024 (0.037)
Marriage								
Unmarried	0.032 (0.026)	-0.005 (0.017)	0.028*** (0.010)	0.097*** (0.035)	0.101*** (0.035)	-0.001 (0.037)	0.009 (0.022)	0.004 (0.036)
Married	0.073** (0.030)	0.007 (0.015)	0.045** (0.020)	0.042 (0.049)	0.092** (0.043)	0.024 (0.054)	-0.006 (0.023)	-0.019 (0.040)
Children								
No children	0.038 (0.028)	0.017 (0.025)	-0.004 (0.013)	0.018 (0.035)	0.180*** (0.057)	-0.069 (0.066)	-0.027 (0.045)	0.019 (0.053)
Children	0.087** (0.033)	0.010 (0.018)	0.055** (0.023)	0.039 (0.033)	0.068 (0.048)	0.046 (0.062)	-0.002 (0.023)	-0.044 (0.036)
Share of daughters								
Low share of daughters	0.060 (0.040)	0.010 (0.022)	0.039 (0.028)	0.029 (0.038)	0.072 (0.056)	0.049 (0.062)	0.052* (0.028)	-0.023 (0.040)
High share of daughters	0.109*** (0.037)	0.009 (0.021)	0.069*** (0.025)	0.045 (0.031)	0.069 (0.054)	0.046 (0.082)	0.024 (0.024)	-0.061 (0.037)
Gender equality index								
Below median att	0.042** (0.019)	0.003 (0.015)	0.027* (0.013)	0.082* (0.041)	0.109*** (0.033)	0.023 (0.046)	- (0.041)	-0.003 (0.039)
Above median att	0.055* (0.030)	0.001 (0.014)	0.037*** (0.013)	0.051 (0.040)	0.080 (0.049)	0.035 (0.057)	- (0.042)	0.009 (0.042)
Decision-making								
Below median empower	0.029 (0.024)	0.004 (0.015)	0.027** (0.011)	0.107** (0.040)	0.064 (0.050)	0.131* (0.075)	-0.005 (0.020)	- (0.039)
Above median empower	0.054** (0.022)	0.001 (0.015)	0.030* (0.015)	0.048 (0.044)	0.113*** (0.031)	-0.054 (0.032)	0.012 (0.028)	- (0.039)

Note: Simple DD estimates from Equation (1). *** denotes significance at the 1%, ** 5%, and * 10% levels. Standard errors are clustered by village. Control variables include a dummy variable for having secondary education or higher, age, age square, marital status, number of children, household size, a dummy variable that takes the value of one if the girl's father is educated, household wealth index, and region (markaz) FE.

Appendix A

Table A1: Treated and control village characteristics

	Treated villages		Control villages		P value
	Mean	SD	Mean	SD	
Population size of the village	16,817.07	7,799.97	16,065.27	6,212.51	0.75
Number of women in the age group 15-29	2,504.20	1,138.64	2,854.80	1,282.33	0.36
Household size	4.71	0.44	4.77	0.69	0.70
Female labor force participation	6.92	3.39	7.34	5.82	0.76
Unemployment rate among men	7.00	5.56	7.02	4.12	0.99
Share of HH with the head employed in agriculture sector	0.45	0.09	0.43	0.08	0.58
Share of illiterate women	27.92	5.62	24.13	7.75	0.07
Compulsory school enrollment rate among women	0.71	0.18	0.72	0.16	0.92
Share of illiterate HH heads	0.66	0.11	0.66	0.13	0.99
Share of HH with access to electricity	98.45	1.34	98.92	0.50	0.20
Share of HH connected to public water network	69.61	22.63	68.02	22.00	0.82
Share of HH with private kitchen	0.36	0.22	0.32	0.21	0.57
Share of HH with private toilet	0.26	0.12	0.29	0.10	0.30
Number of villages	30		15		

Source: The table provides descriptive statistics for the treated and control villages from the 2006 census

Table A2: Items of Business knowledge

-
- What are the procedures required for registering a small business?
 - What are the procedures required for obtaining a loan for a small enterprise?
 - Are buildings, equipment, and machinery considered among the fixed or variable assets of the project?
 - What is the primary goal of the market analysis?
 - What are the main three components of feasibility study?
 - What is the goal of the financial study?
-

Note: Women were asked to give a correct answer to each of these statements. A complete correct answer to each question takes the value of one. If the answer is wrong, incomplete, or the respondent does not know, the statement takes the value of zero. The unweighted average is calculated and rescaled from 0 to 1.

Table A3: Items of the gender equality index

-
- The place of a woman should not only be the house, she should be allowed to work
 - Female education should be to get jobs, not only to become good wives/mothers
 - Female work doesn't contradict the ability to build a good relationship with one's husband
 - Boys and girls should receive the same level of education
 - Women could get leadership positions in society
 - A husband should help the working wife with housework and taking care of children
 - Women should have a say in house expenditure
 - Woman can go out in nearby areas without their husband's permission
 - When working opportunities are few, men should have priority, regardless of qualifications
-

Note: Women were asked if they agree or disagree with each of the statements. The unweighted average is calculated and rescaled from 0 to 1.

Table A4: Items of the decision-making index

I will tell you some life decisions that you may experience and tell me who makes them:

- Becoming employed or starting a business project
- Choosing your household chores
- Choosing how to spend your leisure time
- Spending your income from work
- Going to a doctor/health unit
- Buying clothes for yourself
- Spending your saved money

Note: Choices given are: me alone, me with my partner (or family, if unmarried), my partner (or family, if unmarried alone), or other. Women are assigned the value of one if they make the decision on their own, and zero otherwise. The unweighted average of the seven statements is calculated and rescaled from 0 to 1.

Table A5: Descriptive Statistics for those attrited and those who remained in the follow-up wave

	Mean remained	SD remained	Mean dropped	SD dropped	P value
Treatment groups					
Treated	0.611	0.488	0.599	0.490	0.438
Untreated	0.175	0.380	0.177	0.382	0.825
Control	0.215	0.411	0.224	0.417	0.475
Women empowerment					
Income-generating activity	0.106	0.308	0.135	0.342	0.002
Waged work	0.062	0.241	0.085	0.279	0.002
Self-employment	0.024	0.154	0.020	0.141	0.375
Business knowledge index	0.371	0.284	0.382	0.281	0.222
Wishes to set up/continue a project	0.195	0.396	0.179	0.383	0.166
Wishes to get employed	0.273	0.446	0.285	0.451	0.409
Role of women index	0.404	0.192	0.401	0.186	0.623
Decision-making power index	0.384	0.256	0.381	0.257	0.655
Background characteristics					
Less than secondary education	0.543	0.498	0.560	0.497	0.259
Secondary education	0.396	0.489	0.369	0.483	0.068
Above secondary education	0.061	0.240	0.071	0.257	0.179
Age	22.200	7.139	22.691	10.632	0.042
Married	0.434	0.496	0.371	0.483	0.000
Number of children	0.797	1.236	0.658	1.171	0.000
Household size	4.947	1.945	5.013	1.997	0.268
Father can read and write	0.192	0.394	0.161	0.367	0.009
1st wealth quantile	0.204	0.403	0.219	0.414	0.214
2nd wealth quantile	0.205	0.404	0.221	0.415	0.212
3rd wealth quantile	0.193	0.394	0.182	0.386	0.358
4th wealth quantile	0.198	0.399	0.194	0.395	0.694
5th wealth quantile	0.200	0.400	0.185	0.388	0.215

Source: The table provides descriptive statistics for the attrition.

Table A6: Participation in NEQDAR program

Variable	Mean
Attended at least one business session	0.94 (0.25)
Attended at least half of business sessions	0.68 (0.47)
Attended all business sessions	0.18 (0.39)
Attended vocational training sessions	0.74 (0.44)
Attended life skills training sessions	0.61 (0.49)
Number of observations	2,919

Note: Detailed data on beneficiaries' attendance were available for business trainings. For vocational and life skills trainings, only data on whether the participant attended at least one session are available.

Table A7: Descriptive Statistics on the whole Sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	NEQDAR villages Treated	villages Untreated	Control villages	P value (1)=(2)	Normalized diff. (1) and (2)	P value (1)=(3)	Normalized diff. (1) and (3)	P value (2)=(3)	Normalized diff. (2) and (3)
Women empowerment									
Income-generating activity	0.15	0.06	0.06	0.00	0.07	0.00	0.08	0.21	0.01
Waged work	0.09	0.03	0.04	0.00	0.06	0.00	0.06	0.68	-0.00
Self-employment	0.03	0.01	0.01	0.00	0.03	0.00	0.04	0.05	0.00
Business knowledge index	0.43	0.24	0.31	0.00	0.15	0.00	0.12	0.00	-0.04
Wishes to set up/continue a project	0.27	0.08	0.07	0.00	0.11	0.00	0.13	0.38	0.00
Wishes to get employed	0.29	0.22	0.28	0.00	0.04	0.16	0.01	0.00	-0.03
Role of women index	0.39	0.40	0.44	0.33	-0.01	0.00	-0.07	0.00	-0.05
Decision-making power index	0.40	0.37	0.35	0.00	0.03	0.00	0.05	0.05	0.02
Background characteristics									
Currently enrolled in school	0.20	0.20	0.19	0.94	-0.00	0.92	0.00	0.98	0.00
Less than secondary education	0.57	0.52	0.50	0.01	0.02	0.00	0.04	0.22	0.01
Secondary education	0.38	0.41	0.42	0.06	-0.02	0.03	-0.02	0.87	-0.00
Above secondary education	0.05	0.06	0.09	0.11	-0.01	0.00	-0.04	0.05	-0.02
Age	22.37	22.00	21.86	0.29	0.01	0.04	0.02	0.24	0.00
Married	0.35	0.60	0.54	0.00	-0.12	0.00	-0.10	0.04	0.02
Number of children	0.71	1.02	0.87	0.00	-0.06	0.00	-0.03	0.01	0.03
Household size	5.26	4.45	4.47	0.00	0.10	0.00	0.10	0.56	-0.00
Father can read and write	0.16	0.24	0.25	0.00	-0.05	0.00	-0.06	0.49	-0.01
1st wealth quantile	0.22	0.17	0.18	0.00	0.03	0.00	0.02	0.27	-0.01
2nd wealth quantile	0.22	0.17	0.20	0.00	0.03	0.15	0.01	0.10	-0.01
3rd wealth quantile	0.18	0.20	0.23	0.09	-0.01	0.00	-0.03	0.14	-0.01
4th wealth quantile	0.19	0.22	0.19	0.01	-0.02	0.98	0.00	0.04	0.02
5th wealth quantile	0.19	0.23	0.20	0.00	-0.03	0.28	-0.01	0.04	0.02

Note: The table provides descriptive statistics from the mid-line survey on the balanced estimation sample. The normalized difference is computed following Imbens and Wooldridge (2009).

Table A8: The impact of the intervention on the empowerment of women, individual FE model

VARIABLES	(1) Income-generating activity	(2) Waged work	(3) Self-employment	(4) Business knowledge index	(5) Wishes to set up/ continue a project	(6) Wishes to get employed	(7) Gender equality index	(8) Decision-making power index
Treated group x Follow-up round	0.042** (0.020)	-0.000 (0.013)	0.030** (0.011)	0.058** (0.024)	0.102*** (0.031)	0.016 (0.043)	0.022 (0.021)	-0.014 (0.031)
Untreated group x Follow-up round	0.003 (0.016)	0.000 (0.010)	-0.003 (0.008)	0.022 (0.025)	0.047 (0.029)	0.026 (0.046)	0.015 (0.025)	0.014 (0.033)
Follow-up round	-0.001 (0.013)	0.001 (0.009)	0.007 (0.007)	0.126*** (0.020)	0.038 (0.024)	0.025 (0.040)	-0.023 (0.017)	-0.019 (0.027)
R-squared	0.014	0.009	0.017	0.305	0.052	0.008	0.009	0.017
Number of indid	5,704	5,704	5,704	5,704	5,704	5,704	5,704	5,704
Mean of outcome	.135	.079	.034	.432	.268	.295	.393	.401
Effect size %	31	0	87	13	38	6	5	-4
Sample size	11412	11412	11412	11412	11412	11412	11412	11412

Note: *** denotes significance at the 1%, ** 5% and * 10% levels. Standard errors are clustered by village. Control variables include a dummy variable for having secondary education or higher, age, age square, marital status, number of children, household size, a dummy variable that takes the value of one if the girl's father is educated, household wealth index, and region (markaz) FE.

Table A9: Probit regression of girl participation in the NEQDAR program using baseline covariates

VARIABLES	(1) Treated	(2) Untreated
Age	0.029*** (0.003)	-0.000 (0.004)
Married	-0.576*** (0.053)	0.102 (0.072)
Number of children	0.031 (0.020)	0.032 (0.025)
Household size	0.067*** (0.009)	0.010 (0.014)
Father can read and write	-0.173*** (0.035)	-0.061 (0.044)
Education		
Less than secondary education	Reference	Reference
Secondary education	-0.073** (0.031)	-0.056 (0.040)
Above secondary education	0.336*** (0.058)	-0.208*** (0.075)
Region		
Region 1: Qena	Reference	Reference
Region 2: Fayoum	0.183*** (0.035)	-0.055 (0.043)
Region 3: Suhag	0.016 (0.034)	-0.252*** (0.046)
Wealth quantiles		
Wealth quantile 1	Reference	Reference
Wealth quantile 2	-0.006 (0.043)	0.016 (0.060)
Wealth quantile 3	-0.178*** (0.043)	0.005 (0.058)
Wealth quantile 4	0.008 (0.044)	0.177*** (0.058)
Wealth quantile 5	-0.024 (0.044)	0.206*** (0.059)

Note: *** denotes significance at the 1%, ** 5% and * 10% levels. Standard errors are clustered by village.

Table A10: Impact of NEQDAR on schooling outcomes

VARIABLES	(1) Currently enrolled in school	(2) Spends time daily on homework and study
Treated group x Follow-up round	0.010 (0.021)	0.057 (0.091)
Untreated group x Follow-up round	-0.025 (0.025)	0.127 (0.104)
Treated group	-0.042** (0.018)	-0.025 (0.068)
Untreated group	0.021 (0.020)	-0.041 (0.070)
Follow-up round	-0.036* (0.019)	-0.025 (0.086)
R-squared	0.175	0.041
Sample size	11,412	1,963

Note: *** denotes significance at the 1%, ** 5%, and * 10% levels. Standard errors are clustered by village