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Keywords

Morocco, gender, women's empowerment, income-generating projects, impact evaluation, decision-making, bargaining, resources, observational data, instrumental variables, propensity score matching

Disciplines

Business | Entrepreneurial and Small Business Operations | International Business | Labor Relations | Management Sciences and Quantitative Methods | Nonprofit Administration and Management

Comments

Income-generating projects are used as a tool of engendered development in developing economies. This paper uses primary data from rural Morocco to investigate whether income-generating projects have an impact on the five dimensions of women's empowerment identified: economic decision-making, child decision-making, mobility, access to resources, and control over resources. The paper uses Instrumental Variable (IV) and Propensity Score Matching (PSM) methods to address the endogeneity and selection on observables issues that may arise in this enquiry. IV and PSM methods estimate a 39.63% and 14.21% significant increase in total empowerment respectively.

Measuring the impact of income-generating projects on women's empowerment outcomes: Evidence from Rural Morocco¹

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May 2, 2014

Abstract

Income-generating projects are used as a tool of engendered development in developing economies. This paper uses primary data from rural Morocco to investigate whether income-generating projects have an impact on the five dimensions of women's empowerment identified: economic decision-making, child decision-making, mobility, access to resources, and control over resources. The paper uses Instrumental Variable (IV) and Propensity Score Matching (PSM) methods to address the endogeneity and selection on observables issues that may arise in this enquiry. IV and PSM methods estimate a 39.63% and 14.21% significant increase in total empowerment respectively.

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Disciplines: Public Responsibility, Entrepreneurial and Small Business Operations, International Business, Labor Relations, Management Sciences and Quantitative Methods, Nonprofit Administration and Management

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I. Motivation

Women's empowerment is increasingly perceived as one of the key elements in poverty reduction strategies and attempts across the world. Empowerment allows individuals to reach their full potential, and to allow them to reach their own capabilities. Gender empowerment has significant implications for the rest of the household. Empirically, empowered women appear to have fewer children and higher child survival rates (Rosenzweig and Schultz, 1982; Dyson and Moore, 1983), healthier and better-fed children (Lundberg, Pollak and Wales, 1997; Kanbur and Haddad, 1994), and a generally greater allocation of resources to children (Thomas, 1990). Theoretically, the question of women's empowerment has consistently experienced a tension between structure and agency. It is difficult to capture women's empowerment within a generation because it is driven by not only informational efficiency about the range of choices that a woman has, but also about what Kabeer (1994) has defined as the "power within." This is a woman's intrinsic belief in her ability to control resources and to make decisions.

The World Bank sees women's empowerment as a means of promoting growth, reducing poverty, and promoting better governance – in addition to being an objective within itself. In 1994, the International Conference on Population and Development identified "women's empowerment and gender equity" as factors that are critical to sustainable development. We continue to refine our definitions and answers, but the same question remains, even 10 years later – what empowers women? And how does their empowerment manifest itself?

There is no shortage of development programs with the explicit goal of gender empowerment. Development programs attempt to empower women by increasing their access to credit, contraceptives and education. Microfinance, as an institution, has often attempted to address the structures that inhibit engendered development. The effectiveness of microfinance programs continues to be debated, as many evaluations do not provide conclusive results. Female targeting could be a cost-effective strategy for microfinance institutions, and also effective in its ability to address poverty. However, this requires that adequate support networks and empowerment strategies are able to diffuse the complete burden of household debt and subsistence onto women.

In order to overcome the limitations associated with microfinance, instead, I explore the role that income-generating projects – economically sustainable activities – have on the empowerment of women in rural Morocco. This moves away from capturing what could be debt dependency and disempowerment. I use primary data from rural Morocco to examine the impact of income-generating projects supported by non-profit associations working on female empowerment outcomes. The income-generating projects aim to empower women by economically uplifting the women. I measure empowerment using (i) economic decision-making, (ii) child decision-making, (iii) mobility, (iv) access to resources, and (v) control over resources. These variables represent a variety of dimensions in which engaging with income-generating projects can empower women domestically, socially, and of course, economically.

I investigate this question through a quasi-experimental, observational framework. In doing so, I address some sources of bias that may arise. I anticipate selection on observable and endogeneity of treatment (the woman's choice of whether to engage in an income-generating project). Using instrumental variables and propensity score matching, I compare pre-determined levels of empowerment and empowerment outcomes, to establish that even after controlling for the pre-determined level of empowerment, income-generating projects have an impact on the dimensions of empowerment considered. Some of the questions I attempt to address include, but are not limited, to the following:

1. What is the impact of income-generating projects on women's empowerment in rural Morocco?
2. Is this impact uniform across all the domains of household decisions?
3. Can a relationship of causality be established?

Using both approaches, we find a positive, significant treatment effect on women's empowerment outcomes. Instrumentation demonstrates that women who engage in income-generating projects are more empowered overall, in addition to being empowered in the following dimensions: economic decision-making, mobility, access to resources, and control over resources. These results are qualitatively similar to the PSM effects estimated, and suggests that our instrument adequately controls for sample selection.

This paper contributes to the literature in several ways. Empirically, this is the first independent, econometric assessment of the relationship between income-generating projects and women's empowerment in the context of rural Morocco. It is also the first to provide robust estimates of the impact of treatment. Methodologically, this paper is an attempt to challenge the notion that cross-sectional data from a non-randomized experimental framework cannot be used to make statements of inference on the impact of income-generating projects.

The rest of the paper is structured as follows. Section II lays out the motivating theoretical framework. Section III outlines the testing strategy. Section IV details the data used. Section V discusses the estimation results. Section VI concludes and offers policy implications.

II. Motivating Theoretical Framework

A. Economic Development and Women's Empowerment

The subject of defining empowerment has never been free of controversy or difficulty. Many scholars indicate that empowerment is a "latent phenomenon," meaning that it is not directly observable (Narayan-Parker, 2005). Its aggregate actions or results may be observed, but its internal dynamism is much more difficult to examine and evaluate. It also raises the need to address what it means to transition from disempowerment to empowerment. Scholars have gone on to define women's empowerment as improving the ability of women to access the constituents of development— in particular health, education, earning opportunities, rights, and political participation (Duflo, 2012). Gender empowerment has also been defined as the process by which those who have been denied the ability to make strategic life choices acquire such an ability (Kabeer, 1991). The ability to choose incorporates three inter-related dimensions: resources, agency, and achievements (Kabeer, 1999). This conceptualization of empowerment highlights the interdependence of individual and structural change in the processes of empowerment. Structures shape individual resources, agency, and achievements. Economic agendas set the structures that ultimately end up shaping the empowerment of individuals. The development priorities of nations are ultimately set by governments and the larger global community. Economic development, by in large, has been defined as a multi-dimensional process that involves changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of poverty (Todaro and Smith, 2011).

During the 1950s and early 1960s, the prevailing development strategy, as part of the modernization model, regarded economic growth as the main development objective. Traditional economic development theories promote the idea that poverty is rooted primarily in deficient savings, and this, foreign aid should be able to remedy this ailment. However, most aid has been distributed in a top-down development approach system. Aid money passes through a complex system involving a chain of agencies, with resources being wasted at

each level. After some years, it became more apparent that the expected trickle-down effect from the investment projects to the majority of those at the base of the pyramid (Prahalad, 2009) did not occur. As the Green Revolution unfolded in the 1970s witness a surge in government-directed credit programs to rural programs. In 1980s, the development strategy of redistribution and basic human needs was replaced by the Structural Adjustment Policies (SAP). The strategy of subsidized credit provision in rural areas was replaced by a more market-based approach, where the private sector took charge of credit provision.

This gradually set the stage for microfinance to emerge as a tool of economic development and poverty alleviation. The presumption is that microfinance will significantly increase women's incomes, enable them to play a more critical role in the decisions of their household. Randomized evaluations have been conducted to evaluate the impact of microfinance in developing nations, such as India, but no discernible changes in women's empowerment outcomes were observed after both 18 and 36 months (Banerjee, Duflo, Glennerster, Kinnan, 2014). This defies the conventional image of the role of microfinance in the life of the poor. The literature has pointed to this result since 1996. Evidence from Bangladesh has also suggested that credit taken by women may be used by the male household head instead, with women having very little control over their own investments (Goetz and Sen Gupta, 1996). This is in line with the phenomena that researchers have identified as the "feminization" of debt (Mayoux, 2001). In the absence of support networks and empowerment strategies, female credit targeting could merely shift the burden of household debt and subsistence onto women. This has serious implications not only for women themselves, but also for children and the role of men in the household and society.

This prompts us to rethink the role of microfinance in economic development. In fact, there has been a dearth of literature assessing the underlying mechanism that explains how microfinance impacts entrepreneurial activity. This study attempts to address this deficiency in the literature. We explore the role that income-generating projects have in empowering women in rural Morocco. Income-generating projects are often initiatives adopted by small scale enterprises (SSEs). Small and informal firms have been found to be the source of employment for half or more of the labor force in most developing countries. As large-scale enterprises become incapable of providing large shares of employment in developing countries, employment by SSEs becomes all the more important. Scholars suggest that the importance of small-scale enterprise in rural contexts increases as the size of locality decreases (Overholt, 1984). For women, SSEs offer opportunities to earn income without the restrictions that come with employment in larger enterprises, which may require education, training, and experience that women may not necessarily have.

Two schools of thought exist on supporting active policies to promote women's empowerment. The first suggests that women's empowerment is valuable in and of itself, and worth the cost that it implies. The second rationale suggests that women have a fundamental role to play in development. It is thought that not only is it equitable to reduce the gender gap in education, political participation, and employment opportunities, but it is also beneficial in its ability to induce positive societal outcomes (Duflo, 2012). This would explain why many developmental efforts have specifically targeted women, in terms of microcredit schemes and conditional cash transfer programs. This is to suggest that women's empowerment induces economic development. Economic development has a primary role to play in narrowing the gap between men and woman – an issue that hinders development itself (Sen, 1987).

The literature approaches the role of women in development by first examining the role that they play in the household. An analysis of decision-making power within a household is necessary as households are often sites of distributional inequality. Scholars suggest that bargaining power comprises a wide range of factors, some of which are quantifiable, and others which are less so (Agrawal, 1997). Bargaining power models

allow for an analysis of the importance of gender in decision-making. Based on the intra-household bargaining literature (Browning and Chiappori, 1998, Duflo, 2003, Blumberg, 2005), economic factors are identified as an important factor for empowering women. Bargaining power can be measured by an individual's resources: their labor and non-labor income, transfer payments, (paid) labor supply, and assets. Educational attainment may also be considered as a resource that contributes to bargaining power. Others consider the number of children a woman has to be a measure of a women's bargaining power (Osmani, 2007).

There has also been a theoretical demonstration that income needs to only be generated by women, but also in their control, to impact their bargaining power in the household (Anderson and Eswaran, 2005). This is also supported by the finding that cash transfers that are made to women only do not automatically translate into an increase in their bargaining power (Kabeer 2005, Malhotra and Mather 1997). This arises from the cultural and social constraints imposed on women's autonomy, or personal accumulation of resources. Increases in the value of female time and monetary time have been postulated to result in higher bargaining power, access to economic opportunities, and greater participation in household decision-making. This induces a greater investment in education, nutrition, and housing for children (Duflo, 2003). In the literature, it is assumed that by increasing the relative value of female time and her money income, the weight and hence the bargaining power of the female members can be increased within the household. This weight could be thought of as one index of women's empowerment as it is reflective of a woman's power within the household.

B. Economic Conceptualization of Household Decision-Making

Neoclassical models of intra-household distribution put forth the unitary household decision-making model, which assumes that family members act as if they maximize a single utility function. The consensus model was the first model to ignore intra-household differences in preferences (Samuelson, 1956). Later, a household model was developed in which the head of the household – the patriarch – aggregates the preferences of individuals to form one joint utility function and sets out to maximize it. Both theories ignore the potential for unequal power and resource distribution within households. There has been a move towards the methodological argument that suggests individuals, not households, have heterogeneous preferences and utility functions (Cherchye et al., 2005).

Economists have transitioned to non-unitary models that conceptualize bargaining power models. These models are more commonly referred to as collective household models. They interpret the intra-household allocation of power as an outcome of bargaining processes among household members. Conceptualizations of asymmetric intra-household bargaining power theories appear in the literature in the 1980s (Manser and Brown 1980, and McElroy and Horney 1981).

Within our theoretical framework, we utilize the collective household model to allow the representation of individual behavior within the household. In collective models, choices are derived by assuming Pareto-optimality of allocations, and single a priori assumption defines the collective rationality concept used. If the behavior in the household is Pareto efficient, the household's objective function takes the form of a weighted sum of individual utilities, as can be seen in (1):

$$(1) \quad \Omega = \theta u_1(x) + (1 - \theta) u_2(x)$$

where $\theta \in (0,1)$ stands for the relative power of the female compared to male partner in the household decision making process; $u_1(x)$ captures the preferences of the female over a bundle of consumption goods 'x', and $u_2(x)$ are the male preferences over the same consumption bundle.

Montgomery and Casterline (1996) argue that women face an optimization problem in which she chooses a course of action c in order to maximize her expected utility. Let $\{c_1, \dots, c_N\}$ be the set which represents the universe of choices that a woman could potentially make. Let $\{c_1, \dots, c_K\}$ be the set which represents the universe of choices that a woman is aware of as being available to her ($K \leq N$). We assume that a woman arrives at her choices as a result of her household bargaining, leading to one of several possible outcomes (indexed by j). Each outcome is associated a woman's empowerment, Y_j . Let $P(Y_j | c, I)$ be the probability of the woman experiencing the vector of determinants Y_j , which is conditional on the choice made by her, c , and her information set, I . The vector Y_j represents the outcome of the woman's household bargaining. Thus, this framework is fully compatible with the standard Nash bargaining framework.

Consider a woman who chooses to start her own income-generating project through bargaining. This represents her choice, c_j . This decision affects the amount of household income she is able to control, Y_j , which is an outcome of her household bargain. The impact of the bargaining outcome on her individual utility, and ultimately her empowerment, is denoted by $U(Y_j)$.

The woman's expected utility maximization problem is denoted by (2):

$$(2) \quad \max_{c \in (c_1, \dots, c_k)} \sum_j U(Y_j) P(Y_j | c, I)$$

The woman's information set is composed of the following in (3):

$$(3) \quad I = (p_t, q_t, E(p_{t+1}), E(q_{t+1}), E(Y_{t+1}|c), \Sigma^2, Z)$$

p_t and q_t are known current prices and quantities of goods and services consumed by the woman. We presume that future price and quantities are $E(p_{t+1})$ and $E(q_{t+1})$. The expected future vector of empowerment dimensions, $E(Y_{t+1}|c)$, have associated variances Σ^2 . Z is the vector of remaining costs and constraints that are not captured by the model's specification.

By engaging in entrepreneurial activities, women improve their household bargaining position and increase expected lifetime outcomes. In the worst case scenario, a woman is not worse off than before. We can think of this engagement as adding a choice c_{K+1} where $K+1 \leq N$, to the woman's existing choice set. Although some women may not select the newly available choice c_{K+1} , its addition could lead to an increase in $P(Y_n | c_m, I)$, where c_m is a choice that was available before the engagement and Y_n is an improved outcome for the woman. This expands choice sets, changes expectations of empowerment outcomes, given the choices. Ultimately, this can improve the woman's expected utility.

C. Measurement of Variables

Using the existing literature on the determinants of intra-household bargaining- and decision- making power, we formulate and formally test the following hypotheses about women's empowerment in rural Morocco. Since empowerment is an unobservable latent variable, we use its observable characteristics as proxies for empowerment. We define five dimensions that we believe to be representative of an expansions of choice and control, to take actions which are critical in influencing their life outcomes. These dimensions are: (i)

economic decision-making, (ii) child decision-making, (iii) mobility, (iv) access to resources, and (v) control over resources. A number of items are allocated to each of these five measurements. The empowerment score of each woman is computed by summing the scores obtained in all items listed under the respective dimension. The aggregate empowerment score is computed by summing the scores obtained across all items of the five dimensions of empowerment. We choose these variables because they represent a diverse set of ways in which income-generating projects can potentially empower women.

D. Previous Empirical Studies

To the author’s knowledge, this is the first econometric assessment of the impact of income-generating projects on women’s empowerment. Although the study cannot sufficiently address the unobserved heterogeneity of treatment and control groups and the issue of endogeneity, statistical measures, informed by methods used in the literature to handle observational data, have been undertaken to address these shortcomings.

III. Testing Strategy

The “fundamental problem of causal inference” (Holland, 1986) is that, for each individual, we can observe only one of the potential outcomes, as each individual at a certain time with receive either treatment or control, and not both. The estimation of causal effects can thus be thought of as a missing data problem (Rubin, 1976a), where we are interested in predicting the unobserved potential outcomes.

We do this through instrumental variables estimation and propensity score matching. It is important to note that the propensity score matching method is not meant to compete with the instrumental variable estimation method. In fact, both methods have been demonstrated to work best in combination (Carpenter, 1977; Robins and Rotnitzky, 1995; Heckman *et al.*, 1997; Rubin and Thomas, 2000; Glazerman *et al.*, 2003; Abadie and Imbens, 2006). This is in line with the property of “double robustness,” as both methods can lead to more precise inference and offers protection against misspecification.

A. Estimation Strategy & Robustness

Instrumental Variable (IV) Estimation

The instrumental variable (IV) estimator is defined in (4):

$$(4) \quad \hat{\beta}_{IV} = (Z'X)^{-1}(Z'Y)$$

For an instrumental variable, an instrument, Z , to be valid, it must satisfy two conditions:

1. Instrument exogeneity: $\text{corr}(Z_i, \varepsilon_i) = 0$
2. Instrument relevance: $\text{corr}(Z_i, X_i) \neq 0$

We posit that there is an issue of selection on observables and endogeneity of treatment. This means that changes in treatment are not only associated with changes in the dependent variable, empowerment in this case, but also changes in the error u . We assume that those who are treated are those who would have been more likely to be empowered. OLS estimation would provide inconsistent estimates. This necessitates the need for a method that would generate only exogenous variation in treatment. An instrumental variable is an exogenous regressor.

In this case, we identify the age of the association that the treatment group is associated with. We assume that the longer an association has been around, the greater the likelihood of impacting the outcome indicators of a woman's empowerment. It is important to note that using age of the association as an instrument encapsulates the assumption that each association's marketing and outreach efforts are uniform across all associations. By extension, this means that informational inefficiencies are overcome, and that all the beneficiaries targeted are made aware of the productive economic opportunities that come with joining the association. We assume that all associations experience similar shocks, and thus, would have been impacted uniformly if an external event were to interfere with their outreach impact, as determined by their age. We test for strict exogeneity by adding the reduced form residuals to the second stage regression. We find that the instrument has no structural covariance with the error across all instrumental variable estimations conducted.

Propensity Score Matching (PSM) Estimation

Propensity score matching, in terms of structure, is most similar to randomized controlled trials (RCTs). A propensity score is the probability of a unit being assigned to a particular treatment given the observed covariates. In our case, this would be the probability of a woman being treated, that is, to have engaged in an income-generating project. The propensity score is the conditional probability of treatment given the background variables,

$$(5) \quad p(x) = \Pr(T = 1 | X = x)$$

Where T is the treatment indicator variable and X is the vector of covariates. Let $Y(1)$ and $Y(0)$ denote the outcome under treatment and control, respectively. We must make the following assumptions for the estimation of the propensity score:

1. Conditional Independence: there exists a set of X observable covariates such that after controlling for these covariates, the potential outcomes are independent of treatment status

$$(6) \quad [Y(1), Y(0)] \perp T | X$$

After controlling, the assignment of units to treatment is "as good as random." This assumption is also known as selection on observables.

2. Common Support: for each value of X , there is a positive probability of being both in the treatment and control group

$$(7) \quad 0 < P(T = 1 | X) < 1$$

This assumption ensures that there is sufficient overlap in the characteristics of the treated and control units to find adequate matches.

After these two assumptions have been fulfilled, the treatment assignment is said to be "strongly ignorable" (Rosenbaum and Rubin, 1983). The propensity score assists in the construction of matched sets with similarly distributed covariates, without requiring exact matches on all of the individual variables. It summarizes the covariates into one scalar: the probability of being treated. Propensity scores are balancing scores. This is to say that at each value of the propensity score, the distribution of the covariates defining the propensity score is the same in the treated and control groups.

This method matches treated units with their most similar controlled units, with respect to covariates – measuring the likelihood of having engaged with income-generating projects. This guarantees that the conditional probability of participation in the program is uniform across treated and controlled units. We employ a nearest neighbor algorithm to conduct 1:1 matching. For each treated individual i selects the control individual with the smallest distance from individual i .

The propensity score matching estimator of τ that matches on the estimated propensity scores in (8).

$$(8) \quad \hat{\tau}_{t,N}(\hat{\theta}_N) = \frac{1}{N_1} \sum_{i=1}^N W_i \left(Y_i - \frac{1}{M} \sum_{j \in J_{M(i, \hat{\theta}_N)}} Y_j \right)$$

We define the average treatment effect (ATE) in (8). This is the effect of treatment on all individuals, in treatment and control.

$$(9) \quad E[Y(1) - Y(0)]$$

The propensity score matching estimator for the average treatment can be defined as

$$(10) \quad \hat{\tau}_N^* = \frac{1}{N} \sum_{i=1}^N (2W_i - 1) \left(Y_i - \frac{1}{M} \sum_{j \in J_{M(i)}} Y_j \right)$$

M is the number of matches per unit and $J_{m(i)}$ is the set of matches for unit i . The matching is done on the true propensity score. We consider matching with replacement, so each unit in the sample can be matched multiple times. In the absence of matching ties, we define the set of match $J_{m(i)}$ as:

$$(11) \quad J_{m(i)} = \{j = 1, \dots, N: W_j = 1 - W_i, (\sum_{k: W_k = 1 - W_i} \mathbf{1}|p(X_i) - p(X_k)| \leq |p(X_i) - p(X_j)|)\} \leq M\}$$

We define the average treatment effect on the treated (ATET) in (11). This is the effect of treatment on those in the treatment group only.

$$(12) \quad E[Y(1) - Y(0) | D = 1] = E(Y(1) | D = 1) - E(Y(0) | D = 1)$$

The propensity score matching estimator for the average effect on the treated can be defined as

$$(13) \quad \hat{\tau}_N^* = \frac{1}{N_1} \sum_{i=1}^N W_i \left(Y_i - \frac{1}{M} \sum_{j \in J_{M(i)}} Y_j \right)$$

We define $N_1 = \sum_{i=1}^N W_i$, the number of treated units in the sample.

IV. Data

A. Sampling Framework

Primary data was collected from 140 households in rural Morocco. The target population comprises all women engaged with income-generating projects around Marrakesh, the capital of the mid-southwestern economic region of Marrakech-Tensift-El Haouz. This area is situated in central Morocco.

The author collaborated with Peace Corps Volunteers on the ground to reach the communities of interest. The author also worked with the High Atlas Foundation (HAF) a US 501(c)(3) organization and a Moroccan association, on contextualizing income-generating projects and women's empowerment in rural Morocco. HAF takes on a participatory approach to development, and this is in line with the author's approach.

The exact ratio of treatment to control observations is 1:1. 70 women were surveyed for treatment, while 70 were also in control. Those belonging to the control group were women who had not yet begun working on their income-generating projects, but were comparable to the treatment group in that they were enrolled in workshops that equipped with them necessary business skills to launch future entrepreneurial ventures. It was necessary to ensure that the control group was comparable in some sense to the treatment, as this would remedy selection bias. Those who engage in income-generating projects may be fundamentally different from those who don't, in a variety of ways that are captured in the selection of covariates.

B. Questionnaire Design

The building block of empirical research is the questionnaire. It makes or breaks the enquiry at hand. The questionnaire design was guided by the research question, previous empirical studies, and the World Bank's Living Standards and Measurement Survey (LSMS). In addition to the quantitative findings that the survey attempted to answer, qualitative questions were incorporated in the survey to reinforce the validity of findings. The questionnaire was translated into Arabic by the author, a native speaker of Arabic. However, the author often had to resort to local oral translators when the women at hand only spoke Berber. The draft instrument was pre-tested in the field, to optimize the length and type of questions to be asked in the questionnaire. The final questionnaire could be delivered in approximately 30-45 minutes. The sequences of the questions followed the best practices for household surveys where less sensitive questions preceded those that were more sensitive.

C. Implementation

The final instrument was implemented in a three week period in May 2013. The instrument underwent some changes for the control group. The survey was carried out by the author. Once the data collection was completed, the data was processed into the computer, to ensure quality control.

V. Estimation Results & Discussion

Table A reports the descriptive statistics of all the exogenous and endogenous variables used in the regression analysis. This offers a crude comparison of the treatment and control groups on the covariates controlled for in this study. We observe that the duration of marriage, on average, is double for those in the treatment in comparison to the control group. We also observe that the wage work status of the treatment group has a larger proportion of women who have been in occupations with payment, as anticipated. We also find that those in the treatment group are more likely to live in a joint family setting.

Table B summarizes the differences in means and standard deviations for each indicator of empowerment for both the treatment and control group. Most of the results are as we anticipate. On empowerment dimensions that are more economically-oriented, we observe the greatest disparities between treatment and control. In the area of child decision-making, women of both the treatment and control are similarly engaged. The same is to be said of mobility. This speaks, at a basic and naïve level, to the pervasive nature of patriarchy and distribution of control in society. Most women, even in the treatment group, continue to need permission from male figures in leaving the house, to go to the market, healthcare center, a relatives' residence, the fair, or the next village.

Table C summarizes the estimated effects of the impact of income-generating projects on dimensions of women's empowerment, using IV and PSM estimation. We also report the percentage level conversions of these estimates. A comparison of estimates across methods highlights the robustness of our findings. We

compare 2SLS with the ATET results obtained from PSM as they are the two most similar and comparable in what they attempt to measure: the impact on those affected by the instrument, that is, the treated group. Overall, these results suggest that engaging in income-generating projects empowers women especially overall (total), and control over resources. In the rest of this section, we discuss the results of each estimation method in further detail.

A. Instrumental Variables Results

Table D tabulates the robust first stage results, demonstrating that the instrument utilized is highly significant and positively correlated with the treatment. This validates the use of the instrument to predict empowerment. The first stage regression also suggests that women who are members of a cooperative are more likely to participate in treatment. The F-statistic for the first-stage regression is used to determine whether the instrument is sufficiently correlated with the endogenous variable of interest. In our regression, the F-statistic is 22.274, greater than the rule-of-thumb cutoff of 10 suggested by Staiger and Stock (1997). No Sargan test is needed as the model is just identified.

Table E and F report OLS results and the robust IV stage results, respectively. We offer OLS results to demonstrate the importance of instrumenting for treatment. The analysis suggests that those who participate in treatment are significantly more empowered in general than those who do not. This result is significant at the 0.1% level. Access to resources is also significant at the 0.1% level. Economic decision-making and control over resources are both significant at the 1% level. Mobility is significant at the 5% level.

We also compute the Wu-Hausman test to examine the difference between the IV and OLS coefficients. The null hypothesis of this test suggests that there is no endogeneity. We reject the null hypothesis in the regressions of total empowerment, economic decision-making, mobility, access to resources, and control over resources. The Wu-Hausman test indicates the presence of endogeneity in these estimations, thereby validating our reliance on instrumental variable estimates rather than OLS. The Breusch-Pagan test, otherwise known as the Lagrange Multiplier test, tests for homoscedasticity. The null hypothesis of the Breusch-Pagan test indicates homoscedasticity. We only fail to reject the null in the regressions of total empowerment, access to resources, and control over resources. Despite this, robust Huber-White standard errors are computed to account for potential heteroscedasticity.

Child decision-making is the only dimensions of empowerment that does not appear to be impacted significantly upon treatment. The age of the participant appears to be consistently significant across the regressions involving total empowerment, mobility, access to resources, and control over resources. The trend is generally that an older a woman is, the more likely she is to be empowered on those respective dimensions of empowerment. This poses an interesting tension, as for women who are married, we observe that the longer a woman has been married, the less likely she is to be empowered in general, mobile, and have control over resources. Interestingly, we also find that a divorced woman is more likely to be empowered in the dimensions of total empowerment, economic decision-making, child decision-making, mobility, access to resources, but not control over resources. This is a powerful finding as it speaks to the environment of patriarchy that women often escape upon escaping their marriages. We also find that the more children a woman has, the more likely she is to have say in matters of child decision-making, but not in other dimensions of empowerment. This raises the question of whether women participate in the perpetuation of traditional gender roles.

B. Propensity Score Matching Results

Table G reports the propensity score estimations and odds ratio results using a logistic regression. An odds ratio of less than 1 typically means that the respective factors would have reduced the probability of treatment. We observe that the wage work status of unemployed, being married, having more children, and more adult males in the household drive the likelihood of treatment down. We observe a chi-square of 77.24 with 18 degrees of freedom and an associated p-value of less than 0.001 suggests that the model is significant. The log likelihood is -58.42 on 19 degrees of freedom.

Tables H and I provides the balance statistic for both before and after matching, respectively. We run a 1000 bootstrap samples, and report the bootstrapped Kolmogorov-Smirnov test, to provide correct coverage even when there are point masses in the distributions being compared (Abadie, 2002). We also report the variance ratio (treatment/control). If this ratio is 1, then this suggests a perfect balance has achieved on the respective covariate. Overall, we find that the impact of matching achieves a better balance, as the variance ratio tends to 1 for most indicators. This allows to presume that any differences in measures of empowerment are likely to be driven by engaging in income-generating projects.

Table J reports the average treatment effects and average treatment effect on the treated estimates, alongside the Abadie-Imbens standard errors. These standard errors provide correct coverage since the X vector contains the covariates and thus, takes into account the uncertainty of the matching procedure. We find that the average treatment effects are consistently positive across all dimensions of empowerment. The average treatment effect of engaging in income-generating projects on total empowerment is 3.99 points. This translates into a 21.03% increase in total empowerment. For the average treatment effect on the treated, we observe that the impact of treatment is a 14.21% increase on total empowerment. We observe lower average treatment effect on treated estimates consistently.

C. Comparing IV & PSM Results

The IV estimates are known as the “local” average treatment effect (LATE). This is the average causal effect for those affected by the instrument. The LATE is not informative about the impact of income-generating projects on those who are in the control group because, by definition, their treatment status is unaffected by the instrument. Thus, the LATE estimates obtained from IV cannot be compared directly to average treatment effects estimated by the propensity score model. Some efforts in the literature have attempted to multiply the LATE estimates with individual propensity scores for participation, to provide information on the distribution of treatment effects. The average of this interaction is said to be the average treatment effect.

We proceed with a comparison of the IV estimates with the average treatment effects on the treated as those estimates are more comparable in what the structures they are attempting to capture. Table C offers a comparison of the estimates of these two methods. We find that the IV method is able to detect more significance than the PSM method is able to. The IV estimates suggests that total empowerment, economic decision-making, mobility, access to resources, and control over resources achieve significance. The PSM method suggests that only total empowerment and control over resources achieve significance. Such a result is counterintuitive as total empowerment is contingent on the other dimensions of empowerment that do not appear to achieve significance. PSM is known to require a large sample size in order to gain statistically reliable results, as PSM has a tendency to discard many observations which fall under the common support. There are variations in the magnitudes of estimates produced, but overall, we find that both methods produce estimates that are of the same direction. With that said, we rely on the IV estimates more heavily, as instrumenting is less sensitive to the requirements for a large sample size.

VI. Conclusions & Policy Implications

This paper uses primary data from rural Morocco to study the impact of income-generating projects on women's empowerment. Traditional economic development theories promote top-down approaches to development. Such approaches have proven to be ineffective, as they tend to view the poor as part of the problem rather than as part of the solution. Bottom-up development strategies take into account local economic strengths, weaknesses, opportunities, and threats while considering the social, cultural, and legal characteristics of contexts. Income-generating projects are economically sustainable activities undertaken by women in rural settings. Income-generating projects satisfy local needs and incorporate local women into decision-making processes that promote knowledge and grassroots innovations. By having greater say and bargaining power in their households and communities, women will be more empowered. Such an outcome will have significant benefits to the participant's household and community. We find evidence that income-generating projects succeed in empowering rural women. However, there is some variation across the five dimensions of empowerment identified.

Our empirical approach addresses two sources of potential bias. First, endogeneity – that is essentially, an omitted, correlated variable bias issue – is addressed using the signature instrumental variables technique. Second, selection bias on observables – that is a difference in characteristics of women who are treated and untreated – is mitigated by propensity score matching. Within the constraints of cross section data, some meaningful robust estimates are made. We observe that there is a positive and significant impact on total empowerment by both the IV and PSM methods. IV and PSM methods estimate a 39.63% and 14.21% significant increase in total empowerment respectively. There is agreement between both methods that income-generating projects impact total empowerment and control over resources positively and significantly.

Income-generating projects are not unique to Morocco, and may be fruitfully replicated elsewhere in the developing world, with the potential of yielding similarly positive results. With that said, we maintain that the relationship between income-generating projects and women's empowerment demands further investigation, particularly through increasing the sample size, and asking more questions about the mechanisms that could potentially drive empowerment. It is also important to remember that the definition of empowerment continues to be re-evaluated by development practitioners and communities themselves. It could also be informative to compare these results with those of a randomized controlled trial (RCT), as that would provide some benchmark for the quasi-experimental methods utilized. Such knowledge would allow policymakers to reform and transform policy accordingly. This paper contributes to the academic and practitioner literature as it evaluates whether policies that encourage entrepreneurial activities should be subsidized, in an effort to improve gender empowerment outcomes.

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Appendices

Table A – Descriptive Statistics of Covariates

Variable Name	Definition	Treatment	Control
		Mean & t-statistics	
Treatment Dummy	0-1 Dummy Variable, =1 if respondent engaged with income-generating projects; = 0 if she has not	1.0000 (0.0000)	0.0000 (0.0000)
Age of Respondent	Reported age of respondent (continuous)	38.6100 (-12.1680)	30.0430 (-11.1010)
Schooling of Respondent	Level of education achieved by respondent; =1 if elementary, =2 if middle, =3 if high school, =4 university, =5 technical school	1.343 (-1.295)	1.343 (-1.350)
Wage Work Status	Employment status of respondent; =0 if unemployed, =1 if currently employed, =2 if previously employed	0.1570 (-0.4040)	0.3430 (-0.5870)
Marital Status	Marital Status of respondent; =0 if single, =1 if married, =2 if divorced, =3 if widowed, =4 in 2 nd marriage	0.8710 (-1.0760)	0.7570 (-1.0690)
Duration of Marriage	Number of years respondent has been in wedlock (continuous)	12.0700 (-13.3620)	6.8140 (-9.7760)
Surviving Children	Number of total children of respondents (continuous)	1.8430 (-2.1030)	1.4000 -1.9520
Proportion of Adult Males	Number of male members in the household above the age of 16 (continuous)	0.6140 (-0.9670)	0.6140 (-0.9220)
Joint Family	Co-residence with in-laws; =0 if not, =1 if yes	0.0290 (-0.1680)	0.0140 (-0.1200)
Age of Association	The number of years the association has been serving its beneficiaries (continuous)	3.5000 (-1.9880)	2.4460 (-1.5970)
Number of Observations	140	70	70

Table B – Descriptive Statistics of Outcome Indicators

Dependent Variable	Treatment	Control
	Mean & t-statistics	
Economic Decision-Making	2.2000 (-1.1370)	1.4430 (-1.2580)
Food Purchases	0.7000 (-0.4920)	0.4570 (-0.5020)
Major Household Goods	0.6570 (-0.5080)	0.4140 (-0.4960)
Personal Belongings	0.8430 (-0.4040)	0.5710 (-0.4980)
Child Decision-Making	1.3860 (-1.3760)	1.1140 (-1.3460)
Child Sickness	0.4860 (-0.5030)	0.4140 (-0.4960)
Child Education	0.3570 (-0.4830)	0.2710 (-0.4480)
Child Discipline	0.5430 (-0.5020)	0.4290 (-0.4980)
Mobility	2.8290 (-2.0850)	2.3860 (-2.0660)
Market	0.6000 (-0.4930)	0.5000 (-0.5040)
Healthcare Centre	0.5570 (-0.5000)	0.5000 (-0.5040)
Relatives' Residence	0.7570 (-0.4320)	0.7140 (-0.4550)
Fair	0.4860 (-0.5030)	0.3430 (-0.4780)
Next Village	0.4290 (-0.4980)	0.3290 (-0.4730)
Access to Resources	2.9140 (-1.3910)	2.0290 (-1.6330)
Household Expenditure	0.7430 (-0.4400)	0.5570 (-0.5000)
Cash to Spend	0.8290 (-0.3800)	0.7140 (-0.4550)
Purchase of Personal Belongings	0.7140 (-0.4550)	0.4000 (-0.4930)
Purchase of Gifts for Relatives	0.6290 (-0.4870)	0.3570 (-0.4830)
Control over Resources	1.1710 (-0.8840)	0.5140 (-0.8120)
Owns household goods	0.6430 (-0.4830)	0.3140 (-0.4680)
Savings for future	0.5290 (-0.5030)	0.2000 (-0.4030)

Table C –Triangulation of Estimation Methods

Method	Total	Economic DM	Child DM	Mobility	Access to Resources	Control over Resources
IV	7.5332*** (2.3047)	1.4211** (0.5162)	0.3126 (0.3896)	1.8061* (1.0828)	2.5662*** (0.6454)	1.4271*** (0.4197)
%	39.65	23.67	6.25	36.12	64.16	71.36
PSM	2.7000. (1.5380)	0.4857 (0.3577)	-0.1857 (0.3547)	0.5714 (0.6237)	0.9286 (0.4780)	0.9000*** (0.2462)
%	14.21	8.10	-3.71	11.43	23.22	45.00

.p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Huber-White standard errors are in parentheses for IV estimates. Abadie-Imbens standard errors are in parentheses for PSM ATET estimates.

Table D – Robust First Stage (Reduced) Regression Results

	Treatment
(Intercept)	-0.5843*** (0.1333)
Age of Association	0.1034*** (0.0218)
Ed: Elementary	0.2241* (0.1038)
Ed: Middle School	0.150164 (0.1177)
Ed: High School	0.165019 (0.1590)
Ed: Undergraduate School	0.10622 (0.1154)
Ed: Graduate School	-0.2645 (0.1946)
Ed: Technical School	0.6719. (0.1320)
Employment Status: Yes	-0.091667 (0.1216)
Employment Status: No	0.1530 (0.1262)
Duration of Marriage	0.012 (0.0077)
Married	-0.0113 (0.1263)
Divorced	0.188872 (0.2222)
Widowed	0.181457 (0.1975)
Second Marriage	0.123399 (0.1475)
Age	-0.001879 (0.0057)
Surviving Children	-0.041236 (0.0414)
Adult Males in HH	-0.026315 (0.0627)
Co-residence with in-laws	0.101056 (0.2340)
Cooperative	0.8518*** (0.0944)
First Stage F-statistic	22.2740
Adjusted R-squared	0.4303

.p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Huber-White standard errors are in parentheses.

Table E – OLS Regression Results

	Total	Economic	Child	Mobility	Access Res	Control Res
(Intercept)	-1.8438 (1.6111)	-0.0600 (0.3865)	0.0651 (0.3108)	-1.1922. (0.67481)	-0.2049 (0.5247)	-0.4517 (0.3124)
Treatment	0.7614 (0.8538)	0.1424 (0.2048)	0.0225 (0.1647)	-0.3089 (0.3576)	0.3836 (0.2780)	0.5218** (0.1656)
Ed: Elementary	-0.5969 (1.0044)	-0.0932 (0.2409)	-0.1022 (0.1938)	0.0496 (0.4207)	-0.2461 (0.3271)	-0.2050 (0.1948)
Ed: Middle School	-0.5850 (1.0621)	0.0784 (0.2548)	-0.1964 (0.2049)	-0.1139 (0.4449)	-0.2604 (0.3459)	-0.0928 (0.2059)
Ed: High School	1.9956 (1.3928)	0.4520 (0.3341)	-0.0246 (0.2687)	0.7890 (0.5833)	0.5679 (0.4536)	0.2113 (0.2701)
Ed: Undergraduate School	1.7477 (1.7733)	0.3506 (0.4254)	-0.1152 (0.3421)	1.2257 (0.7427)	0.2805 (0.5780)	0.0062 (0.3438)
Ed: Graduate School	0.9788 (2.5211)	-0.3574 (0.6048)	1.1510* (0.4864)	0.0584 (1.0559)	0.2911 (0.8210)	-0.1643 (0.4888)
Ed: Technical School	2.5112 (4.0766)	0.5840 (0.9779)	-0.4642 (0.7865)	1.3972 (1.7074)	0.6969 (1.3276)	0.2973 (0.7905)
Employment Status: Yes	4.6248*** (0.9892)	0.9310*** (0.2373)	0.3197. (0.1908)	1.5727*** (0.4143)	0.9936** (0.3221)	0.8079*** (0.1918)
Employment Status: No	4.00716. (2.2035)	0.992985. (0.5286)	0.2713 (0.4251)	1.0609 (0.9230)	1.1181 (0.7176)	0.5639 (0.4273)
Duration of Marriage	-0.0581 (0.0778)	0.0116 (0.0187)	0.0242 (0.0150)	-0.0681* (0.0326)	-0.0077 (0.0253)	-0.0182 (0.0151)
Married	2.22256. (1.2303)	0.4327 (0.2951)	1.1106*** (0.2374)	0.0681 (0.5153)	0.6078 (0.4007)	0.0034 (0.2386)
Divorced	8.6751 (2.9488)	2.0884** (0.7074)	1.5567** (0.5689)	2.9104* (1.2351)	1.4112 (0.9603)	0.7084 (0.5718)
Widowed	3.4072 (2.3460)	0.4353 (0.5628)	1.1528* (0.4526)	0.2499 (0.9826)	1.0986 (0.7640)	0.4706 (0.4549)
Second Marriage	3.1765* (1.5574)	0.3894 (0.3736)	0.9168** (0.3005)	1.1169. (0.6523)	0.8398 (0.5072)	-0.0863 (0.3020)
Age	0.1746*** (0.0514)	0.0031 (0.0123)	-0.0031 (0.0100)	0.0900*** (0.0215)	0.0555** (0.0168)	0.0291** (0.0100)
Surviving Children	-0.0631 (0.4196)	-0.0277 (0.1006)	0.1887* (0.0809)	0.0525 (0.1757)	-0.2941* (0.1366)	0.0175 (0.0814)
Adult Males in HH	0.5768 (0.5739)	0.0742 (0.1376)	-0.0046 (0.1107)	0.1522 (0.2404)	0.2562 (0.1869)	0.0987 (0.1113)
Co-residence with in-laws	1.5953 (2.4031)	1.1013 (0.5765)	0.9999* (0.4636)	-1.6506 (1.0065)	0.7135 (0.7826)	0.4312 (0.4660)
Cooperative	2.8833* (1.3007)	1.3129*** (0.3120)	0.1467 (0.2509)	0.9209. (0.5448)	0.5227 (0.4236)	-0.0199 (0.2522)
Adjusted R-squared	0.5352	0.4554	0.7019	0.3968	0.3641	0.3212
Observations	140	140	140	140	140	140

.p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Standard errors are in parentheses.

Table F – Robust IV Regression Results

	Total	Economic	Child	Mobility	Access Res	Control Res
(Intercept)	0.8783 (1.8211)	0.4540 (0.3831)	0.1818 (0.3393)	-0.34204 (0.7704)	0.6724 (0.5611)	-0.0877 (0.3333)
Treatment	7.5332*** (2.3047)	1.4211** (0.5162)	0.3126 (0.3896)	1.8061* (1.0828)	2.5662*** (0.6454)	1.4271*** (0.4197)
Ed: Elementary	-2.7631* (1.2420)	-0.502191. (0.2886)	-0.1950 (0.2458)	-0.6270 (0.5532)	-0.94427* (0.3493)	-0.49461* (0.2095)
Ed: Middle School	-2.3032* (1.2640)	-0.2460 (0.2726)	-0.2700 (0.2082)	-0.6506 (0.5871)	-0.8142* (0.3999)	-0.3225 (0.2375)
Ed: High School	0.1448 (1.5525)	0.1025 (0.3249)	-0.1039 (0.2957)	0.2109 (0.6773)	-0.0286 (0.4817)	-0.0361 (0.2907)
Ed: Undergraduate School	-0.2613 (1.6131)	-0.0288 (0.3928)	-0.2013 (0.3083)	0.5982 (0.8493)	-0.3670 (0.6023)	-0.2624 (0.2907)
Ed: Graduate School	1.7302 (3.1711)	-0.2155 (0.5613)	1.1832* (0.8602)	0.2931 (1.1115)	0.5333 (0.5104)	-0.0638 (0.4784)
Ed: Technical School	-2.6245 (2.0069)	-0.3857 (0.4543)	-0.6843 (0.3260)	-0.2068 (0.9346)	-0.9584 (0.5842)	-0.3893 (0.3768)
Employment Status: Yes	6.1606*** (0.9968)	1.2210*** (0.2265)	0.38546. (0.2314)	2.0524*** (0.3953)	1.4886*** (0.3126)	1.0133*** (0.2281)
Employment Status: No	3.2370 (1.7732)	0.8476 (0.5426)	0.2383 (0.5206)	0.8204 (0.9308)	0.8698 (0.6125)	0.4609 (0.3385)
Duration of Marriage	-0.1620* (0.0800)	-0.0080 (0.0201)	0.0198 (0.0189)	-0.1005** (0.0421)	-0.0412 (0.0228)	-0.0321* (0.0176)
Married	3.0013* (1.2278)	0.5797* (0.2744)	1.1440*** (0.3086)	0.3113 (0.5932)	0.8588* (0.4240)	0.1075 (0.2202)
Divorced	9.7271*** (2.1523)	2.2870** (1.1134)	1.6018** (0.4913)	3.2390** (0.9118)	1.7502. (0.6097)	0.8490 (0.4290)
Widowed	2.0153 (1.9890)	0.1724 (0.4492)	1.09314* (0.6169)	-0.1848 (1.0618)	0.6500 (0.7954)	0.2845 (0.3321)
Second Marriage	2.8300. (1.3784)	0.3240 (0.2983)	0.9019** (0.4216)	1.0086 (0.6273)	0.7282 (0.3582)	-0.1327 (0.3379)
Age	0.1357** (0.0576)	-0.0042 (0.0144)	-0.0048 (0.0092)	0.0779*** (0.0223)	0.0429** (0.0184)	0.0239* (0.0110)
Surviving Children	0.3247 (0.4193)	0.0455 (0.1009)	0.2054* (0.1048)	0.1736 (0.2200)	-0.1691 (0.1423)	0.0694 (0.0938)
Adult Males in HH	0.9264. (0.5915)	0.1402 (0.1355)	0.0104 (0.1209)	0.2614 (0.2636)	0.3689* (0.1960)	0.1455 (0.1179)
Co-residence with in-laws	0.8265 (1.1781)	0.956129. (0.2869)	0.9670* (0.2585)	-1.8907. (0.5282)	0.4657 (0.5231)	0.3284 (0.4674)
Cooperative	-1.8835 (1.6565)	0.4128 (0.4442)	-0.0576 (0.3336)	-0.5679 (0.8098)	-1.0136. (0.5044)	-0.6572. (0.3120)
Adjusted R-squared	0.5793	0.4874	0.7033	0.4131	0.4247	0.3308
p-value Wu-Hausman	0.0000	0.0070	0.4500	0.0100	0.0010	0.0180
p-value Breush-Pagan	0.4895	0.0178	0.0047	0.0758	0.4965	0.1626

p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Huber-White standard errors are in parentheses.

Table G – Propensity Score Estimation and Odds Ratio Results

	Estimate	Odds Ratio
(Intercept)	-35.20 (2466)	0.0000
Ed: Elementary	1.781** (0.6672)	5.9352
Ed: Middle School	1.1120 (0.6764)	3.0398
Ed: High School	1.369 (0.8245)	3.9330
Ed: Undergraduate School	1.3440 (1.3740)	3.8359
Ed: Graduate School	-17.73 (5544)	0.0000
Ed: Technical School	20.70 (10750)	979688500
Employment Status: Yes	-0.8973 (0.6146)	0.4077
Employment Status: No	15.61 (2359)	6010603
Duration of Marriage	0.1167* (0.05926)	1.1238
Married	-0.7496 (0.9111)	0.4726
Divorced	15.62 (5804)	6074599
Widowed	17.22 (1984)	29972330
Second Marriage	0.2407 (1.2090)	1.2721
Age	0.01950 (0.0336)	1.0197
Surviving Children	-0.4179 (0.3059)	0.6584
Adult Males in HH	-0.2514 (0.3674)	0.7777
Co-residence with in-laws	0.5290 (1.3890)	1.6972
Cooperative	34.4000 (2466)	8.6864
p-value for chi-squared test	0.0000000026	
log likelihood ratio test	-58.41835	

.p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Standard errors are in parentheses.

Table H – Balance Statistics Before 1:1 Matching

	mean treatment	mean control	std mean diff	var ratio (Tr/Cr)	T-test p- value
Ed: Elementary	0.3000	0.3143	-3.0951	0.9744	0.8559
Ed: Middle School	0.2000	0.2286	-7.0917	0.9074	0.6830
Ed: High School	0.1286	0.0429	25.4240	2.7313	0.0714
Ed: Undergraduate School	0.0429	0.0571	-7.0029	0.7614	0.7007
Ed: Graduate School	0.0000	0.0429	-	0.0000	0.0832
Ed: Technical School	0.0143	0.0000	11.9520	-	0.3208
Employment Status: Yes	0.1286	0.2286	-29.6610	0.6354	0.1243
Employment Status: No	0.0143	0.0571	-35.8570	0.2614	0.1751
Duration of Marriage	12.0710	6.8143	39.3450	1.8680	0.0089
Married	0.4286	0.4286	0.0000	1.0000	1.0000
Divorced	0.0429	0.0000	21.0090	-	0.0832
Widowed	0.0429	0.0143	14.0060	2.9130	0.3142
Second Marriage	0.0571	0.0714	-6.1105	0.8123	0.7327
Age	38.6140	30.0430	70.4410	1.2015	0.0000
Surviving Children	1.8429	1.4000	21.0550	1.1616	0.1988
Adult Males in HH	0.6143	0.6143	0.0000	1.1024	1.0000
Co-residence with in-laws	0.0286	0.0143	8.5135	1.9710	0.5629
Cooperative	1.0000	0.6143	-	0.0000	0.0000

Table I – Balance Statistics After 1:1 Matching

	mean treatment	mean control	std mean diff	var ratio (Tr/Cr)	T-test p- value
Ed: Elementary	0.3000	0.4143	-24.7600	0.8654	0.1288
Ed: Middle School	0.2000	0.2571	-14.1830	0.8376	0.4660
Ed: High School	0.1286	0.0714	16.9490	1.6892	0.2050
Ed: Undergraduate School	0.0429	0.0000	21.0090	-	0.0811
Ed: Graduate School	0.0000	0.0000	0.0000	-	1.0000
Ed: Technical School	0.0143	0.0000	11.9520	-	0.3174
Employment Status: Yes	0.1286	0.0857	12.7120	1.4297	0.3661
Employment Status: No	0.0143	0.0000	11.9520	-	0.3174
Duration of Marriage	12.0710	14.4140	-17.5340	0.7460	0.2263
Married	0.4286	0.5429	-22.9280	0.9868	0.1933
Divorced	0.0429	0.0000	21.0090	-	0.0811
Widowed	0.0429	0.0000	21.0090	-	0.0811
Second Marriage	0.0571	0.0429	6.1105	1.3134	0.7063
Age	38.6140	37.4000	9.9791	0.7951	0.5124
Surviving Children	1.8429	2.4286	-27.8460	0.7610	0.0620
Adult Males in HH	0.6143	1.0143	-41.3440	0.8389	0.0124
Co-residence with inlaws	0.0286	0.0286	0.0000	1.0000	1.0000
Cooperative	1.0000	1.0000	0.0000	-	1.0000

Table J – Average Treatment Effect (ATE) & Average Treatment Effect on Treated (ATEI) Estimates

	ATE	ATEI
Total	3.9964* (1.7917)	2.7000. (1.5380)
Economic Decision-Making	0.7786* (0.3822)	0.4857 (0.3577)
Child Decision-Making	0.4714 (0.4161)	-0.1857 (0.3547)
Mobility	0.7250 (0.6764)	0.5714 (0.6237)
Access to Resources	1.0679* (0.4702)	0.9286 (0.4780)
Control over Resources	0.9536*** (0.2502)	0.9000*** (0.2462)

.p<0.10, * p<0.005, ** p<0.01, *** p<0.001. Abadie-Imbens standard errors are in parentheses.