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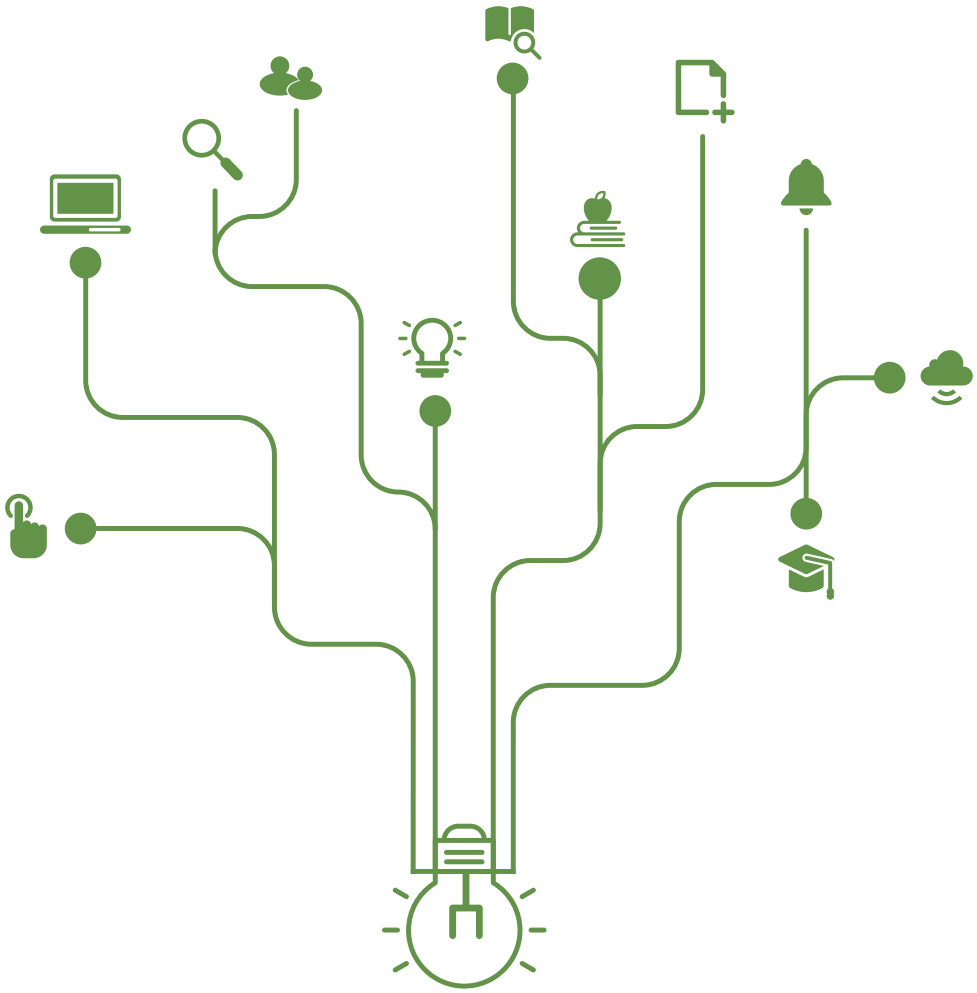
Explaining the Gender Gap Dilemma in Microfinance

Darwin Ugarte Ontiveros(Universidad Privada Boliviana)
Evelin Mamani Huayta (Universidad Privada Boliviana)



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Darwin Ugarte Ontiveros
Universidad Privada Boliviana

Evelin Mamani Huayta
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Abstract

In this paper, we address main entrepreneurship puzzles prevailing in microfinance literature. The literature has shown that it is much more difficult to improve business outcomes for female entrepreneurs than for their male counterparts. This paper provides new empirical evidence to characterize the so-called microfinance gender gap. We present evidence on the relation of female ownership with women empowerment, the allocation of resources, and intrahousehold decision patterns. Likewise, we analyze their relation with microenterprise performance, profits. By using data of the microcredit programme ProMujer in Bolivia we find that female microenterprise ownership is positively related to women empowerment, which at the same time has a negative relation with profits. We also find that one of the mechanisms through which female microenterprises are related negatively with business profits is the absence of coordination and cooperation in the intrahousehold decision making process. We also find that women are positively related with the misallocation of resources, and having through this mechanism negative effects on profits. Through the paper we highlight the positive effect of women education level on profit levels, on cooperative intrahousehold behaviors and on the efficient allocation of resources.

I. INTRODUCTION

A long-standing literature has pointed out deep and widespread gender inequalities in labour market outcomes, on gender wage gaps and gender differences in labour force participation, Bertrand (2020) and Borrowman and Klasen (2020). Likewise, in the literature there has been huge interest on studying gender differences in firm productivity for small and micro enterprises. It is well documented that female-owned businesses are less profitable than male-owned businesses, including micro-enterprises that make up the majority of firms in developing countries, Batista et al. (2021). In fact, female-led businesses often report less than half of male-led business profits, even when operating in similar sectors as their male counterparts, Hardy and Kagy (2018). As women represent more than a third of all business owners in developing countries, identifying those factors that explain these differences may affect their overall economic performance.

Though there are several factors that can be considered, the causes of this gap are not well understood yet. Some studies highlight that women and men have different opportunities, as evidenced by the fact that female labor force participation is often lower than men's. In addition, women-led firms tend to be concentrated in low-productivity sectors, Cirera and Qasim (2014). There is research suggesting that even when male and female entrepreneurs operate in similar sectors, the gap persists, Hardy and Kagy (2018). More specifically, the returns to capital for micro-enterprises are substantial for male-owned enterprises but null for their female counterparts De Mel, et al. (2008, 2009), Fafchamps et al. (2014). All these factors raise the following open question: what drives the gender gap in business performance?

Recent research has increasingly pointed toward intrahousehold dynamics as an important mediating factor in women's business development that influences women's business management and investment decisions. Bernhardt et al. (2019) shows that in households with multiple operating microenterprises, grants and loans are not always invested in the targeted business: when women are the recipient of a grant or loan and their husbands also operate a household business, resources are often invested in the husband's rather than the wife's business. Similarly, Fafchamps et al. (2014) suggest that the profits of female enterprises respond more positively to in-kind grants, because they are less easily diverted to other purposes. In this line, a number of studies suggest that when transfer payments are given to women rather than to their husbands, expenditures on children increase, see Bobonis (2009), Attanasio and Lechene (2014), this is called the "preference hypothesis". Fiala (2017) finds that women who hid income from their husbands in the experimental game, invested her business loans and grants leading to positive economic outcomes. Similarly, Friedson-Ridenour and Pierotti (2019), suggest that

woman's efforts to structure her intrahousehold relationships to best meet her needs may constrain the decisions that she makes about her business.

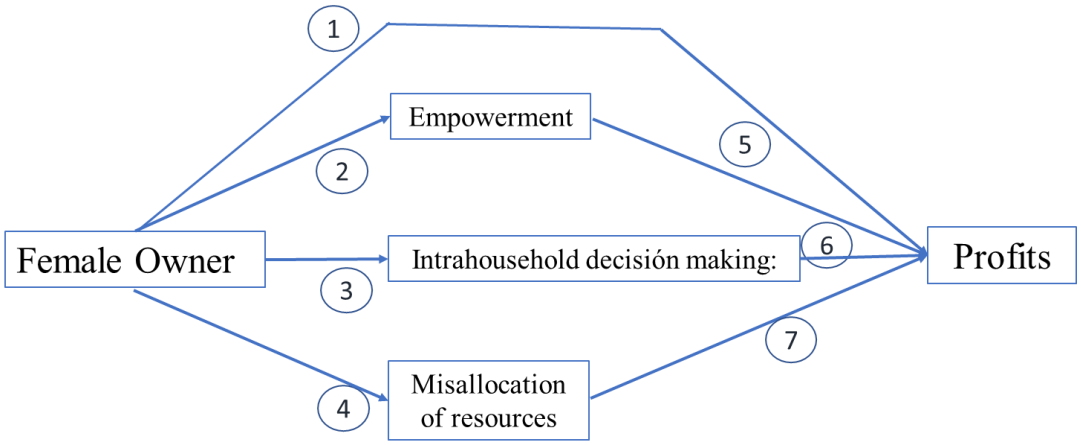
Building on this research, we seek to provide quantitative evidence on some unanswered questions on gender gap in microfinance. This paper provides empirical evidence on the role of intra-household decision-making processes, the allocation of resources, and household enterprise ownership structure, on microcredit's effectiveness. We present evidence on following open questions from the microfinance literature, Figure 1 depicts the manner in which these questions are tested in the paper:

Are female enterprise owners more related to profits, women empowerment, inefficient allocation of resources, and non-cooperative intrahousehold decision patterns? (Relations one to four in Figure 1).

What is the role of female empowerment, the intra-household decision-making process and the resources allocation on microenterprise' profits? (Relations five to seven in Figure 1).

Which other household characteristics are more related to women empowerment, the allocation of resources and to a participative intra-household decision-making process? (Relations two to four in Figure 1).

Figure 1: Structure of the relations tested in the paper



In this paper, we engage with the above issues and contribute broadly to the empirical literature on gender-based firm performance differences. Our overall aim is to contribute to a deeper understanding of the extent, nature and origins of female-owned firms' performance gaps

The remainder of the paper is organized as follows: in section 2 we provide a description of the data as well as some stylized facts. Section 3 presents the empirical methodology designed. Section 4 displays the results, whereas in section 5 we conclude.

II. SAMPLE DESIGN AND CHARACTERISTICS

Pro Mujer, founded in 1990 in Bolivia, is a nonprofit development organization that provides financial inclusion, health and education programs to low-income women in Latin America. From a pioneering experiment in micro-lending, Pro Mujer has become one of Latin America's leading microfinance organizations that currently is part of the Partnership for Responsible Financial Inclusion, institution that among its 10 members has BRAC, Grameen Foundation, FINCA and others.

Currently, Pro Mujer operates in Argentina, Bolivia, Guatemala, Mexico, Nicaragua and Peru. In 2019, it reached 215,000 clients and $222 million in loans were disbursed. In the same year, only in Bolivia 119,900 clients were served with $106 million in loans, thus Pro Mujer is the second largest microfinance institution in Bolivia with an average interest rate for loans of 34% on its main product Communal Bank (group lending). This research will consider for its analysis the Communal Bank lending instrument that conforms 87% of the total loans Pro Mujer disbursed in 2019.

Thus, the target population of the study is the urban area of the department of La Paz, Bolivia where Pro Mujer had agencies. Specifically, the cities of La Paz and El Alto where, at the moment of the baseline, Pro Mujer had two agencies in La Paz and ten in El Alto. The twelve agencies were located in seven different districts of the two cities. The final sample contains individuals that were proportionally chosen from these seven districts.

Two groups, treatment and control, of 175 individuals each were part of the baseline survey. For endline, the attrition rate for the treatment group was 37.1% from which, 27.4 percentage points were not found at the time of the endline survey, and 9.7 refused to participate in the endline survey. In the case of the control group, the attrition rate was 29.7% from which 11.4 percentage points were not found at the time of the endline survey, and 16.6 refused to participate in the endline survey. The baseline and the endline surveys took place in July of 2021 and May of 2022 respectively.

The treatment group was composed by lenders of Pro Mujer's Communal Bank in the seven districts of the cities of El Alto and La Paz were the organization had an agency, who, at the same time, were owners of a business In this case the treatment consisted of loans up to Bs7,000 (approx. USD 1,000), with the restriction that only people linked to a communal bank participate.

The assignment of the treatment was direct as long as the individual that requests the loan was previously accepted to be part of a communal bank and has no past default history.

The control group was composed by individuals who, at the time of the baseline survey, did not belong to a communal bank, did not have active loans with financial institutions, run a business. This group's number of individuals surveyed in each of the seven targeted districts were the same as the ones coming from the treatment group.

Note that with a sample size of 175 individuals, a representativeness of 12% of the population in the treatment group is obtained. The geographical distribution is as follows:

Table 1: Sample distribution

Intervention area	District	Treatment	Control
LA PAZ	VILLA COPACABANA	23	23
EL ALTO, district 6	JUAN PABLO II	59	59
EL ALTO, district 3	VILLA ADELA	24	24
EL ALTO, district 2	PANAMERICANA	30	30
EL ALTO, district 1	VILLA TEJADA	6	6
EL ALTO, district 8	SENKATA	8	8
Reserve individuals (attrition)		25	25
Total sample : 350 individuals		**175**	**175**

We may now turn to presenting descriptive statistics of the sample households, distinguishing between treatment and control groups. These statistics relate to some important variables that will be used in next sections.

Table 2: Mean of main variables

Main variables	Treatment	Control	Ho:diff=0 (p-value)
Household size (# persons)	4.41	4.18	0.108
Household Age (Mean)	31.87	35.65	0.095
Cognitive indicator: Number of digits she/he memorized (1=3 digits, 2=4 digits, 3 = 5 digits...)	3.32	3.18	0.229
Use TICs for business and bank transfers (1=yes)	0.56	0.48	0.071
Risk tolerance 1 if he/she define itself as risk tolerant (vs nuetral or adverse), and he/she prefers Bs100 each month for a year (vs Bs700 now)	0.18	0.21	0.192
Financial experience (Had a debt=1)	0.24	0.09	0.031
Years of operation	7.21	9.65	0.101
Childcare (yes=1)	0.14	0.07	0.001
Education of Women (0 no education, 1 primary, 2 secondary, 3 tertiary)	2.09	2.16	0.254
Education of Men (0 no education, 1 primary, 2 secondary, 3 tertiary)	2.03	1.98	0.473
Distance to ProMujer's office	29.85	61.86	0.001
A friend received ProMujer loan	0.92	0.04	0.001
Couple years	21.25	21.56	0.776
Age difference	3.45	2.48	0.071
Men's economic power	0.26	0.32	0.061
Monthly profits (Bs)	7323.9	7503.1	0.799
Female Owner (1=yes)	0.803	0.771	0.304
Household tasks	3.45	2.93	0.041
Define itself as poor	0.14	0.11	0.157
Welfare level perception	3.36	3.31	0.274

III. THE ECONOMETRIC FRAMEWORK

This section describes the empirical strategy that will be used in this section in order to test our main relations of interest (Figure 1). To begin, it is important to consider that the sample consists of households that participated in the microcredit programme, and these households might differ in important unmeasured ways from households that did not participate. A selection model to determine entry into the microcredit programme is then needed. The model we estimate is the following:

$$Y_i^* = \beta X_i + \kappa K_i + vF_i + \varepsilon_i \qquad (1)$$

$$s_i^* = \pi P_i + \alpha X_i + vF_i + u_i \qquad (2)$$

$$Y_i = \begin{cases} 1(Y_i^* > 0) & if \;\; 1(s_i^* > 0) \\ NA & otherwise \end{cases} \qquad (3)$$

Where equation (1) models the dependent variable of interest and equation (2) is the sample selection equation with s_i^* representing the unobservable propensity to participate in the programme. Y_i represents the dependent variable and it is observed only when $S_i = 1(s_i^* > 0)$,

represented in equation (3), where 1(D)=1 if D is true and 0 if D is false. K_i denotes the main variable of interest, P_i is a column vector of various measures explaining participation in the programme, X_i is a set of control variables, and F_i represents the village fixed effects. The disturbances ε_i and u_i are assumed to be independent of X_i zero-mean Gaussian distributed with unit variances and $corr(\varepsilon_i, u_i) = \rho$

X_i includes the following household characteristics: number of members of the household, mean education level of the parents, average age of the household, and five variables measuring idiosyncratic characteristics of the business owner: (i) a cognitive indicator measuring the number of digits she/he memorized (1=3 digits, 2=4 digits, 3 = 5 digits, and so on) after showing her/him a card with a sequence of numbers, (ii) also we include a dummy variable with value 1 in case the owner uses Information and Communication Technology (ICT) for financial transfers and business, (iii) a third variable called Risk Tolerance with value 1 if he/she define itself as risk tolerant (vs neutral or adverse), and he/she prefers Bs100 each month for a year (vs Bs700 now), and (iv) a dummy variable with value 1 in case the household had experience with past loans (already paid). (v) We also consider as covariate the variable experience measured as the number of years the business is functioning. District fixed effects (dummies) are also included to account for other regional's idyosincratic unobserved fixed factors that can influence dependent variables (Y_i).

3.1 The Heckman selection model

The Heckman (1979) selection methodology is applied. To take into account that individuals who (by out of necessity or by choice) did not participate in the microcredit programme could be a non-random group of the population, the vector P_i in equation (2) includes for identification three excluded restrictions a set of variables explaining participation in the programme (those included in X_i), and: (i) a dummy for whether the household knew people who participated in the programme or not (received a ProMujer loan in the past), Knowing people related to ProMujer might have increased their likelihood of enrolling to the programme. Also we consider (ii) the distance of the business to a ProMujer's office, being close to the bank's office may influence access to information and so increase the likelihood of enrolling to the microcredit programme.

First stage statistics support their relevance as excluded restrictions. The validity of these variables might however be threatened in the case these variables affect the dependent variables by other channels different from the possession of the loan, in next section we present a different approach that considers this subject.

3.2 Selection Model: An alternative identification strategy

In the paper we also apply a distribution-free estimator that does not require instruments for selection nor a large support regressors. We implement the semi-parametric methodology proposed by D'Haultfoeuille et. al (2018) to estimate the model of equations 1-3 without relying on exclusion restrictions, that is, to achieve identification without instruments. It is based on the assumption that selection is independent of covariates at infinity, i.e., when the outcome takes large values. If selection is indeed endogenous, the effect of the outcome on selection dominates those of the covariates, for satisfactorily large values of the outcome. This approach is implemented by using a quantile regression estimator applied to the upper tail of the outcome variable. In our framework, the assumption would be that participation in the ProMujer programme is regardless of the covariates in X_i, as long as they exhibit high values of Y_i. A J-test for the fulfillment of this assumption is proposed by D'Haultfoeuille et. al (2018).

3.3 Dealing with the normality assumption

A natural concern about the Heckman selection model is related to the normality assumption of the error terms that characterizes this method. As highlighted in the semiparametric literature, departures from this distributional assumption can lead to inconsistent estimations. The normality assumption on the distribution of the disturbances in the selection process might cause the results to simply reflect the specific structure imposed to the estimation. To address with this concern, we also apply the semi-nonparametric selection model of Gabler et al. (1993), hereon called SNP. SNP relaxes the Gaussian distributional assumption by specifying semiparametrically the likelihood function. The basic idea of the SNP estimation is to approximate the unknown densities of the latent regression errors by Hermite polynomial expansions instead of assuming Gaussianity. It then uses these approximations to derive a pseudo-maximum likelihood estimator for the model parameters instead of the full log-likelihood estimator. Gallant and Nychka (1987) showed that these resulting pseudo-maximum likelihood estimators are consistent provided that the order of the polynomials increases with the sample size. Inference can be conducted as if the model was estimated parametrically by treating the order of the polynomials as known. The underlying assumption is that, for fixed values of the order of the polynomials, the true joint density function belongs to the class of densities that can be approximated by the Hermite polynomial expansion. In this paper we use polynomials of order three to approximate the unknown densities of the errors. Variations in the order of the polynomials do not change the generality of the results.

3.4 Dealing with the endogeneity with available instruments

Another concern in our estimations is the risk of an endogeneity bias, while testing relation 5, for example, in figure 1. It is conceivable that lenders who actually have or expected to have high profit levels may have decided to allocate resources efficiently at the same time. In addition, there may exist some unobserved heterogeneity (unmeasured or unobserved differences) that may explain business profits and allocation of resources. Considering the possibility of simultaneity, or omitted variable bias imply adding a supplementary equation that explains the variable K_i of interest.

Addressing the issue of the endogeneity is however more critical and challenging by the fact, as mentioned before, that many households decided not to participate in the programme at all, adding to the analysis a problem of sample selection bias which is not easily treatable in the context of endogenous regressors.

The estimation of simultaneous equation systems with censoring has been comprehensively analyzed in Blundell and Smith (1994), Blundell and Smith (1989), and Rivers and Vuong (1988), via control functions approach in a two-step estimation framework. To address endogeneity in this context, Heckman tried to account for the endogeneity of selection bias situation by estimating the so-called Inverse Mill's Ratio $(\hat{\Psi}_i)$ via MLE probit model, using exclusion restrictions[1]. This Ratio essentially tells us the probability that an agent decides to get a loan over the cumulative probability of all agent's decision. Thus, in the first step we estimate $(\hat{\Psi}_i)$ as a means of controlling the selection bias, i.e. the part of the error term for which the decision to get a loan influences the profit level, that is, it is used as a control function in equation (1a). Since a selection bias is equivalent to an omitted variable bias, which is a function of $(\hat{\Psi}_i)$, see Heckman (1979), then, by including $(\hat{\Psi}_i)$ in (1a) will produce free from selection bias estimations. In the second step, we estimate an instrumental variable regression of the variable K_i on the set of explanatory variables X_i and a vector of instruments Z_i that are correlated with K_i but uncorrelated with ε_i. It corresponds to equations (1a) and (4a). Therefore, we estimate:

[1] Given Normality, the inverse Mill's ratio can be seen as generalized residuals following Heckman and Robb (1985).

$$Y_i^* = \beta X_i + \kappa \hat{K}_i + \nu_i F_i + \varphi \hat{\Psi}_i + \varepsilon_i \qquad (1a)$$

$$s_i^* = \pi P_i + \alpha X_i + \nu_i F_i + u_i \qquad (2)$$

$$Y_i = \begin{cases} 1(Y_i^* > 0) & if \;\; 1(s_i^* > 0) \\ NA & otherwise \end{cases} \qquad (3)$$

$$K_i = \lambda X_i + \theta Z_i + \nu_i F_i + \varsigma_i \qquad (4a)$$

Equation (1a) is estimated by instrumental variables maximum likelihood estimator (LIML) estimator. The implicit assumption in our procedure is that the orthogonal decomposition for $\tilde{\varepsilon}_i = \varphi \hat{\Psi}_i + \varepsilon$ follows $E[\tilde{\varepsilon}_i \mid X_i] = 0$, where $E[\varsigma_i \mid \varepsilon_i] = 0$. That is, the K_i variable is uncorrelated with $\tilde{\varepsilon}_i$ conditional on u_i (the control function). In addition, $\tilde{\varepsilon}_i$ and u_i are jointly normally distributed.

In case of $\varphi \neq 0$ and $\kappa \neq 0$, the standard errors and test statistics will not be strictly valid. Given that the second step uses an estimate of the residuals from the first step (both from $\hat{\Psi}_i$ and $\hat{K}_i$), the asymptotic sampling variance of the second-step estimator needs to take these extra sources of variation into account for the inference. Omitting this fact would bias downwards the standard errors estimations. To approximate this additional source of variance in the control function approach, we bootstrap the standard errors. Specifically, we regress equation (4a) with a bootstrapped sample, calculate the implied residuals, and estimate equation (1a) with these new residuals. We then repeat this exercise over 500 bootstrapped samples. The variance in the parameter estimates across the bootstrapped samples is then added to the traditional variance estimates from equation (1a). Mandic and Train (2003) found that this procedure provides very similar results to their standard error correction for two-stage estimations in nested samples.

To test for the quality of our instruments, we use standard tests for underidentification, weak instruments and overidentification (all the test considered are robust to heteroskedasticity). More specifically we report (i) The weak instrument Kleibergen-Paap rank Wald F-statistic to assess if instruments are sufficiently correlated with the right hand side endogenous variable. Two null hypotheses can be tested using this statistic. The first is that the relative bias of instrumental variables with respect to that of OLS is smaller than 5% (which is quite demanding since, as a rule of thumb, instruments are generally not considered as weak if the relative bias is smaller than 20%). Second, that the relative size of the Wald test based on the IV statistic is smaller than 10% (as before, instruments are generally not considered as weak if the size is smaller than 20%). The critical values are non standard but available from Stock and Yogo (2005). And, (ii) we also report the Hansen J test statistic for overidentifying restrictions in IV. The joint null hypothesis is that the instruments are orthogonal to the errors.

3.5 Dealing with the endogeneity without available instruments

Additionally, to overcome concerns about the strict exogeneity of the proposed exclusion restrictions, we deal with the endogeneity in an alternative way. Instead of restricting the parametric space (by imposing restrictions on the parameters), we exploit further information in the data that can be included in the identification strategy. Lewbel (2012) presents an instrumental variable technique that is useful when valid external instruments are arguable, or simply not available, based on the heteroskedastic nature of the residuals to generate internal instruments. Particularly, Lewbel (2012) demonstrates that identification can be obtained by observing a vector of exogenous variables that are uncorrelated with the covariance of heteroskedastic errors (a common feature of models with endogeneity). That is, the structural parameters in equation (1a) can be identified if $E(X_i, \varsigma_i)=0$, $Cov(X_i, \varsigma_i \tilde{\varepsilon}_i)=0$, and $Cov(X_i, \varsigma_i^2) \neq 0$, where the observed X_i might be, though need not be, a subset of X_i. Then, $(X_i - \bar{X})\tilde{\varsigma}_i$ can be used as identifying instruments. The first assumption, $E(X_i, \varsigma_i)=0$, implies the exogeneity of the regressors that is useful to identify the reduced form. The second assumption, the key one, $Cov(X_i, \varsigma_i \tilde{\varepsilon}_i)=0$, implies that $(X_i - \bar{X})\tilde{\varsigma}_i$ is a "valid" instrument for K_i since it is uncorrelated with $\tilde{\varepsilon}_i$. The "relevance" depends on the covariance of these instruments with ς_i, which corresponds to the level of heteroskedasticity in the first stage. This requirement is stated in the third assumption $Cov(X_i, \varsigma_i^2) \neq 0$. That is, the product of the centered regressors with the residuals will contain sizable elements if there is clear evidence of heteroskedasticity (with respect to the regressors). The greater the degree of heteroskedasticity in the error process, the higher will be the correlation of the generated instruments with the endogenous explanatory variable. Bootstrapped standard errors, following the procedure mentioned before, are considered for inference. As validation for this technique, we test the presence of heteroskedasticity in the sample and the validity of the generated instruments (overidentifying restrictions).

IV. EXPLAINING THE GENDER GAP IN MICROFINANCE

4.1 The gender gap: the effect on business' profits

The main objective of this section is to assess whether a performance gap between male-owned and female-owned microenterprises, as observed in most of the existing studies, is present in Bolivia. It corresponds to relation 1 in figure 1.

Female-owned microenterprises have been promoted in development countries as a powerful engine of economic growth, poverty alleviation, and a right pathway to the reduction of gender inequality, see Agyapong (2010). The World Economic Forum identified women entrepreneurs

as the way forward at their annual meeting in 2012. While the proportion of women entrepreneurs in developing countries has been growing, at the same time, however, the literature on gender, entrepreneurship, and firm performance generally shows evidence of significant gender gaps in microenterprise business performance and investment, see Jayachandran (2020).

In this section we provide additional evidence of the gender gap in microfinance performance for the Bolivian case. From Table 3, it emerges that female ownership is negatively correlated with business profits. This is true under different estimation methods, the Heckman selection model and the distribution-free semi-parametric methodology proposed by D'Haultfoeuille et. al (2018). Note that these results are in line with the literature, de Mel et al. (2008), for example suggest that directing capital to men rather than women would generate higher returns.

Table 3: The relation Female Owner and Profit levels

	Heckman model		Extremal quantile regression
VARIABLES	Log ProfitsHH	Selection Eq	Log ProfitsHH
Female Owner	-0.882***		-0.716***
	(-4.687)		(-4.260)
Distance to ProMujer		-0.034***	
		(-4.237)	
A friend received ProMujer loan		10.911***	
		(13.915)	
Household size	-0.019	0.049	
	(-0.451)	(0.512)	
Household Age	0.007	0.022	
	(0.775)	(1.423)	
Cognitive indicator	0.193***	0.209	
	(3.377)	(1.236)	
Use TICs	-0.027	-0.063	
	(-0.142)	(-0.161)	
Risk Tolerant	0.223	-0.854**	
	(0.712)	(-1.965)	
Experience with loan	0.468***	-0.310	
	(2.683)	(-0.489)	
Years of operation	0.018**	0.006	
	(1.972)	(0.408)	
A Childcare, yes	-0.706***	-1.152	
	(-4.292)	(-1.553)	
Men's Education	0.185	0.155	
	(1.451)	(0.533)	
Women's education	0.768***	0.241	
	(6.304)	(1.159)	
Village Fixed Effects	Yes	Yes	Yes
J test(p-value)			0.722
F-statistic excluded restrictions		17.6	
Observations	274	274	203

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In order to explain the existence of the profit gender gap, Bernhardt et al. (2017) suggest that returns to capital in female-operated microenterprises are lower in multiple-enterprise households

but not in single-enterprise households. That is, women invest the capital in their husbands' enterprises rather than in their own. So husbands' business profits would be positively related to female ownership. To test this hypothesis with our data we evaluate the relation of female-operated business separately with female's microenterprises profits, and with male's microenterprises profits. As can be seen in Table 4, we do not find evidence for a positive relation of female ownership with husband' business profits that may support Bernhardt et al. (2017) theory. With our data, female ownership is negatively related to household' profits and women's business profits and has no relation to men's profit microenterprises.

Table 4: The relation Female Owner and Profit levels, by gender

	Heckman model		Extremal quantile regression	
VARIABLES	Log ProfitsF	Log ProfitsM	Log ProfitsF	Log ProfitsM
Female Owner	-0.481*	0.117	-0.927***	-0.643*
	(-1.778)	(0.310)	(-3.440)	(-1.890)
Household size	0.025	0.048		
	(0.561)	(0.713)		
Household Age	0.020*	-0.036**		
	(1.713)	(-2.107)		
Cognitive indicator	0.069	-0.084		
	(0.986)	(-0.965)		
Use TICs	-0.083	-0.478		
	(-0.327)	(-1.556)		
Risk Tolerant	0.169	0.357		
	(0.646)	(0.812)		
Experience with loan	0.634***	-0.450		
	(3.389)	(-1.151)		
Years of operation	0.002	0.012		
	(0.136)	(0.617)		
A Childcare, yes	-0.188	-0.188		
	(-0.724)	(-0.724)		
Men's Education	0.094	0.399*		
	(1.011)	(1.720)		
Women's education	0.192*	1.290***		
	(1.666)	(6.361)		
Village Fixed Effects	Yes	Yes	Yes	Yes
J test(p-value)			0.950	0.822
F-statistic excluded restrictions	16.4	17.8		
Observations	289	289	203	203

Robust t-statistics in parentheses

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

Currently the majority of micro credit programs around the world are available exclusively to women. The policy implication of de Mel et al. (2008) and Bernhardt et al. (2017) hypothesis is that if increasing firm growth and profitability is the main goal, then a focus on just female entrepreneurs might be misguided. The results for the Bolivian case support this argument, though the discussion will be extended in next sections, this research cast doubt about the effectiveness of female microcredit policy "alone" to reduce gender inequality.

4.2 The gender gap: the effect on women empowerment

In recent years female empowerment has become a fundamental element of development policy. The World Bank's Gender Action Plan in 2006, and the United Nations' Millennium Development Goals, for example based their arguments in the effects of female empowerment on economic development, Duflo (2012). While these policies may in part be designed as a remedy for existing inequities (such as higher barriers for women in accessing financial markets, or the discrimination against women in areas such as education and labor markets), in large part they are founded on the belief that they yield returns in terms of economic development, since mothers put more weight on children's health and education than fathers do, and so they promote human capital accumulation, and faster economic growth, Doepke and Tertilt (2019) explain this phenomenon as the "specialization hypothesis". An additional reason international organizations focus on helping female-owned enterprises is not just to boost household income, but to also improve women's economic position that could increase their personal autonomy and give them more say in households, with the rational that this may imply better outcomes for children as a downstream benefit.

In the literature whether female ownership in fact improves women's empowerment is neither well recognized nor well-known, and the evidence regarding its impacts is largely inconclusive from one context to another and from one study to another. For example, Islam et al., 2015, argue that even though microcredit may be an important tool for women empowerment, it has less impact on women who share their husband the business. These authors suggest that microcredit can also be harmful to women, especially to those who have a little control over their loan because it may affect their ability to meet loan repayment in time, see also Ali and Niehof (2007). As found by Bekele et al. (2012) women may also be subjected to marital conflict when their husbands force them to hand their microcredits. So, another gender-related open question in the literature is whether female ownership improves women's empowerment, this research fills this gap and tests the effect of gender ownership on women's empowerment.

As displayed in Table 5, we find evidence that women ownership is positively related to women's empowerment. So, with our data we support the argument that microcredit being focused on women helps them, and specifically gives them an increase in their decision-making faculties.

Table 5: The relation Female Owner and Empowerment level

	Heckman model	Extremal quantile regression
VARIABLES	Empowerment	Empowerment
Female Owner	1.416***	2.463***
	(3.603)	(5.200)
Couple years	0.004	
	(0.384)	
Age difference	-0.033	
	(-1.504)	
Men's economic power	-0.173	
	(-0.505)	
Men's Education	-0.195	
	(-0.966)	
Women's education	0.495***	
	(2.801)	
Household size	-0.089	
	(-1.088)	
Household Age	0.005	
	(0.357)	
Cognitive indicator	0.090	
	(0.890)	
Use TICs	-0.339	
	(-1.090)	
Risk Tolerant	0.031	
	(0.080)	
Experience with loan	-0.047	
	(-0.132)	
Years of operation	0.026	
	(1.304)	
Childcare	0.681*	
	(1.845)	
Village Fixed Effects	Yes	Yes
J test(p-value)		0.271
Observations	274	203

Robust t-statistics in parentheses

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

4.2.1 Explaining the profit gender gap: the role of women empowerment

There is some literature that suggests a strong positive correlation between the relative position of women in society and the level of economic development, Duflo (2012) and Doepke et al., (2012). These studies suggest that when transfer payments are given to women rather than to their husbands, expenditures on children increase, and to the extent that more spending on children promotes human capital accumulation, this imply that empowering women will result in faster economic growth. Based on this relation, among policy makers there is a growing belief that there is a causal link running from female empowerment to development. Although Doepke and Tertil (2019) find that empowering women is likely to accelerate growth in advanced economies that rely mostly on human capital, but may actually hurt growth in economies where physical capital accumulation is the main engine of growth.

While most of the literature on women empowerment is focusing on the effectiveness of microcredit, little is known about the effect of women empowerment on microenterprise' performance. This section contributes to this discussion, still undocumented in the literature, by presenting empirical evidence for this relation (5 in figure 1). We present our results in Table X, here we treat in column one women empowerment as an exogenous variable, so we estimate a Heckman model, whereas in columns two and three we consider the possibility of endogeneity between profit levels and women empowerment. There may be some unobserved factors that we are not able to control that explain both variables at the same time, so, endogeneity by unobserved heterogeneity may exists. Then, we apply the approaches suggested and explained in sections 3.4 and 3.5, that is, here we estimate simultaneous equations (1a) to (4a) from section 3.4. As explained before, here we follow two approaches, we use some variables included in Z_i to ensure identification, we use the variable female ownership and a dummy with value equal to one in case men earns more than women in household. Note that we also consider instruments generated internally by the data following the seminal work of Lewbel (2013). The advantage of the first approach is that it allows to test the mechanism: female owner, women empowerment and profit levels, in a simultaneous equation framework. Traditional statistical tests for identification are presented at the bottom of the table.

By using our three methodological approaches the generality of the results show that women empowerment is negatively related with business profits. A study by Sayed et al. (2017) suggests that even though the effect of microcredit empowers women borrowers in households' decisions-making, it has no effect on women control over minor financials. These results contribute to an unexplored research question in economics, does female empowerment influences business performance? As mentioned below most of the literature is focused on the women empowerment's effectiveness of microfinance, while their relation to business performance is still unknown. This research suggests that giving microcredit to women, effectively may increase their empowerment capabilities, however it is insufficient to make her business better off. While it may be true that empowering women can enable them to overcome sociocultural issues, interpersonal constraints, and family issues, it is important to understand the multiple constraints female entrepreneurs experience in a developing country context, Minh and Nwachukwu (2020), suggest for example, that microcredit policies must be accompanied by the creation of a conducive environment and incentives to promote female entrepreneurship.

Table 6: The relation Female Owner, Empowerment level and Profits

	Heckman model	IV-Heckman model	IV Lewbel-Heckman model
SECOND STEP	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH
Women Empowerment	-0.050**	-0.316***	-0.083*
	(-2.100)	(-3.916)	(-1.957)
Household size	0.210**	0.118	0.197**
	(2.565)	(1.216)	(2.446)
Household Age	0.670***	0.682***	0.600***
	(9.996)	(9.047)	(8.814)
Cognitive indicator	0.041	-0.010	-0.015
	(1.303)	(-0.270)	(-0.465)
Use TICs	0.000	0.020**	0.010
	(0.078)	(2.436)	(1.556)
Risk Tolerant	0.176***	0.232***	0.210***
	(4.510)	(4.129)	(4.385)
Experience with loan	-0.106	0.051	-0.032
	(-0.881)	(0.336)	(-0.232)
Years of operation	0.381**	-0.075	-0.050
	(2.406)	(-0.367)	(-0.281)
A Childcare, yes	0.204	0.424**	0.246
	(1.448)	(1.974)	(1.395)
Men's Education	0.012	0.006	0.006
	(1.497)	(0.865)	(0.942)
Women's education	-0.845***	-0.771***	-0.964***
	(-5.779)	(-4.465)	(-6.939)
Inverse Mills Ratio		**0.017***	**0.063***
		(1.774)	**(1.678)**
Village Fixed Effects	Yes	Yes	Yes
FIRST STEP:		Women Empowerment	Women Empowerment
Female Owner		1.934***	
		(6.649)	
Men's economic power		-0.444	
		(-1.559)	
Men's Education		-0.227	
		(-1.141)	
Women's education		0.453***	
		(3.616)	
Lewbel's internally generated instruments			Yes
Breusch-Pagan test (Ho:Homoscedasticity)			0.001
Hansen J overid test (p-value)		0.479	0.832
Kleibergen-Paap rk Wald F statistic		25.461	8.688
Critical value (10% maximal LIML size)		8.68	3.39
Observations		274	274

Bootstrap t-statistics in parentheses

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

4.3 The gender gap: the effect on the intrahousehold decision making

Understanding intrahousehold relations between couples has engaged the attentions of interdisciplinary development studies in the literature. Still how households collectively manage economic resources and their effects is an open question in economics. It is now recognized, Udry (1996) and Doss and Meinzen-Dick (2015), that the unitary household model, which makes abstraction of individual preferences of household members and assumes the collective action

problem of the household is solved, does not adequately explain how households decide upon production and resource allocation. In contrast, cooperative bargaining models acknowledge that each household member has his/ her own utility function with different preferences and different abilities to impact outcomes, which implies bargaining between household members, and that the outside options of those involved in bargaining determine the intrahousehold resource allocation. Doss and Meinzen-Dick (2015) take the existence of household public goods and collective action within the household, by drawing parallels with common pool resources. These authors argue that households manage a set of common resources to provide in a livelihood and are mutually interdependent on the individual decisions of the other members about provision and appropriation of (the benefits of) those resources, which have implications for all users. Hence, a collective action problem arises. Doss and Meinzen-Dick (2015) suggest that findings ways to improve cooperation within households can benefit from looking into ways to overcome the provision and appropriation dilemmas that typically arise in common pool resources settings, see also Duflo and Udry (2004).

In practice, some common household resource management practices found in the literature suggest non cooperative behavior, since husbands and wives tend to manage their income separately and do not pool their money, (Johnson, 2017). This pattern has been documented by studies in Ghana (Mikell, 1997), in Kenya (Johnson, 2004), in Malawi (Johnson, 2005), as well as Nigeria (van Staveren and Ode bode, 2007). Moreover, other evidence suggests that in many households, husbands and wives do not practice transparency regarding income as both tend to keep money hidden, see Castilla (2013), Iversen et al., (2011) and Kebede et al. (2014).

These existing studies of intrahousehold resource management provides rich descriptions of common practices, but there has been little work trying to explain the factors that may influence these behaviors. This research fills this gap and provides first empirical evidence on the determinants of the intrahousehold decision making. To measure this concept, we constructed three participative indicators, as the simple average of 20 dummy variables that stem from the question: In your household, who normally makes most of the decisions about the 20 activities listed below? With three possible answers, both, women (or wife), men (or husband), see Appendix 1. Then we construct the first indicator “Egalitarian household” as the mean of the responses “both” to the 20 questions mentioned below. The second indicator is called “Women most of the decisions” is also the mean of the answer “women”. And the third variable is called “Men most of the decisions” is also the mean of the answer “women” to the 20 questions. These variables have values that oscillates between 0 and 1 (minimum values of these indicators meaning low levels). The average values of these indicators are 0.43, 0.41, and 0.09, respectively.

This approach is based on Musalia (2018) who examines the decision-making process among 4931 married Kenyan women and outlines three household decision-making profiles, the first classified as Egalitarian (decisions are a joint effort between spouses), the second as Independent (women makes all household decisions), and the third as Conservative (decisions are man's responsibility). Similarly, Johnson (2017) examines the financial management systems and levels of cooperation among 51 married couples in Kenya. She presents a typology of intrahousehold financial management arrangements and then examines how this relates to the level of cooperation between couples.

Table 7: The determinants of Intrahousehold decision patterns

	Heckman selection model			Extremal quantile regression		
VARIABLES	Egalitarian most decisions	Women most decisions	Men most decisions	Egalitarian most decisions	Women most decisions	Men most decisions
Female Owner	-0.157***	0.164***	0.003	-0.169***	0.247***	-0.014
	(-3.826)	(3.016)	(0.139)	(-3.240)	(3.200)	(-0.800)
Couple years	0.008***	-0.002	-0.001			
	(5.475)	(-0.887)	(-1.077)			
Age difference	0.002	0.000	0.004*			
	(0.504)	(0.039)	(1.910)			
Men's economic power	-0.116**	-0.090*	0.036*			
	(-2.231)	(-1.680)	(1.763)			
Men's Education	0.085***	-0.020*	0.014*			
	(3.533)	(-1.715)	(1.702)			
Women's education	0.036*	0.050**	-0.013*			
	(1.742)	(1.974)	(-1.704)			
Household size	0.001	0.023**	0.001			
	(0.116)	(2.443)	(0.171)			
Household Age	0.000	0.003	0.001			
	(0.124)	(1.463)	(1.406)			
Cognitive indicator	-0.006	-0.006	0.005			
	(-0.487)	(-0.397)	(0.871)			
Use TICs for business	-0.034	0.026	-0.003			
	(-0.810)	(0.532)	(-0.113)			
Risk Tolerant	-0.020	0.020	-0.037			
	(-0.344)	(0.274)	(-1.135)			
Financial experience	0.044	-0.042	-0.014			
	(0.929)	(-0.805)	(-0.644)			
Years of operation	-0.001	-0.006*	0.001			
	(-0.215)	(-1.766)	(0.728)			
Childcare	-0.065	0.179***	0.327***			
	(-1.192)	(4.108)	(11.694)			
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271	271	271	289	289	289

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Scholars spanning other social science disciplines have recognized the complex and gendered nature of intrahousehold decisions. Table 7 provides interesting information about the determinants of intrahousehold decisions patterns. From it emerges that:

(i) Female owner is negatively related to egalitarian decision process schemes, while it is positively related to households in which women takes most of the decisions. We understand this

result in the framework of the results found in section 4.2. That is, female ownership is related with women empowerment.

(ii) Another interesting characteristic is that men's economic advantage is negatively related with egalitarian decisions process and with households in which women take most of the decisions, but it favors men's decision frequency. (iii) Moreover, households in which there is a difference in ages between couples (men being older than women) are those in which most of the decisions are taken by men. These results are in line with the traditional social narrative which emphasizes men's responsibility to afford the resources required to meet household needs and women's corresponding role in working daily household tasks. And so, women end up relatively excluded from asset management, Johnson (2004).

(iv) Finally, table 7 suggest that education of both men and women are positively related with egalitarian decisions process, nevertheless men education level diminish women's decisions frequency while at the same time it supports men's decisions frequency. In the same way that women education level diminishes men's decisions frequency while at the same time it boosts women's decisions frequency. These result supports recent research by Le and Nguyen (2021) who state that women education is positively associated with women's intra-household decision making authority in both financial and non-financial domains. In addition, while acknowledging women's subordination, more recent research, Jackson (2007, 2012) and Johnson (2017), has emphasized that intrahousehold relationships are not static according to a conjugal contract, but rather are dynamic and constantly renegotiated, Despite their relative disadvantage, women exercise agency within ongoing bargaining over the management of household economic resources. Then, our results suggests that women education level might be a fundamental factor of bargaining power for women in these games of cooperative conflicts, see the bargaining theory proposed by Manser and Brown (1980) where education allows women to enjoy higher bargaining power within households.

4.4.1 Explaining the profit gender gap: the role of the of the intrahousehold decisions

The literature on gender, entrepreneurship, and firm performance generally concludes the existence of significant gender gaps in several dimensions of female-owned firms' performance, see Campos and Gassier (2017). Although several hypotheses have been advanced, there is no conclusive evidence on the underlying factors explaining any gender gaps on firm performance in developing countries. Some works, World Bank (2012), Kucera and Tejani (2014) for example, find that female businesses are concentrated in sectors characterized by limited economies of scale, low growth, low technology and low capital. Other research as Aterido and Hallward-Driemeier (2011), suggest that female entrepreneurs may be disadvantaged in terms of education,

experience and other skill-related traits that are positively linked to productivity. However, Nix et al. (2016) and Kagi (2018), show that the gender performance gap remains partly unexplained even after controlling for industry, firm, and owners' characteristics.

There are some common household resource management practices found in the literature which suggest non cooperative behavior, since husbands and wives tend to manage their income separately and do not pool their money, (Johnson, 2017). These existing studies of intrahousehold resource management provides rich descriptions of common practices. However, none of these studies specifically examines how these intrahousehold decisions affect business performance, a gap that this research fills. This paper is the first to present quantitative evidence on the link between intrahousehold decisions patterns and business performance, here we propose a mechanism called "participative management", households who take decisions jointly as a couple are prone to get positive outcomes. In this section we test relation 6 of figure 1.

We present our results in Table 8, here we consider the possibility of endogeneity between profit levels and intrahousehold decisions. There may be some unobserved factors that we are not able to control that explain both variables at the same time, or simply, it is possible that microenterprises with high levels of profits may want to hold this status and then couples decide to cooperate and take decisions jointly for this profit level aim. So, endogeneity by unobserved heterogeneity or simultaneity may arise. Then, we apply the approaches suggested and explained in sections 3.4 and 3.5, that is, here we estimate simultaneous equations (1a) to (4a) in section 3.4.

As explained before, here we follow two approaches, we use some variables included in Z_i to ensure identification, the determinants of intrahousehold decision patterns identified in last section, and we also consider instruments generated internally by the data following the seminal work of Lewbel (2013). The advantage of the first approach is that it allows to test the mechanism: female owner, intrahousehold decisions and profit levels, in a simultaneous equation framework.

Table 8: The relation Female Owner, Intrahousehold decision patterns and Profits

	IV-Heckman model			IV Lewbel-Heckman model		
SECOND STEP	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH
Egalitarian most decisions	2.714***			2.564***		
	(6.391)			(5.397)		
Women most decisions		-2.600***			-1.455**	
		(-4.206)			(-2.277)	
Men most decisions			-2.704*			-1.707***
			(-1.919)			(-3.504)
Household size	-0.003	0.084*	-0.020	0.010	0.013	0.029
	(-0.073)	(1.749)	(-0.517)	(0.371)	(0.393)	(1.228)
Household Age	0.006	0.020**	0.013*	0.000	0.011*	0.003
	(0.942)	(2.523)	(1.686)	(0.059)	(1.761)	(0.931)
Cognitive indicator	0.163***	0.139***	0.204***	0.136***	0.180***	0.199***
	(3.607)	(2.623)	(3.712)	(4.280)	(4.007)	(6.141)
Use TICs	0.149	0.236	-0.016	0.083	0.033	-0.013
	(1.046)	(1.315)	(-0.103)	(0.998)	(0.240)	(-0.164)
Risk Tolerant	0.015	-0.016	-0.209	0.134	-0.031	0.121
	(0.078)	(-0.081)	(-1.004)	(1.315)	(-0.194)	(1.128)
Experience with loan	0.113	0.204	0.118	-0.009	0.195	0.061
	(0.649)	(0.926)	(0.655)	(-0.078)	(1.202)	(0.557)
Years of operation	0.014*	-0.002	0.007	0.009**	0.002	0.004
	(1.786)	(-0.224)	(0.719)	(2.028)	(0.398)	(0.822)
A Childcare, yes	-0.805***	0.006	0.444	-0.686***	-0.701***	-0.619***
	(-3.994)	(0.020)	(0.538)	(-5.227)	(-3.652)	(-4.389)
Men's Education	0.058	0.045	0.247**	0.146***	0.170**	0.102*
	(0.654)	(0.424)	(2.527)	(2.714)	(2.209)	(1.811)
Women's education	0.297***	0.733***	0.515***	0.237***	0.611***	0.516***
	(2.793)	(8.507)	(4.520)	(3.020)	(9.756)	(11.168)
Inverse Mills Ratio	**0.224****	**0.063***	**-0.037**	**-0.111***	**0.075***	**-0.092***
	(1.967)	**(1.654)**	**(-0.199)**	**(-1.897)**	**(1.664)**	**(-1.677)**
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
FIRST STEP:	Egalitarian most decisions	Women most decisions	Men most decisions			
Female Owner	-0.249***	0.221***	-0.006			
	(-9.871)	(6.391)	(-0.380)			
Couple years	0.006***	-0.000	-0.001**			
	(8.229)	(-0.198)	(-2.206)			
Age difference	0.008***	-0.000	0.003***			
	(5.222)	(-0.044)	(2.615)			
Men's economic power	-0.032	-0.030	0.035**			
	(-1.502)	(-0.898)	(2.487)			
Has a debt loan	-0.042*	0.020	0.014			
	(-1.654)	(0.405)	(0.828)			
Men's Education	-0.010	-0.020	0.006			
	(-0.754)	(-1.003)	(0.712)			
Women's education	0.087***	0.021	-0.029***			
	(7.698)	(1.196)	(-3.790)			
Lewbel's internally generated instruments				Yes	Yes	Yes
Breusch-Pagan test (Ho:Homoscedasticity)				0.001	0.001	0.001
Hansen J overid test (p-value)	0.099	0.102	0.832	0.597	0.263	0.638
Kleibergen-Paap rk Wald F statistic	28.166	10.011	6.185	4.934	4.854	17.256
Critical value (10% maximal LIML size)	4.84	4.84	4.84	3.39	3.39	3.39
Observations	274	274	274	274	274	274

Bootstrap t-statistics in parentheses

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

The generality of the results shows that egalitarian households, those who take most of the decisions participatively, are positively related with business profits, while the schemes in which

either man or woman make the majority of the decisions have a negative relationship with business profits. That is, coordination, cooperation as a couple matters. This result support theorical models like McCarthy and Kilic (2017) who show that, relative to increasing wives' bargaining power, improving cooperation between spouses would exert larger and statistically significant positive impacts on total household income and consumption expenditures per capita. Similar conclusion is offered by Lecoutere and Jassogne (2019), who through a lab-in-the-field experiment conducted with spouses in agricultural households in Uganda, find that intrahousehold decision-making that supports cooperation and equitable sharing is associated with greater investment in the intensification of cash and food crop production, and more equitable access and control over income.

The main conclusion of this result and the result of section 4.2.1 is that development programs that promote intra-household cooperation could lead to greater gains in business performance compared with interventions focusing exclusively on women's empowerment.

4.4 The gender gap: the effect on the allocation of resources

This section tests relation 4 of figure 1. It is the first in the literature which presents evidence on the relation of gender and allocation of resources in microenterprises. de Mel et al. (2008, 2009) and Fafchamps et al. (2014) find that returns to capital grants tend to be positive for male-operated microenterprises but close to zero for women. These authors argue that women's grants were captured by other household members, as there is no separation between family and business for microentrepreneurs. One way this materializes is that pressure from family to share income can lead to a decrease in the likelihood of investing in an existing business, or, simply women might put more weight on or have more responsibility for spending for the household, Jakiela and Ozier (2016). In this line of research, Fafchamps et al. (2014) find that in-kind transfers are more effective than cash transfers in increasing profits for female business owners. This is true since women are more likely to use cash transfers for household expenses and to invest less in their business, see also Friedson-Ridenour and Pierotti (2019)

It is important to highlight that these two hypotheses mean that women are less likely than men to invest available capital in their business, in the case of Fafchamps et al. (2014) a conclusion based on the finding that in-kind grants lead to increases in business profits for female while cash grants did not in Ghana. In the case of Friedson-Ridenour and Pierotti (2019) a conclusion based on 49 interviews also in Ghana. Proper quantitative evidence for this hypothesis has not been tested yet in the literature.

To achieve this objective, we create three indicators (dummies) which are used as proxies for misallocation of the capital, all of them based in the difference between what was planned with the money borrowed (the intended use stated before obtaining the loan) and what was actually disposed (how it was effectively used): the first indicator is called Loan Misallocation, and it takes the value 1 if the household spent the loan different as it was initially planned, 0 otherwise. The second indicator is called Investment Misallocation, and it takes the value 1 if the household invested in business lower than it was planned, 0 otherwise. And the third indicator is called Household Misallocation, with value 1 if the household spent the loan in household needs more than it was initially planned.

Table 9: The determinant of resource allocation

	Heckman probit selection model			Semi-nonparametric selection model		
VARIABLES	Loan misallocation	Investment misallocation	Household misallocation	Loan misallocation	Investment misallocation	Household misallocation
Female Owner	0.055**	0.098**	0.089*	0.081***	0.088***	0.128***
	(2.550)	(2.519)	(1.757)	(2.716)	(4.379)	(2.774)
Couple years	-0.006***	-0.021***	-0.005***	-0.005***	-0.022***	-0.006***
	(-7.070)	(-6.199)	(-2.947)	(-5.074)	(-8.229)	(-4.359)
Age difference	-0.001	0.004**	0.000	-0.001	0.004***	-0.001
	(-1.167)	(2.471)	(0.041)	(-0.757)	(4.918)	(-0.352)
Men's economic power	0.004	0.079***	0.080**	0.039	0.040*	0.093***
	(0.138)	(3.145)	(2.244)	(1.277)	(1.740)	(2.914)
Men's Education	0.006	-0.042***	0.017	0.033**	-0.051***	0.009
	(0.479)	(-3.054)	(0.803)	(2.540)	(-5.284)	(0.442)
Women's education	-0.026	-0.041***	-0.058***	-0.012	-0.032*	-0.064***
	(-1.443)	(-3.181)	(-3.197)	(-0.877)	(-1.922)	(-2.703)
Household size	0.012	0.012**	0.008	0.014*	0.010***	0.006
	(1.622)	(2.515)	(1.020)	(1.855)	(2.669)	(0.879)
Household Age	-0.004***	0.002*	0.002	-0.003***	0.002***	0.002**
	(-3.473)	(1.957)	(1.641)	(-3.547)	(3.295)	(2.244)
Cognitive indicator	-0.027***	-0.017**	-0.021*	-0.028***	-0.007	-0.019
	(-4.410)	(-2.150)	(-1.831)	(-4.010)	(-1.497)	(-1.166)
Use TICs for business	0.014	0.100***	0.013	0.015	0.084***	0.017
	(0.577)	(3.720)	(0.422)	(0.451)	(6.385)	(0.392)
Risk Tolerant	0.080***	-0.012	-0.115**	0.055*	-0.018	-0.136***
	(2.801)	(-0.342)	(-2.089)	(1.685)	(-0.723)	(-3.421)
Financial experience	0.007	-0.102***	0.005	-0.030	-0.084***	-0.013
	(0.332)	(-2.705)	(0.142)	(-1.127)	(-3.869)	(-0.183)
Years of operation	0.000	-0.003	-0.003	0.001	-0.001	-0.002
	(0.219)	(-1.594)	(-1.291)	(0.642)	(-1.491)	(-0.935)
Childcare	0.276***	0.040**	0.071**	29.254***	0.060**	0.099***
	(5.598)	(2.152)	(2.059)	(8.260)	(2.174)	(3.218)
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	271	271	271	271	271	271

Robust t-statistics in parentheses

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

In Table 9 we show the average marginal effects for both estimation methods. The dependent variables are our measures of resources misallocation and the main explanatory variable of interest is a dummy with value equal to one in case the owner of the business is a woman. As can be seen our prediction stands neatly and consistently confirmed, (i) the coefficient of female

owners is positive and highly significant through the different estimations, that is women are positively related to resource misallocation. These results provide empirical support to previous indirect hypothesis in the literature as de Mel et al. (2008, 2009), Fafchamps et al. (2014), and Friedson-Ridenour and Pierotti (2019). Additional interesting findings are (ii) the more mature the couple, the less likely they are to misallocate their resources. Result that supports recent research by Lim et al. (2022) who state that older couples tend to consult financial professionals about financial management. Also, (iii) the greater the men's economic advantage at home, the more likely the couple misallocate their resources. Finally (iv) in all cases education of both men and women are negatively related to the misallocation of resources. These results support previous findings in the literature which states that owners with higher human capital employ better business practices in developing countries, see McKenzie and Woodruff (2015).

4.4.1 Explaining the profit gender gap: the role of the allocation of resources

The literature on gender, entrepreneurship, and firm performance generally concludes the existence of significant gender gaps in several dimensions of female-owned firms' performance, see Campos and Gassier (2017). Although several hypotheses have been advanced, there is no conclusive evidence on the underlying factors explaining any gender gaps on firm performance in developing countries. Building on this research, this section investigates what drives the estimated gender gap in business performance. We propose a mechanism that joins previous research called the misallocation of resources channel: "women have lower profits because they misuse the capital", relation 7 in figure 1. The objective of the empirical analysis of this section is along the lines of existing studies on the topic, we try to find out whether and to what extent the misallocation of resources (explained in preceding section)[2] can explain female-owned firms performance gap compared to their male-owned counterparts.

[2] The underlyng assumption here is that the planned allocation at the beginning was the optimal allocation.

Table 10: Female ownership, resource allocation and profits

	IV LIML-Heckman model			IV LIML Lewbel-Heckman model		
VARIABLES	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH	Log ProfitsHH
Loan misallocation	-2.346***			-1.192***		
	(-6.011)			(-5.425)		
Investment misallocation		-3.488***			-0.958***	
		(-5.663)			(-2.888)	
Household misallocation			-4.789***			-1.122***
			(-2.856)			(-3.330)
Household size	0.011	0.046	0.010	-0.006	-0.001	-0.012
	(0.333)	(1.158)	(0.172)	(-0.189)	(-0.025)	(-0.379)
Household Age	-0.002	0.000	0.008	0.003	0.005	0.007
	(-0.379)	(0.009)	(1.083)	(0.508)	(0.896)	(1.197)
Cognitive indicator	0.048	0.143***	0.123**	0.120**	0.184***	0.185***
	(0.822)	(2.992)	(2.026)	(2.416)	(4.271)	(4.128)
Use TICs	-0.085	0.185	0.232	-0.065	0.014	0.016
	(-0.650)	(1.174)	(1.337)	(-0.525)	(0.114)	(0.123)
Risk Tolerant	0.004	0.040	-0.247	-0.024	-0.013	-0.089
	(0.023)	(0.190)	(-1.102)	(-0.149)	(-0.075)	(-0.518)
Experience with loan	0.041	-0.224	-0.139	0.114	0.085	0.110
	(0.242)	(-1.198)	(-0.564)	(0.734)	(0.538)	(0.678)
Years of operation	0.013*	0.011	0.012	0.008	0.006	0.006
	(1.939)	(1.298)	(1.185)	(1.365)	(1.110)	(1.086)
A Childcare, yes	-0.990***	-0.045	0.925	-1.025***	-0.742***	-0.582***
	(-6.890)	(-0.184)	(1.260)	(-7.706)	(-4.570)	(-2.899)
Men's Education	0.301***	-0.128	0.135	0.261***	0.125	0.201**
	(3.311)	(-1.067)	(1.223)	(3.185)	(1.353)	(2.527)
Women's education	0.486***	0.360***	0.453***	0.502***	0.518***	0.535***
	(6.229)	(3.625)	(3.823)	(8.078)	(7.752)	(8.574)
Inverse Mills Ratio	**0.157***	**0.319***	**-0.353**	**0.119***	**0.151***	**-0.020**
	(1.815)	**(1.738)**	**(-1.477)**	**(1.771)**	**(1.890)**	**(-0.122)**
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
FIRST STEP:	Loan misallocation	Investment misallocation	Household misallocation	Loan misallocation	Investment misallocation	Household misallocation
Female Owner	0.109***	0.097***	0.060**			
	(3.452)	(2.630)	(2.175)			
Couple years	-0.006***	-0.008***	-0.001			
	(-5.153)	(-6.017)	(-0.792)			
Age difference	0.001	0.002	0.001			
	(0.231)	(0.688)	(0.499)			
Men's economic power	0.034	-0.064*	-0.007			
	(0.987)	(-1.932)	(-0.225)			
Has a debt loan	0.149**	0.297***	0.286***			
	(2.171)	(4.689)	(5.186)			
Men's Education	-0.090***	0.047**	-0.014			
	(-4.345)	(1.994)	(-0.683)			
Women's education	-0.061***	-0.042**	-0.031*			
	(-3.399)	(-2.419)	(-1.759)			
Lewbel's internally generated instruments				Yes	Yes	Yes
Breusch-Pagan test (Ho:Homoscedasticity)				0.001	0.001	0.001
Hansen J overid test (p-value)	0.268	0.102	0.110	0.492	0.206	0.343
Kleibergen-Paap rk Wald F statistic	12.747	15.064	6.185	48.540	18.254	45.876
Critical value (10% maximal LIML size)	4.84	4.84	4.84	3.39	3.39	3.39
Observations	274	274	274	274	274	274

Bootstrap t-statistics in parentheses

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

We present our results in Table X, here we consider the possibility of endogeneity between the profit level and the allocation of resources. That is, we apply the approaches suggested and

explained in sections 3.4 and 3.5. The variables included in Z_i to ensure identification in the estimation are proxies for possible channels that can affect the allocation of resources (tested in last section): the number of years the couple is married, a dummy stating whether men earn more than women or not, a dummy with value one in case there is age difference between men and women, also a dummy stating if the coupe has actually a debt loan. We also include the variable gender ownership, this allows us to test the effect of gender to profits via the allocation of resources channel. It is important to highlight that we also consider an alternative identification strategy that does not depend of Z_i, that is we use instruments generated internally by the data following the seminal work of Lewbel (2013).

The results suggest a positive effect of gender ownership on the misallocation the resources (first stage), and a negative effect of these variables on profit levels (second stage). That is, one factor that may explain the profit gender gap is that women misallocate the resources. These results are in line with Friedson-Ridenour and Pierotti (2019), who based on qualitative interviews suggest that woman's efforts to structure her intrahousehold relationships to best meet her needs may constrain the decisions that she makes about her business. These authors find that women opted to be cautious about business investment, instead maintaining pressure on their partner to meet current needs and investing in children and property for the future. Another related work by Fafchamps et al. (2014) conclude that the profits of female enterprises respond more positively to in-kind grants, which are less easily diverted to other purposes. In line with this, Bernhardt et al. (2017) using experimental data from India, Sri Lanka and Ghana, suggest that women may be investing the capital in their husbands' enterprises rather than in their own.

Other factors that are positively related with the misallocation of resources is the existence of debt loan (financial conditions). Finally, couple years and education level of both men and women are negatively related with the misallocation of resources, and so with positively related with profit levels, see Lim et al. (2022) for analysis of older couples' behavior and McKenzie and Woodruff (2015) for the positive role of education in business management in developing countries.

IV. CONCLUSIONS

In this research we have sought to provide evidence on some unanswered questions on gender gap in microfinance. It is well known that female-owned microenterprises have been promoted in development policy as a powerful engine of economic growth, poverty alleviation, and to decrease of gender inequality. However, the literature has documented gender gaps in microenterprise business investment and performance, which can serve to reproduce gender inequality and hinder economic growth (De Mel et al., 2009; Fafchamps et al., 2014; Berge et al., 2015).

Building on this research, this paper investigates how women's business is related to empowerment, intrahousehold decision patterns, and the allocation of resources. We contribute to the literature by answering empirically the following questions: (i) Are female enterprise more related to profits, women empowerment, egalitarian intrahousehold decision schemes, and efficient allocation of resources?. (ii) What is the role of women empowerment, the intra-household decision-making process, and the resources allocation on microenterprise' profit levels?. (iii) Which household characteristics are more related to a participative intra-household decision-making process, which ones to women empowerment, and which ones to the allocation of resources?

Based on an in-depth quantitative study of women microentrepreneurs in Bolivia, we explored the intertwined nature of performance gender gap in the microcredit literature. We find that: (i) women's business are related to lower profits, that is, there is a performance gender gap in Bolivia. Also, (ii) we contribute to the heterogeneous results on this literature and suggest that female microenterprise ownership is positively related to women empowerment. In addition, we contribute to the literature by testing the effect of women empowerment on profit levels. The results show a negative relation. (iii) We also see the effect of women ownership on three intrahousehold decision patterns, egalitarian (cooperative), a scheme in which women take most of the decisions, and a pattern in which men take most of the decisions. We find that female business is negatively related with the egalitarian scheme, which in turn is positively related with business profits. That is, one of the mechanisms through which female microenterprises are related negatively with business profits is the absence of coordination and cooperation in the intrahousehold decision making process. (iv) The policy implication of above results is that development programs that promote intra-household cooperation could lead to greater gains in business performance compared with interventions focusing exclusively on women's empowerment. (v) In the paper we also see the effect of female microenterprises on economic resource management practices. We find, according to the literature that, women are positively related with the misallocation of resources, and having through this mechanism negative effects on profits. (vi) Through the paper we highlight the positive effect of women education level on profit levels, on cooperative intrahousehold behaviors and on the efficient allocation of resources.

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ANNEX 1: OTHER MAIN VARIABLES

Women's empowerment index		
	Treatment	**Control**
PERSONAL		
Personal autonomy:		
Can you personally decide to participate in activities or meetings with friends or relatives?	0.24	0.36
Can you personally decide whether to work or not?	0.42	0.52
Can you personally decide to use social networks to communicate with friends or relatives?	0.43	0.57
Self-Confidence, Individual Capability:		
I decide and manage my business alone	0.62	0.55
RELATIONAL		
Control over household assets:		
Can you personally decide whether to use, sell or replace assets in your home? (R.- Yes)	0.15	0.15
Involvement in household decision making:		
In your household, who normally makes most of the decisions about the activities listed below? (R.-Herself)		
How to spend the money made from the household income-generating activities	0.20	0.19
What food to buy and consume	0.29	0.33
Purchase of furniture for the house	0.16	0.15
The education of your children	0.12	0.16
Time and workload:		
In addition to the business activities who is responsible for the care of children, cooking, cleaning the house, washing clothes? (R.- Both)	0.21	0.25
Contribution to household income		
Given the total income of your household, what is the percentage of your own contribution? (R.- Contribution>0)	0.96	0.93
EMPOWERMENT INDICATOR	**3.86**	**4.02**

INTRAHOUSEHOLS DECISION PATTERNS

In your household, who normally makes most of the decisions about the activities listed below?	**BOTH**	**HER**	**HIM**
How to spend the money made from the household income-generating activities	0.23	0.54	0.12
Contracts with input suppliers	0.13	0.63	0.13
Sales strategies (marketing)	0.12	0.64	0.13
Recruitment	0.12	0.55	0.14
Rest days (which days to work)	0.19	0.58	0.12
The selling price	0.13	0.64	0.13
After a discussion who has the last saying	0.17	0.01	0.01
Purchase of food for the home (fruits, vegetables, etc.)	0.18	0.29	0.11
Purchase of durable goods for the home (TV, refrigerator, etc.)	0.36	0.14	0.07
Health expenditures	0.36	0.16	0.06
The spending of household income	0.34	0.18	0.06
How much to save and how to spend household savings	0.35	0.19	0.04
Buying clothes for the children	0.25	0.16	0.07
Expenditures on children's education	0.28	0.13	0.05
Shopping for clothes for you	0.11	0.44	0.02
Purchase of personal care products for you (rings, creams, perfume etc.)	0.10	0.41	0.06
Choosing the dish that you will serve in a restaurant	0.17	0.39	0.01
Whether or not you attend any social gatherings with friends	0.27	0.28	0.02
Whether you can work or not	0.14	0.42	0.01
If you can use social networks to communicate with friends/family	0.09	0.46	0.01
Egalitarian, both most of the decisions	**0.43**		
Women most of the decisions		**0.41**	
Men most of the decisions			**0.07**

HOUSEHOLD TASKS INDICATOR

	Treatment	Control
How many days a week do you cook lunch/dinner?	4.29	3.61
How many days a week do you wash clothes?	1.68	1.71
How many days a week do you clean the house?	4.43	3.46
How many days a week do you go to the market?	2.04	1.86
Household tasks indicator	**3.45**	**2.92**

APPENDIX 2:

THE IMPACT OF THE MICROFINANCE PROGRAM PROMUJER

The institution ProMujer allowed us to collect information on the commitment to carry out a quantitative analysis of impact evaluation. Here we present the results of this analysis

A2. METHODOLOGY

The data collection was designed to use Difference in Difference technique (diff-in-diff), that is we observed outcomes of people who were exposed to the intervention, ProMujer credit (treated) and people not exposed to the intervention (control), both before and after the intervention.

To lay out the setup, we rest on the traditional potential outcome approach developed by Rubin (1974), which views causal effects as comparisons of potential outcomes defined on the same unit. In this framework, each observation $i = 1...n$ has two potential responses (Y_i^0, Y_i^1) for a treatment. Y_i^1 is the outcome if observation i is treated (treatment group), and Y_i^0 is the outcome if observation i is not treated (control group). Each observation is exposed to a single treatment: $T_i = 0$ if the observation receives the control treatment and $T_i = 1$ if the observation receives the active treatment. In addition, each observation has a vector of characteristics X_i that are not affected by the treatment (usually referred to as covariates, pre-treatment variables or exogenous variables). For each observation, it is therefore observed the triple $(Y_i; T_i \in \{0,1\}; X_i)$, where Y_i is the realized outcome: $Y_i = T_i Y_i^1 + (1 - T_i) Y_i^0$. Unfortunately, we never observe both Y_i^0 and Y_i^1 simultaneously, so either Y_i^0 or Y_i^1 is missing for each observation.

In a cross-section setup, conditional on covariates (X), treatment, and outcomes must be independent for consistent estimation of the treatment effect using standard regression analysis. That is,

$$ATT = E(Y_i^0 \mid X, T) + T[E(Y_i^1 \mid X, T) - E(Y_i^0 \mid X, T)]$$

In practice, it is difficult to meet the assumption that treatment and outcomes are independent, conditional on covariates. So, diff-in-diff: under the assumption that unobserved covariates are time-invariant, and that any ‘‘shocks’’ (S) in the post-treatment period are the same for the treated and control units, unmeasured and unobserved covariates can be partialled-out, allowing the ATT to be consistently estimated. For the post-treatment and pre-treatment periods:

$$ATT = [E(Y_i^{1,Post} \mid X^{T=1}, S, T) - E(Y_i^{0,Post} \mid X^{T=0}, S, T)] - [E(Y_i^{1,Pre} \mid X^{T=1}, T) - E(Y_i^{0,Pre} \mid X^{T=0}, T)]$$
$$ATT = [E(Y_i^{1,Post} \mid T) - E(Y_i^{0,Post} \mid T)] - [E(Y_i^{1,Pre} \mid T) - E(Y_i^{0,Pre} \mid T)]$$

The time-invariant terms $X_i^{T=1}, X_i^{T=0}$, and S cancel out through the differencing process. Then this equation can be estimated using the following regression equation:

$$\text{LnProfitHH} = a_0 + a_1 T + a_2 Post + a_3 TxPost + \varepsilon$$

A.2.1. The parallel trend assumption:

The identifying assumption is that unobserved factors are actually time invariant. It is also called the "parallel trend" assumption: in the pre-intervention period, some set of observed and unobserved covariates influence the levels and trends in the outcomes for both the treatment and control groups. If the observed trends are similar (parallel), it may be rational to assume that observed and unobserved covariates are not changing differentially between treatment and control groups prior to the intervention and therefore may not change differentially after the intervention. In the opposite case, if observed pre-intervention trends are different, then the observed and unobserved covariates may be changing at a differential rate for treatment and comparison groups, which may continue into the postintervention period.

For t=2 as in the present case, there is no way to test the parallel trend, however, Ryan et al. (2018) using Monte Carlo simulation experiment test the performance of diff-in-diff estimators in a scenario when the parallel trends assumption is violated. They find that mean-squared error values were considerably lower for the diff-in-diff estimator with matching than for the standard diff-in-diff, that is, *the diff-in-diff estimator with matching* had superior performance when the parallel trends assumption is violated.

So, in this section we present estimations of the treatment effect for the ProMujer programme applying these two estimators, traditional diff-in-diff and matching diff-in-diff.

A3. RESULTS

As reported in next Table, we find that the ProMujer programme had a positive effect on profit levels of exp(0.145)-1 x100= 15.6% if we consider Table A.3.1 and of 32.1% if we consider the Matching diff-in-diff estimator (Table A.3.2). As can be seen in both tables, ProMujer programme also improved women empowerment and reduced the time spent on household tasks.

It is important to note, as shown in Table A.3.3, that the specification used fulfil the balance of covariates test.

Table A.3.1 Difference in Difference estimation of the Treatment Effect

	Diff in Diff				
VARIABLES	Log ProfitsHH	Empowerment	Hosehold Tasks	Poverty	Welfare
Treatment x Time	0.145**	0.959**	-0.362*	0.028	0.040
	(1.987)	(2.458)	(-1.712)	(0.651)	(0.327)
Time	0.259***	-2.200***	0.245	0.011	-0.061
	(2.727)	(-7.259)	(1.020)	(0.356)	(-0.618)
Treatment	0.194	2.385**	-1.603**	0.148*	-0.642*
	(0.413)	(2.388)	(-2.378)	(1.783)	(-1.900)
Household size	-0.041	-0.296***	0.005	-0.004	0.029
	(-0.977)	(-2.638)	(0.065)	(-0.487)	(1.058)
Household Age	-0.000	0.021	-0.000	-0.005***	0.012**
	(-0.029)	(1.171)	(-0.017)	(-2.688)	(2.181)
Cognitive indicator	0.317***	0.382**	-0.268**	0.023*	-0.085
	(3.929)	(2.200)	(-2.331)	(1.926)	(-1.357)
Use TICs	-0.079	0.683**	0.317	-0.024	-0.009
	(-0.672)	(2.402)	(1.461)	(-0.724)	(-0.085)
Risk Tolerant	-0.325	-0.965	-0.891	-0.105	0.661**
	(-0.540)	(-1.158)	(-0.644)	(-0.434)	(2.024)
Experience with loan	-0.360	1.017	-0.510	0.339	0.015
	(-0.861)	(1.627)	(-0.358)	(0.942)	(0.057)
Years of operation	0.233***	-0.354	-0.094	0.002	-0.001
	(5.491)	(-1.024)	(-0.779)	(0.210)	(-0.020)
A Childcare, yes	-0.660***	0.301	0.846***	-0.008	-0.029
	(-5.051)	(0.538)	(2.934)	(-0.106)	(-0.253)
Men's Education	0.377*	-0.854*	-0.865***	0.031	0.046
	(1.902)	(-1.918)	(-3.041)	(0.726)	(0.571)
Women's education	0.519***	0.361**	-0.128	-0.041***	0.044
	(7.712)	(2.412)	(-0.889)	(-2.731)	(0.871)
Individual Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	631	631	519	631	581

Robust t-statistics in parentheses

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

Table A.3.2 Matching Difference in Difference estimation of the Treatment Effect

	Matching Diff in Diff				
VARIABLES	Log ProfitsHH	Empowerment	Hosehold Tasks	Poverty	Welfare
Treatment x Time	0.279**	0.670*	-0.551*	-0.002	0.058
	(1.981)	(1.760)	(-1.661)	(-0.050)	(0.460)

Robust t-statistics in parentheses

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

Table A.3.3 Balancing of the Covariates

Mean:	Control	Treated	Diff.	|t|	p-value
Log ProfitsHH	8.386	8.066	-0.32	2.34	0.0197**
Household size	4.069	4.184	0.115	0.69	0.49
Household Age	30.286	28.586	-1.699	1.44	0.1518
Cognitive indicator	3.487	3.282	-0.205	1.31	0.191
Use TICs	0.556	0.563	0.007	0.14	0.8923
Risk Tolerant	0.217	0.178	-0.038	0.9	0.3709
Experience with loan	0.252	0.236	-0.016	0.34	0.7317
Years of operation	8.198	7.334	-0.865	0.97	0.3306
A Childcare, yes	0.162	0.19	0.028	0.62	0.5336
Men's Education	2.073	2.138	0.065	0.81	0.4205
Women's education	2.144	2.057	-0.087	0.88	0.3794