Access to Financing for Productive Employment Opportunities for Women in Rural Benin.

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Abstract

Government and financial institutions have attempted to address low financial inclusion in the development of sustainable microenterprises in rural Benin, especially with regard to women. In general, however, their actions have not been guided by evidence regarding the design of financing schemes intended to boost rural, women-owned enterprises. This paper reports on the relationship between various financing schemes in rural Benin and the economic performance of women-owned enterprises. Using an extended multinomial, endogenous-switching-regression selection-bias-correction model on a representative sample of rural microenterprises, we find that social-network-based financing improves the business performance of rural women entrepreneurs in small-scale commerce more than any other alternative financing scheme in any sector. This is particularly true for microenterprises managed by adult women and by women with a primary-school education level. Formal credit-based financing increases the profit margins of mature microenterprises led by rural women or that employ salaried workers, as well as of all businesses that operate on the basis of credit obtained from social-network-based financing. Finally, our study shows that self-financing is more profitable for young rural women entrepreneurs than other financing alternatives. Our results call for policies that target experienced women microenterprises for innovative microfinancing programs and young women entrepreneurs for subsidy programs.

Key words: microenterprise, microfinancing, gender, rural, Benin

JEL Classification : G32, J16, M21, L25, O12

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I.   Introduction

For a long time, women in Sub-Saharan Africa have been underrepresented in labor markets because of their conflicting housework and family-care responsibilities. At the same time, women in general are gaining influence in the work world. Fetterolf (2017), for example, showed that at least 40% of the labor force is female in Sub-Saharan Africa, 68.8% in Benin and 72% in rural Benin (International Labour Organization, 2020). *The Economist* ("Economic Contribution," 2012) reported that, if women's employment rates matched those of men, the impact on GDP in developing countries would be large because most of the world's women who live without adequate education and support are located in those countries. Because economic growth of the Sub-Saharan Africa depends mainly on agriculture, and more women than men live in rural regions, integrating women into the labor market is an important engine for improving women's empowerment and increasing inclusive economic growth. Although rural development is crucial for Sub-Saharan Africa economic growth, however, the area lacks dedicated financing mechanisms for real transformation. As a consequence, rural microenterprises are largely run with non-formal financing.[1]

Because of the potential profitability of microfinancing (Bhatt & Tang, 2001; Mahmud & Osmani, 2017), credit markets have been at the center of policy interventions (Hoff & Stiglitz, 1990), especially in rural areas. Many governments, supported by multilateral and bilateral aid agencies, have devoted considerable resources to supplying cheap credit to rural economic agents, and especially to women. Despite significant growth in microfinance institutions, however, access to financing in developing countries is still subject to disparities (Guerin et al., 2007).

The work of Arrow (1963) and Akerlof (1970) suggested the theoretical possibility that the existence of informational asymmetries would lead to market failure. Adverse selection (hidden information) because of variability and risks related to the primary sector (agriculture) and moral hazard (hidden action)—and justified by the poverty status of the majority of rural economic agents— explained formal credit rationing for rural economy development.

In an empirical perspective, potential credit risks (recovery, liquidity, interest rates, management, and governance) and limited formal sectors induce formal finance institutions to be cautious about financing rural economies (Diagne & Zeller, 2001; Niyongabo, 2008; Wampfler, 2000; Fonds Monétaire International, 2016). The same measures, given the financial realities of the rural environment, also induce microfinance institutions to offer products and services that may not suit the real needs of primary-sector or rural microenterprises. This leads to different or less efficient investment behavior, particularly for women.

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[1] We used the terms "microenterprise" and "income-generating activity" interchangeably to refer to any small firm that produces income.

To make its economy more financially inclusive, in 2006 the Government of Benin created the National Microfinancing Fund with the objective of reinforcing the financial and operational capacities of microfinance institutions. This policy is devoted to providing accessibility, largely for women, to the financial services for the development of growth-enhancing enterprises. Microfinancing products have since been created and have evolved over the years as the government responding to minimizing unpaid credit that would have been likely to compromise the financial-inclusion effort. Despite the advantage of reaching a greater number of rural women-owned enterprises through digital financing, however, this system may not be a long-lasting solution if the microenterprises that receive financing are driven by survival or necessity. Furthermore, very little information exists regarding whether entrepreneurial activities are sustainable enough to repay credit and promote rural economy. This raises an important question about the linkage between the type of microenterprises and microfinancing.

Given this backdrop, we addressed such questions as what financing schemes are more appropriate for which types of productive microenterprises in rural Benin, how and to what extent does access to a type of financing results in a profitable microenterprise for rural women in Benin, and is relationship between financing and the performance of microenterprise gender-driven?

Most previous studies have addressed the issue of financial inclusion and entrepreneurship in a gender perspective, though they have found mixed effects of financial inclusion on the performance of microenterprises. This may be explained by factors that include heterogeneity in access to financing and by economic sector. Some studies conducted in Benin have examined the impact of formal credit mechanisms on the economic and social performance of women (Dahoun et al., 2013; Doligez, 2002), and urban youth (Nadege, et al., 2020). However, to our knowledge, no study has investigated differences among sources of financing or identified those that are better suited to microenterprise-performance improvement in rural Benin, taking into account heterogeneity in groups of women. For an efficient allocation of limited public funds, policy-makers need to be informed regarding which types of rural financing are appropriate to promote, and they can only do this by considering gender disparities in rural economic agents. This study contributes, then, to the literature by identifying the gendered profitable microenterprises that significantly react to microfinancing mechanisms in rural Benin. These mechanisms include self-financing, formal credit-based financing, social-network-based financing, and organization-based financing.[2]

To achieve our study objectives, we used the extended multinomial endogenous switching regression (hereafter, MESR) selection-bias-correction model of Bourguignon, Fournier, and Gurgand (2007) on a nationally representative rural sample of microenterprises. In general, our findings support policies that promote formal credit-based financing and social-network-based financing. With disaggregated results, we found that social-network-based financing makes rural women entrepreneurs more performant in the tertiary sector (small trades) than any over financing

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[2] The description of each type of financing is reported in Section 3.2.

alternatives, especially for adult rural women owners and the ones with at least a primary education level. The results also showed that formal credit-based financing would benefit rural women led-business functioning for more than ten years or having salaried workers, all of which previously operated on the basis of social-network financing. Finally, our study demonstrated that self-financing would be more profitable for young rural women led-microenterprises over any other financing alternatives, and especially for those operating in the secondary sector (agro-based manufacturing activities).

II. Related literature

2.1. Background

Benin's economy is now on the fringes of entrepreneurship vibrancy and the promotion of microfinance institutions in parallel to non-formal financing sources. The financial market in Benin is marked by a heterogeneity of financing sources and their features (Figure A1). According to a report by the World Food Programme (2017), about 26.3% of households in Benin finance income generating activities with funds from friends and family (57%), pooled investment schemes (27%), and loans granted by banks or microcredit institutions (29%). For the later, the average loan is tied to the size of the microcredit institution and the kind of activity for which financing is though; only limited amounts are available in rural areas (World Bank, 2018). Note that in rural Benin, microenterprises are diversified and largely managed by women (70.8%) (Accrombessy, 2010). As such, there is a need to reconsider overrating formal credit as the sole smart and inclusive financial solution for rural women. Furthermore, rural economies, compared to urban ones, face greater risks and higher costs of delivering financial services (Wenner et al., 2007) that do not encourage the participation of commercial banks. This constraint is correlated with rural poverty and sometimes leads the rural poor to divert business loans to food and other family needs (Selvavinayagam, 1995; Sossa, 2011). It nevertheless remains true that, though informal sources of financing appear to be more important than the formal sources, they may not be as effective in improving the sustainable performance of microenterprises.

2.2. Conceptual Framework

Women's financial inclusion and entrepreneurship are important questions in developing countries, especially in rural economies. The presence of microfinance institutions in developing countries has revived the debate regarding whether access to formal microfinancing is a constraint-alleviating

and a performance-enhancing factor for women-owned microenterprises. While the constraint-alleviating role of formal financing seems obvious in theory, no clear evidence for this proposition in the literature. Evidence show that access to formal financing can enhance the performance of women-owned microenterprises but does not always do so; this is one consideration in examining the gender difference that favors men-owned microenterprises. For example, microfinancing has been found to have positive impact on microenterprise performance in Kenya (Gichuki, Mulu-Mutuku & Kinuthia, 2014); in Nigeria (Akingunola, Olowofela & Yunusa, 2018); in Morocco (Crépon et al., 2015); in the Ivory Coast (Becho, 2017); and in Ghana (Alhassan, Hoedoafia & Braimah, 2016), but it has also been found to have no impact in Ghana (Fafchamps et al., 2014); in Sri Lanka (De Mel, McKenzie & Woodruff, 2012); in Nigeria (McKenzie, 2017); in Uganda (Fiala, 2018); and in Ethiopia (Araar et al., 2019).

The literature explains the low or absent performance of women-owned microenterprises through a gender perspective. As far as the financing of women's businesses is concerned, lenders' risk-minimizing measures—the amount of loans, repayment terms, and the type of funds allocated, may not suit the real financing needs of women-owned microenterprises, leading thus to different investments behavior. According to Carter & Rosa (1998), men use larger amounts of capital than do women in starting a business and lower initial financing negatively affects business performance. Carter and Rosa (1998) and Coleman and Robb (2009) also reported that women were more reluctant to use such institutional financial tools as overdrafts, bank loans, and supplier credit); if they did make use of these options, they received smaller loans than did men (Bardasi, Sabarwal & Terrell, 2011). Smaller funding could thus explain the reduced business performance of women-owned enterprises (Fairlie & Robb, 2009; Alam & Molla, 2012). This reflects the finding of Gifford (2004), who showed, in Uganda, that men's activities started with a capital contribution ten times higher than that of women; men's enterprises were also much more profitable than women's.

Another strand of the literature argues that the underperformance of women-owned comparatively to men-owned microenterprises can be explained by expropriation, sorting into less profitable business sectors, and intra household dynamics (see Jayachandran, 2020, e.g.). Expropriation is the process by which financing received by women for microenterprises is more likely to be expropriated by other family members or diverted toward family expenses, the result of the frequent intertwining of business activities and family life in developing countries (Babbitt, Brown & Mazaheri, 2015). Because of pressure by husbands or other family members to share business funding, women with less bargaining power in the family are more likely to hide or hold back a part of the funding and invest less in the business (De Mel, McKenzie & Woodruff, 2009; Jakiela & Ozier, 2016).

The second argument highlights the role of social norms in developing countries. Women hold less collateral and also face a tradeoff between home responsibilities and time dedicated to their businesses. In order to lower business costs and combine family life with business, they are likely to sort into informal, low-return, home-based economic activities that required less funding and less collateral (Berge & Pires, 2015; Bruhn, 2009). This latter suggestion is corroborated in the work of Dutta and

Banerjee (2018), who indicated that women were constrained to adopt low-risk business opportunities because of their gendered role in the household.

The final argument points out the role of intra household dynamics. In a household with multiple microenterprises, women may invest funding in another household member's business, leading that business to prosper rather than the woman's. Experiments in India, Sri Lanka, and Ghana have shown that the underperformance of women-owned microenterprises is the result of women's capital invested into their husband's business activities (Bernhardt et al., 2019).

The above literature clearly raises the likelihood that gender differences exist in financing and types of financing, in the performance of small businesses, and in sectors of activity. In addition, Amponsah (2016) found in Ghana that a locked/asset loan was more attractive to women owners of microenterprises than were unlocked loan products. Experimental evidence in rural Kenya has also shown that providing basic savings services (non-interest-bearing bank accounts) alone helped increase business investment for self-employed women in trade compared to self-employed men in the tertiary sector (transportation) (Dupas & Robinson, 2013). Based on the above evidence, we conclude that changes are needed in capitalization of women-run businesses in order to help them increase their participation in productive economic activities as well as to improve their families' lives.

III. Data and Descriptive Statistics

3.1. Data Source and Sample

We made use of data from the multi-topic household baseline survey entitled Plans Fonciers Ruraux d'Evaluation d'Impact 2011/Impact Evaluation of Rural Land Use Plans 2011, Baseline, undertaken in March-April 2011 by the World Bank and the Institute for Empirical Research in Political Economy (IREEP). The survey was representative of rural areas in Benin, covering all of Benin's agro-climatic zones and nine of Benin's twelve regions. Villages were stratified and randomly selected at the commune level, and respondents were asked to respond to an extensive and detailed household questionnaire. The survey was primarily aimed at analyzing the impact of land demarcation in Benin, though data from the household survey are as well suited for the analysis of such other important topics as rural employment.

The household questionnaire included basic demographics, employment and enterprises, housing, plots, land use, intra-household control of resources, and agricultural production and transformation, and specific modules were administered to women and to men. The community questionnaire contained such detailed village-level information as demographics, infrastructure, social

services, and economic activities.[3] Part B of the household questionnaire, which concerned employment and small-scale income-generating activities (microenterprises and self-employment) by young and adult household members during the twelve months prior to the survey was of particular interest for our purposes. These activities included small-scale commerce, agro-based manufacturing (processing of agricultural products), crafts, agriculture-related activities[4] (animal husbandry, market gardening, fishing, hunting), and services (administration, transportation, and other).

A total of 3,507 households and 21,580 individuals in 291 villages were surveyed. Although 4,069 individuals (in 2,547 households) were originally involved in some form of microenterprise, we restricted our sample to 3,949 individuals (2,479 households) for which complete information are available for all variables relevant to the descriptive and econometric analyses. These variables are reported in Appendix Table A1.

3.2. Defining Outcome and Treatment Variables

Profit margin (microenterprise performance indicator) is an outcome variable. Part B of the household questionnaire provided information on business revenue and benefits that proxied the microenterprise performance indicator. Profit margin was calculated as the profit divided by the total value of sales during the twelve months prior to the survey. The total value of sales was based on the answers to two questions: "How much did this activity generate in the past week or last month?" and "How many months has this activity been operational in the past twelve months?"

Profit was directly retrieved from the question: "In the past twelve months, what was the average monthly profit (net of all costs) during the period that the individual carried out this activity?" Missing profit values were retrieved from such supplemental questions as "What has been the profit of the activity for the last week or last month?" and "How many months has this activity been operational in the past twelve months?"

Part B of the household questionnaire also requested information regarding the main source of financing for microenterprises ("Who mainly provided the money needed for this microenterprise?") We used the original, mutually exclusive answers to that question to define our multivalue treatment variable: the type of financing used for running the microenterprise (Figure A2). As Figure A1 shows, we considered four types of financing: (1) self-financing—that is, financing from the owner of the microenterprise; (2) formal credit-based financing—credit from banks, microfinance institutions,

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[3] Recent World Bank surveys on (informal) microenterprises were not suitable for our study because of their limited sample size and regional coverage, their focus only on urban areas or largest cities, and the limited information they provided regarding household characteristics. National household surveys have collected data on rural non salaried employment but information on informal firms is missing or limited.
[4] This does not include the sale of products cultivated on the land the individual possessed.

cooperatives, or other lenders; (3) social-network-based financing—financing from relatives or friends; and (4) organization-based financing—financing that stemmed from the revenue/income of another business (microenterprise), government agencies, NGOs, or other sources. The multivalue treatment variable was categorized to reflect the degree of flexibility in access to financing that may also relate to such conditions of access to financing as interest rates, collateral requirements, and repayment terms.

3.3. Descriptive Statistics

Trading and agro-based manufacturing are the most dominant income generating activities in rural Benin (41.25% and 27.80% of rural entrepreneurs, respectively). Further disaggregation by sex and type of financing reveals gender differences. Figure 2 shows that rural women were mostly involved in trade and agro-based manufacturing, irrespective of the type of financing (51% and 28%, respectively). Men's involvement in income-generating activities was generally homogeneous across sectors but heterogeneous across types of financing.

Figure 1: Income Generating Activities by Financing Source and Sex
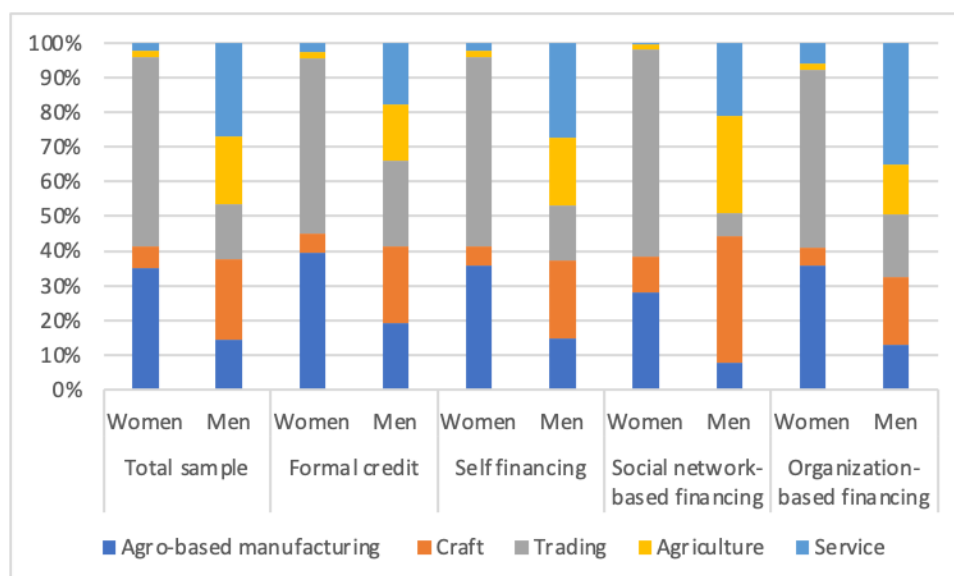
Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

Looking at the distribution of the financing sources in general, self-financing is the most important source of financing for rural men-owned (79%) and women-owned (68%) microenterprises (Table 1). The second most important financing source for rural women stems from their social-networks (15%). This may reflect the reluctance, reported in the literature, of rural people and, especially, of risk-adverse women, to accepting credit under tight conditions (Carter & Rosa, 1998; Coleman & Robb, 2009; Chowdhury, Yeasmin & Ahmed, 2018) and preferred to manage their economic activities through saving or other informal sources, if possible. Indeed, rural women found it easier to mobilize financing, thanks to the solidarity among people living in the same community, and probably because of interest-free credit with comparatively flexible repayment conditions. Statistics also suggest the not

yet well-developed presence of formal finance institutions with formal credit-based financing in rural areas, although women (77.4%) used this type of financing more than men (22.6%). This may reflect government efforts to increase the financial inclusion of women through its Microcredit for the Poorest program, launched in 2007.

Table 1 summarizes the overall profile of microenterprises including owners' characteristics. Significant differences between women owners and men owners are revealed using the mean difference test. Regarding the characteristics of the owners in the whole sample, Table 1 shows that rural microenterprises were operated by adults, on average, and the youngest of these were significantly more likely to be women. Rural women owners are also significantly less supplied with human and social capital compared to their rural men. The majority of women had no formal education (90%), no reading or written skills (89%), and were neither chief advisors, members, or officers of an association (87%). Significant gender differences were also observed: Compared to rural men, on average, rural women were mostly sole proprietors of comparatively younger and smaller microenterprises in which salaries and operating costs were lower; women were also more likely to operate their businesses for longer during the year but generated lower profits.

These significant gender differences were also observed within each type of financing. In the majority of cases, rural men were more productive, and were well supplied with human and social capital, but they bore high salary and exploitation costs. Some exceptions, for example, included microenterprises financed through social networks in which rural women owners performed equally with respect to rural men owners. In these cases, no significant gender differences in membership in an association, owner's age, age of the microenterprise, salary costs, duration of operation during a year, or profit margins were noted. Overall, women performed the least well with formal credit-based financing. Various authors have explained this observation by citing the small size of loans granted (Galli & Rossi, 2016) and the comparatively high interest rates that formal finance institutions apply because of the high risk of lending in rural areas (Muravyev, Talavera & Schäfer, 2009; Aterido, Beck, & Iacovone, 2013; Galli & Rossi, 2016).

Table 1: Owners' Characteristics and Profile of the Microenterprises

	All sample Total (N=3949)		Formal credit-based financing (N=301)		Self-financing (N=2846)		Social-network-based financing (N=494)		Organization-based financing (N=308)	
	Women (65.18%)	Men (34.82%)	Women (77.41%)	Men (22.59%)	Women (61.84%)	Men (38.16%)	Women (78.95%)	Men (21.05%)	Women (62.01%)	Men (37.99%)
Age of owner	38.976	42.169***	37.875	42.662***	39.965	43.069***	36.028	35	37.225	39.889*
Owner is literate	0.108	0.365***	0.150	0.426***	0.096	0.360***	0.141	0.346***	0.094	0.393***
Owner has no education	0.904	0.649***	0.884	0.661***	0.914	0.648***	0.867	0.625***	0.906	0.675***
Owner has a primary level of education	0.073	0.238***	0.099	0.220***	0.065	0.245***	0.097	0.260***	0.031	0.162***
Owner has at least a secondary level of education	0.023	0.112***	0.017	0.118***	0.020	0.106***	0.036	0.115***	0.063	0.162***
Owner is a chief/advisor in community	0.010	0.137***	0.013	0.235***	0.011	0.136***	0.005	0.077***	0.005	0.136***
Owner is a member of or officer of an association	0.116	0.124	0.197	0.206	0.110	0.130	0.085	0.086	0.136	0.060**
Owner has no social status	0.874	0.739***	0.790	0.559***	0..878	0.734***	0.910	0.836**	0.859	0.803
Owner is sole proprietor of the microenterprise	0.961	0.911***	0.948	0.823***	0.970	0.939***	0.949	0. 846***	0.927	0.761***
# of years of existence of the microenterprise	8.976	11.080***	8.083	10.266*	9.571	11.576***	7.433	8.526	7.730	9.217
# of salaried workers	0.304	0.793***	0.502	1.441***	0.284	0.717***	0.308	0.760***	0.246	1.145**
Wage salary (in local currency)	2220.668	17,752**	2446.352	29235.29***	1093.182	19158.38**	7623.077	5923.077	1303.665	8.538.462***
Exploitation costs (fuel, water, etc.) (in local currency)	4017.871	29,414.55***	5424.893	22294.12***	4021.591	25668.51***	3053.846	87894.23*	4235.602	16,341.88***
# of months of operation during a year	9.728	9.357***	9.536	8.779*	9.894	9.491***	10.487	8.808	9.571	8.940*
Profit Margins	0.738	1.466***	0.557	1.586***	0.729	1.524**	0.817	1.050	0.871	1.230

Significance levels are indicated with *** p<0.01, ** p<0.05, * p<0.10. Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

Further descriptive statistics on the performance of microenterprises and the treatment variable are presented in Figures 3 and 4. We draw the kernel density curves of profit margins, and according to the type of financing and for different groups. Figure 3 shows a heterogeneous distribution in the performance of microenterprises, regardless of the type of financing. There are obvious differences in business performance achieved by rural women and men owners with extent of gap depending on the type of financing. Overall, a high proportion of rural women owners has lower profit margins while a low proportion of rural men owners has higher profit margins, but with a less pronounced trend for organization-based financing. Figure 4 shows a more homogenous distribution in performance between trade business and agro-product processing business managed by rural women owners using self-financing. There is no clear performance difference pattern observed in these two types of businesses among women owners as regards to the other type of financing.

Figure 2: Distribution of Profit Margins for Rural Men-and Women-Owned Businesses in Benin
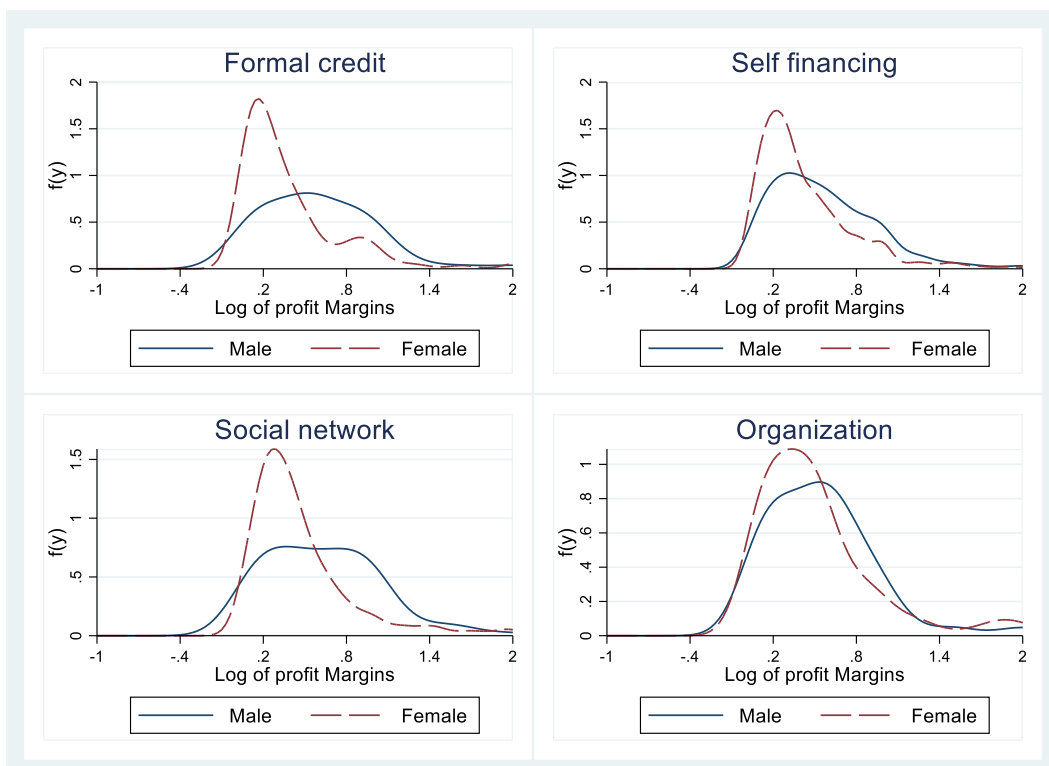
Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

Figure 3: Distribution of Profit Margins for Rural Women's Trade and Agro-Processing Businesses in Benin
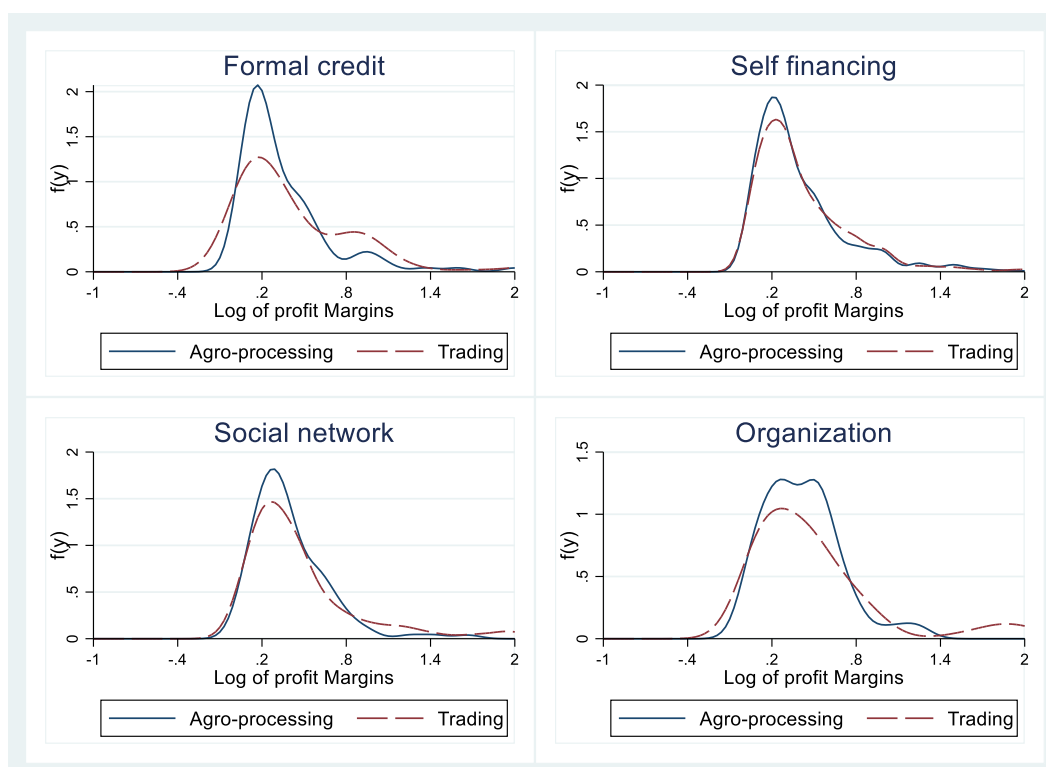
Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

IV. Econometric Specification

4.1. Identification Issues and Empirical Strategy

The choice of using any form of financing for running microenterprises in rural areas is likely to be non-random. Selectivity issues may arise as the rural individual's choice of taking microcredit or self-financing their businesses, for example, may be guided by unobserved factors. For instance, a beneficiary of a microcredit may be selected by a bank or a microfinance institution or a lender, according to some (eligibility) criteria or unobserved factors. Rural individual's choice of taking or not a microcredit from any source may also be guided by unobserved factors such as its ability in running small businesses or its motivation. In such cases, the choice to use any form of business financing may depend upon both observable and unobservable factors, which may also have correlated with the business's performance. The potential endogeneity that results may thus bias estimated coefficients in a simple OLS-performance regression if selectivity issues are ignored.

Impact-evaluation studies have used several methods to correct or reduce selection biases. We accounted for the specific correlation structure between unobservable factors affecting business

performance and access to financing (sources) by using treatment-effect regressions. Our (potential outcome) framework consisted of, first, modelling the outcome-profit margins and the type of financing used and, second, estimating the average treatment effect using the derived estimated parameters. The endogenous switching treatment regression approach has been used extensively in studies of treatment effects. In this study, in which the treatment was multivalued, we used the MESR selection-bias-correction approach of Bourguignon, Fournier, and Gurgand (2007.)[5] This approach, which simultaneously models the treatment process and the outcome, is described as follows.

First, the treatment process is estimated with a multinomial logit selection model. The choice of a rural individual i to make use of a form of financing j (j=1,..., 4) for maximizing potential business outcome over any alternative m is subject to the maximal expected utility derived from that choice and is represented by:

$$F_i = \begin{cases} 1, & \text{if } \max_{m \neq 1}(F_{mi}^* - F_{1i}^*) < 0 \\ \quad ... \\ \quad ... \qquad \qquad \text{for all } m \neq j \\ \quad ... \\ J, & \text{if } \max_{m \neq j}(F_{mi}^* - F_{Ji}^*) < 0 \end{cases}$$

(1)

with, $F_{ji}^* = Z_{ji}' \alpha_j + u_{ji}$, which is the latent unobserved utility. F_i is the multivalued endogenous (treatment) variable representing types of financing. Z_i are explanatory variables, namely individual, household, business and community characteristics (including excluded variables), all defined in the Table Appendix A1. α are parameters to be estimated and u, the error terms supposed to be independently and identically Gumbel distributed. The probability of accessing any form of financing j for running a microenterprise i, given characteristics Z is thus estimated through the multinomial logit model:

$$p_{ji} = prob\{\max_{m \neq j}(F_{mi}^* - F_{Ji}^*) < 0 \mid Z_{ji}\} = \frac{\exp(Z_{ji}' \alpha_j)}{\sum_{m \neq 1}^{J} \exp(Z_{ji}' \alpha_m)}$$

(2)

Second, the relationship between firm performance and explanatory variables is assessed for each alternative form of financing, using ordinary least squares (OLS) including correction terms for selectivity, derived from the estimated probabilities from Model 2. The outcome equations are modelled as:

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[5] The Bourguignon group surveyed and compared alternative methods with related assumptions and proposed a variant of the Dubin and McFadden (1984) approach, which they found preferable. Note also that, according to the authors, the MESR provides reasonable correction for the outcome equation, even when the assumption of the independence of irrelevant alternatives (IIA) is not met (see pp. 199-200). The MESR model has been used for studying labour and agricultural issues (Pérez & Sanz, 2005; Kassie et al., 2014).

$$\begin{cases} \text{Perf}_{1i} = X'_{1i}\beta_1 + \sigma_1\hat{\lambda}_{1i} + \varepsilon_{1i} & \text{if } F_i = 1 \\ \qquad\qquad \dots \\ \qquad\qquad \dots \\ \qquad\qquad \dots \\ \text{Perf}_{Ji} = X'_{ji}\beta_j + \sigma_j\hat{\lambda}_{ji} + \varepsilon_{ji} & \text{if } F_i = J \end{cases} \qquad (3)$$

where Perf_i is the outcome variable representing the performance -profit margins -of the microenterprises The vector X denotes the explanatory variables (Appendix Table A1) such as individual characteristics, some business characteristics including total costs and whether development programs/projects exist in the community. β the parameters to be estimated and ε are the error terms with mean zero. $\sigma\hat{\lambda}$ are the selectivity correction terms with $\sigma = \text{cov}(\varepsilon, u)$ and $\hat{\lambda}$, the Inverse Mills Ratio (IMRs) estimated at $Z\alpha$ from equation (2).

4.2. Estimating Multivalue Treatment Effects

We were interested in estimating the average impact of particular types of financing on the business performance of microenterprises operated by rural individuals. This is the average effect of treatment, which is the difference between the conditional (actual expected) performance (profit margins) for rural microenterprise owners and the respective predicted counterfactual performance. The counterfactual expected performance refers to the profit margins that business owners would have earned if they had used a different financing alternative. All the expected performances were computed using the parameters estimated from the MESR described above. For example, in the case of rural self-financed (SF) users (self-financers), we computed the actual expected performance observed in the sample as:

$$E(\text{Perf}_{SFi}) = X'_{SFi}\hat{\beta}_{SF} + \sigma_{SF}\hat{\lambda}_{SFi}$$

and the respective counterfactual expected outcomes (had they used alternatives) as:

$$E(\text{Perf}_{Alternativei}) = X'_{SFi}\hat{\beta}_{Alternative} + \sigma_{Alternative}\hat{\lambda}_{SFi}$$

with *Alternative* being either formal credit-based financing or social-network-based financing or organization-based financing. The average effect (average impact on performance) of self-financing over another financing alternative is computed as:

$$ATE_{SFusers\to Alternative} = E(\text{Perf}_{Alternativei}) - E(\text{Perf}_{SFi})$$
$$= X'_{SFi}(\hat{\beta}_{Alternative} - \hat{\beta}_{SF}) + \hat{\lambda}_{SFi}(\sigma_{Alternative} - \sigma_{SF})$$

Likewise, the actual and the corresponding expected performance and the ATEs are computed for each financing alternative.

4.3. Exclusion Restrictions Used in the Estimations

Excluded variables (instruments) were used to identify the MESR rather than rely solely upon the exclusion restriction generated by the non-linearity of the selection model. We used a set of variables not included in the outcome model as excluded variables in the selection model. They were variables that should not directly have affected business performance, except through the use of financing for microenterprises.

The set of excluded variables, defined in Appendix Table A1, is related to the awareness of the availability of financing options, which we proxied by community variables related to the sources of credit in the villages. Households or individuals are more likely to use microfinancing loans in communities with greater access to financing (Sultakeev, Karymshakov & Sulaimanova, 2018). However, availability of financing at the community level could be correlated with local conditions that may or may not favor enterprise development and, thus, profitability. Furthermore, microfinancing in the community could be attracted by firms' potential to generate profits. In order to satisfy the orthogonality condition, we controlled for local conditions in the outcome model by including such variables as infrastructure, development associations, and development projects. Based on the assumption that productive microenterprises in rural areas were more likely to continue over time , we also included the number of years the business activity had been in operation in the outcome model.

In addition, a significant correlation between awareness of a specific source of credit and its use has been reported in Mexico (Campero & Kaiser, 2013). Because knowing about a source of credit does not directly affect business performance unless that source is used, we expected the orthogonality condition to be satisfied. Finally, to assess the robustness of our results, we performed alternative estimations such as the MESR but accounted for unobserved heterogeneities at the household level, the MESR without excluded variables in the selection models, ordinary least square (OLS) regressions, fixed effects (FE), and random effects (RE) regressions.

V. Estimation Results and Discussion

We do not discuss the effects of the explanatory variables in the selection model (presented in Table A2 in Appendix) and in the outcome model, given that we are interested in the treatment effects derived from the MESR. Rather, we comment on diagnostic tests on the excluded variables reported in

Appendix Table A3. No obvious option to perform an over-identification test exists with the MESR, contrary to classic instrumental variable (IV) regressions with a binary treatment. We followed previous studies and performed a simple test on the validity of excluded variables, using the non-linearity of the selection model as an identifying restriction (Pérez & Sanz, 2005; Kassie et al., 2015). We included the excluded variables in the outcome models and tested the joint significance of these variables, both in the selection model and in the outcome model. Table A3 shows that the excluded variables are jointly and statistically significant in the selection model, in all cases but one, while they are not jointly and statistically significant in the outcome model.

5.1. Average Impacts of Financing on Profit Margins: Overall Results

In Table 2 we report the average impact on profit margins (the average treatment effects) of one type of financing (rows) over another financing alternative (columns). These are the average effects of the treatment if all rural microenterprises owners were to use that financing alternative.[6] Part A of the table reports results for specifications using the excluded variables in the selection models. Part B of Table 2 reports results for specifications including the mean of firm-related covariates within households following the Mundlak (1978) approach for accounting for unobserved heterogeneities at the household level. Part C of Table 2 reports results for specifications without the excluded variables in the selection models. All the average treatment effects are estimated at a significance level of 5%.

The results in Part A of Table 2 show that average profit margins, presuming that all rural owners in the sample used social-network-based financing, would be 0.20 less than profits obtained with either formal credit-based financing or self-financing. If all rural owners used organization-based financing, average profit margins would be 0.09 less and 0.11 more than those obtained with self-financing and social-network-based financing respectively. The results suggest that formal credit, self-financing, and organization-based financing are better alternatives for increasing firm performance than is social-network financing. To a lesser extent, self-financing constitutes a better alternative to organization-based financing.

There is no evidence that moving from self-financing to formal credit-based financing bring about higher profit margins because the estimated average effect of treatment was not significant at the 5% significance level. The results from the alternative specifications in Parts B and C of Table 2 are consistent with respect to those from specifications in Part A in nearly all significant cases. As such, we considered results from the specifications using the excluded variables in all subsequent analysis.

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[6] Moving from the row (actual financing scheme used) to the column (counterfactual case) indicates the differential impact on profit margins (Average profit margins of counterfactual cases minus Average profit margins of actual cases).

Table 2: Average Impact of Financing on Profit Margins
(average effect of treatment)

Actual types of financing	Alternative financing: counterfactual cases				
	Self-financing	Social-network-based financing		Organization-based financing	
(A): Specifications with excluded variables (N=3,949)					
Formal credit-based financing	-0.001	-0.197	**	-0.086	
Self-financing		-0.196	**	-0.085	**
Social-network-based financing				0.111	**
(B): specifications with excluded variables and Mundlak (1978) approach (N=3,949)					
Formal credit-based financing	-0.009	-0.203	**	-0.083	
Self-financing		-0.194	**	-0.075	
Social-network-based financing				0.119	**
(C): specifications without excluded variables (N=3,949)					
Formal credit-based financing	-0.007	-0.241	**	-0.121	
Self-financing		-0.233	**	-0.114	**
Social-network-based financing				0.120	**

Significance levels are indicated with *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Source: Estimations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

To account for sex-disaggregation analysis, we ran a MESR model on separate samples for rural women and men. The results in Table 3 show how different the average effects of treatment were for rural women owners vs. rural men owners. The average profit margins, if all rural women owners used formal credit, would be less than those obtained with any other financing scheme, ranging between 0.19 and 0.28. Also, rural women owners would increase profit margins by 0.08 if they moved from self-financing to social-network-based financing, suggesting overall that social-network-based financing is likely a better alternative than other types of financing for improving the performance of rural women owners' microenterprise. These results reflect those of Attanasio et al. (2015), who showed that access to group loans increased women's entrepreneurship.

Conversely, the results for rural women owners contrast with those obtained for rural men owners who were more in line with the estimated average effects of treatment reported in Table 2. Unlike the case of women, formal credit-based financing, self-financing, and organization-based financing were better alternatives for improving the performance of rural men owners' firms than was network-based financing. This result is in line with the work of Coleman & Kariv (2013), who found that women and men entrepreneurs used different financial strategies that affected their performance differently. However, moving from one type to another of these alternatives financing options does not further enhance performance for rural men owners.

Table 3: Impact of Financing on Profit Margins, by Sex

Actual types of financing	Alternative financing: counterfactual cases					
	Self-financing		Social-network-based financing		Organization-based financing	
Rural women owners (N=2,574)						
Formal credit-based financing	0.194	**	0.280	**	0.202	**
Self-financing			0.086	**	0.008	
Social-network-based financing					-0.078	
Rural men owners (1,373)						
Formal credit-based financing	0.101		-0.684	**	0.149	
Self-financing			-0.785	**	0.048	
Social-network-based financing					0.833	**

Significance levels are indicated with *** p<0.01, ** p<0.05, * p<0.10. Source: Estimations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

In Table 4, we report the average impact of financing using alternative specifications and econometric models. In addition to the ordinary least square (OLS) regressions, presented here for comparison purposes, we take advantage of the panel dimension of the data at the household level because more than one microenterprise was often located within a single household (65.38% of the working sample).

We assumed that some unobserved individual factors would be related to unobserved household factors for individual living in the same households. We used both fixed effects (FE) and random effects (RE) regressions. Table 4 shows that the significant average effects estimated from RE regressions are similar in signs and magnitudes to those obtained from the OLS regressions. The significant average effects estimated using FE regressions are higher in absolute terms than those obtained with RE. However, the Hausman test shows that no systematic difference exists in coefficients between the FE and the RE regressions for the sample of rural women owners. The contrary was observed for rural men, suggesting the appropriateness of the FE for this sample. Overall, the estimated average effects of financing on profit margins are consistent with the trend shown in Table 3, using the MESR, at least regarding formal credit-based financing and social-network-based financing. Unlike the case of rural women owners, formal credit-based financing is likely to enhance the performance of rural men owners' activities more than social-network-based financing.

Table 4: Average Impacts of Financing on Profit Margins: Alternative Regressions

Actual types of financing	Rural women owners (N=2,574)			Rural men owners (N=1,373)		
	Alternative financing: counterfactual cases					
	Self-financing	Social-network-based financing	Organization-based financing	Self-Financing	Social-network-based financing	Organization-based financing
OLS regressions						
Formal credit-based financing	0.176 *	0.194 *	0.295 **	-0.639	-0.729 ***	-0.462 ***
Self-financing		0.018	0.119		-0.09	0.177
Social-network-based financing			0.101			0.268
Fixed-effects regressions						
Formal credit-based financing	0.392 *	0.348	0.306	-5.27	-4.56 ***	-6.09 ***
Self-financing		-0.04	-0.09		0.702	-0.82
Social-network-based financing			-0.04			-1.52 *
Random-effects GLS regressions						
Formal credit-based financing	0.194 **	0.195 *	0.252 *	-0.65	-0.71 ***	-0.44 ***
Self-financing		0.001	0.059		-0.06	0.211
Social-network-based financing			0.058			0.266

Significance levels are indicated with *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Source: Estimations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

These results are in line with those of previous studies in which performance differences between men- and women-owned firms in Sub-Saharan Africa and in Eastern Europe and Central Asia were associated with microcredit-related conditions (Bardasi, Sabarwal & Terrell, 2011; Fairlie & Robb, 2009). Our results in rural Benin show that differences in business performance according to owners' genders can favor either men or women, depending upon the financing structure. Our results may be explained by the fact that rural women, who are more constrained and risk adverse, would likely find it easier to manage their activities under a more flexible financing scheme (for example, through social-network financing or other informal financing sources), which may be less subject to such stringent restrictions as interest rates, repayment conditions, and limits on lending amount.

5.2. Further Gender Considerations

As Table 5 indicates, we differentiate average treatment effects by types of activities, pooling subsamples of owners involved in craft activities, agriculture-related activities, and service activities as a single subsample running the MESR on each subsample separately resulted in a lack of convergence. Table 5 shows the same trend observed above: social-network-based financing is a better alternative for enhancing the performance of rural women's enterprises than is formal credit-based financing, irrespective of the type of income-generating activity. However, the estimated gain in profit margins for rural women entrepreneurs in trading activities (0.27) and in the other activities (0.53) is higher than that observed for agro-based manufacturing activities (0.20). Except for social-network-based financing, rural women owners in agro-based manufacturing would perform better if they used self-financing while rural women entrepreneurs in trading and other activities would perform better if they used organization-based financing.

Table 5: Impacts of Financing on the Profit Margins of Women's Businesses

Actual types of financing	Alternative financing: counterfactual cases					
	Self financing		Social-network-based financing		Organization-based financing	
Rural women owners of agro-based manufacturing activities (N=900)						
Formal credit-based financing	0.187	**	0.206	**	-0.068	
Self-financing			0.019		-0.255	**
Social-network-based financing					-0.274	**
Rural women owners of trading activities (N=1409)						
Formal credit-based financing	0.196	**	0.279	**	0.309	**
Self-financing			0.083	**	0.113	**
Social-network-based financing					0.030	
Rural women owners of other activities (agriculture-related, craft and service) (N=265)						
Formal credit-based financing	0.210	**	0.537	**	0.558	**
Self-financing			0.327	**	0.348	**
Social-network-based financing					0.021	

Significance levels are indicated with *** p<0.01, ** p<0.05, * p<0.10.
Source: Estimations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

We also differentiate average treatment effects by level of education and age of women owners (Table 6). Except for organization-based financing, we found no evidence that rural women entrepreneurs with no education or those who had at least a primary education would perform better under different financing schemes. The estimated ATEs reported in Table 6 still indicate that social-network-based financing is a better alternative for increasing profit margins over formal credit-based financing and self-financing for both educated and uneducated rural women entrepreneurs. Nevertheless, under a social-network-based financing scheme, the profit margins of women owners with at least a primary education level would be two-times higher than those of rural women owners with no education, suggesting an important association with education in enhancing business performance for rural women owners (Wasihum & Paul, 2011).

Young and adult rural women owners would benefit under different financing schemes in rural Benin. Table 6 shows that moving from any other financing alternative to self-financing would be more profitable for young rural women. Adult rural women would increase profit margins if they moved to social-network financing.

Our results generally corroborate those of Nadege, et al. (2020) in urban Benin. Those authors examined performance differences in terms of firm owners' age and flexibility of financing schemes and found that older urban firm owners benefited from formal credit while younger urban owners

benefited from social-network credit. Compared to the Nadege group's results in urban Benin, however, we noted a high degree of flexibility in financing schemes that served to enhance the performance of adult and even more of young rural women-owned businesses.

Table 6: Impact of Financing on Profit Margins: Women's Human Capital Differences

Actual types of financing	Alternative financing: counterfactual cases					
	Self-financing		Social-network-based financing		Organization-based financing	
Rural women owners with no education (N=2,326)						
Formal credit-based financing	0.177	**	0.253	**	0.202	**
Self-financing			0.076	**	0.025	
Social-network-based financing					-0.051	
Rural women owners with at least primary education level (N=248)						
Formal credit-based financing	0.355	**	0.529	**	0.207	**
Self-financing			0.174	**	-0.148	
Social-network-based financing					-0.322	**
Young rural women owners (15-29 years old) (N=666)						
Formal credit-based financing	0.182	**	0.104	**	0.008	
Self-financing			-0.078	**	-0.174	**
Social-network-based financing					-0.096	**
Adult rural women owners (> 29 years old) (N=1,908)						
Formal credit-based financing	0.198	**	0.341	**	0.270	**
Self-financing			0.143	**	0.071	**
Social-network-based financing					-0.071	**

Significance levels are indicated with *** p<0.01, ** p<0.05, * p<0.10. Source: Estimations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

The estimated average treatment effects reported so far show no evidence that formal credit-based financing enhanced the performance of the business activities of rural women owners in comparison to the three other financing alternatives. In a policy perspective, we explore the issue of low financial inclusion and women's entrepreneurship in rural areas, examining the appropriateness of formal credit-based financing interventions for rural women owners who are already using one of the three non-formal credit-based financing schemes.

Table 7 presents the average impact on profit margins among users of each type of non-formal credit-based financing if they had used formal credit for financing their income-generating activities. Average treatment effects on the untreated are estimated for rural men and women owners and for different groups of rural women owners.

The results in Table 7 show that, unlike rural women owners, rural men owners who used non-

formal credit-based financing would have increased the profitability of their activities had they used formal credit. Profit margins of specific rural women-run activities would also have increased, however, had social-network-based financing users received formal credit from banks, microfinance institutions, or other lenders. These specific income-generating activities are those that have operated for more than ten years and those that employ salaried workers. For these two specific activities, rural women owners could increase profit margins by moving from social-network-based financing to formal credit-based financing (0.16% and 0.13%, respectively). This result suggests that comparatively long-lasting and sizable employee-based-income generating activities have the potential to grow and survive and require the need of upgrading the financing scheme necessary for more expansion. This is in line with the findings of Coleman and Kariv (2013), who highlighted the need for women entrepreneurs to develop and use external sources of financing as the firm progresses through its life cycle.

Table 7: Average Impact on Profit Margins among Users of Non-Formal Credit-Based Financing (Average Treatment Effects on the Untreated)

Actual types of financing	Alternative (counterfactual) financing: formal credit							
	Rural men owners	Rural women owners	Rural women owners of agro-based manufacturing activities	Rural women owners of trading activities	Rural women's firms in operation ≤ 10 years	Rural women's firms in operation > 10 years	Rural women's firms with no employee	Rural women's firms with employee
Self-financing	-0.260	-0.232	-0.245	-0.230	-0.332	0.000	-0.083	0.079
Social-network-based financing	2.086	-0.180	-0.094	-0.144	-0.253	0.162	-0.198	0.133
Organization-based financing	0.422	-0.371	-0.163	-0.462	-0.481	0.030	-0.382	0.105
Obs. (N=)	1375	2574	900	1409	1889	685	2314	260

VI. Conclusion and Policy Implications

We have addressed the question of which financing schemes are appropriate to address gender disparities in microenterprises in rural Benin. Many government and institutional strategies have attempted to address low financial inclusion and participation of women in sustainable income-generating activities in rural Benin. We have also estimated the impact of types of financing on profit margins to determine whether gender differences exist both in access to financing and in rural small-business performance according to the type of financing and business sector.

The two financing schemes that emerged as most likely to enhance business performance are formal credit-based financing and social-network-based financing. The performance enhancement of formal credit-based financing is observed for the overall sample and for rural men owners. Social-network-based financing was found to be a better alternative for rural women owners to increase their profit margins. Policymakers may find it helpful to review the design of formal credit schemes to make them less restrictive and more efficient in improving the productivity of rural women's businesses.

We also found that the increase in profit margin under social-network-based financing was higher for rural women entrepreneurs in trading activities, for adult rural women owners, and for rural women owners with at least a primary education. Policymakers should therefore consider extending support to adult rural women by providing them with formal financing schemes under conditions similar to those for social-network financing, perhaps associated with education or training programs.

Our results also underline the importance of considering targeted criteria in the effort to expand the financial inclusion of women in rural Benin. Thus, there is a need to elaborate multistage, adapted specifically and flexible social-network-based financing alike products toward rural women. Our study has additionally shown that self-financing would be more profitable for young rural women over other financing alternatives. Policymakers may extend support for young rural women by providing them with more flexible financing schemes for starting businesses. This may take a form of a small but reasonable amount of interest-free financing to ease the way for young rural women who are less likely to be creditworthy and or established borrowers. Entrepreneurship programs may also be developed for rural women starting at an early age with comparatively flexible credit conditions.

Finally, our study showed that formal credit-based financing would benefit the functioning of rural women-owned enterprises that have operated for more than ten years or which employ salaried workers (both groups have previously operated on the basis of social-network financing). These results indicate that there is still room for policymakers to develop outreach efforts more targeted to rural women owners and to increase the amount of loans to reach the dual objective of financial inclusion and microenterprise growth in the context of rural development. As profit-driven firms, formal credit institutions, including the IMF, may target rural women owners who have the potential to expand microenterprises and who are already accustomed to the realities of borrowing and repaying credit.
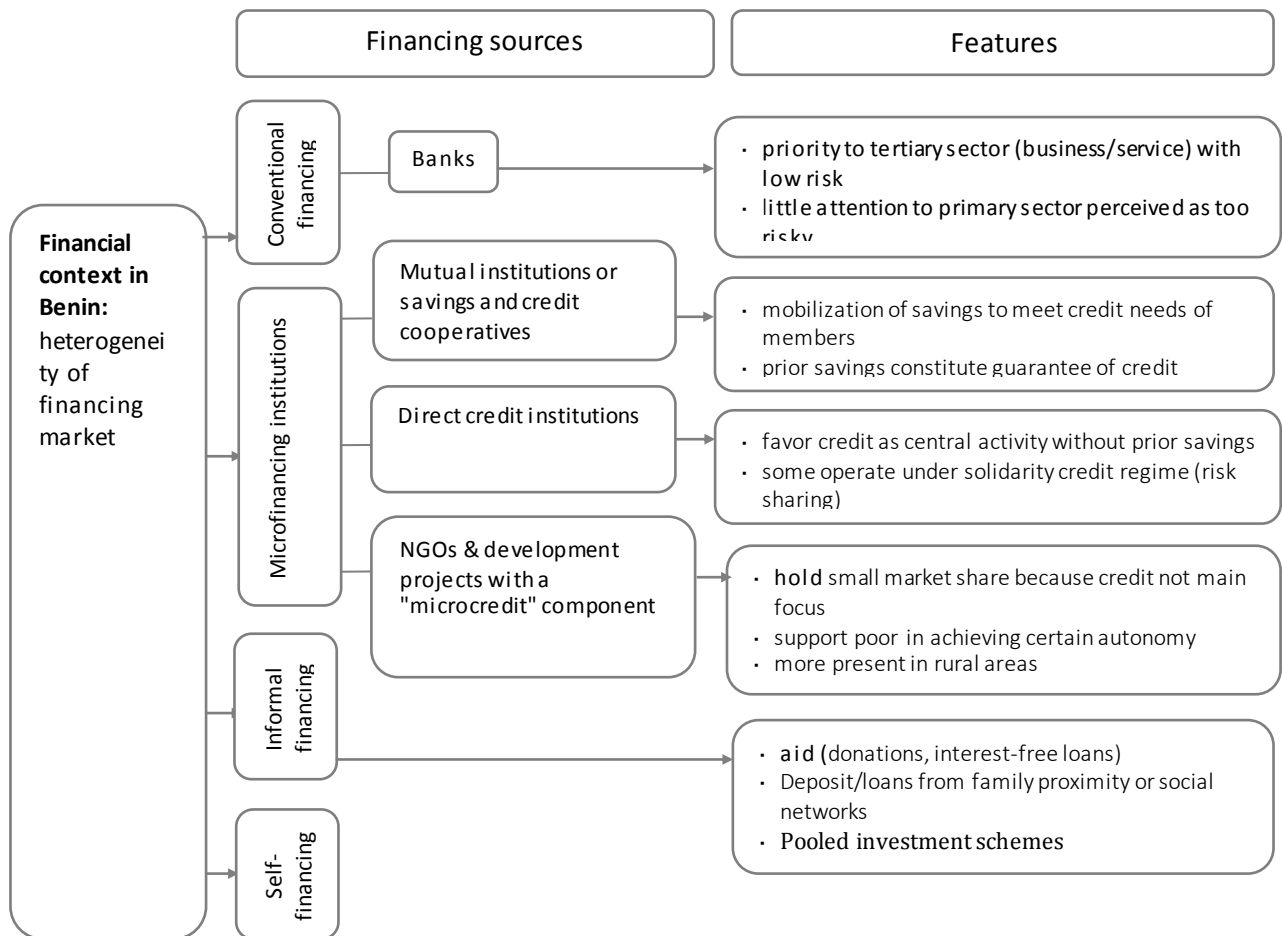
References

Accrombessy, F.D.E.T. (2010). Knowing the Benin Labor Market to Better Conceive a Youth Employment Project: What Do We Learn? World Bank WPS6184. Washington, DC: World Bank Africa Region Poverty Reduction and Economic Management Unit.

Akerlof, G. (1970). The Market for Lemons, Qualitative Uncertainty and the Market Mechanism. *Quarterly Journal of Economics, 84,* 488-500.

Akingunola, R. O., Olowofela, E. O., and Yunusa, L. (2018). Impact of Microfinance Banks on Micro and Small Enterprises in Ogun State, Nigeria. *Binus Business Review*, 9(2), 163-169. Available at https://doi.Org/10.21512/Bbr.V9i2.4253.

Alam, M. and Molla, R. (2012). The Limitations of Microcredit for Promoting Microenterprises in Bangladesh. *Economic Annals*, 57(192), 41-53.

Alhassan, E. A., Hoedoafia, M., and Braimah, I. (2016). The Effects of Microcredit on Profitability and the Challenges on Women Owned SMES: Evidence from Northern Ghana. *Journal of Entrepreneurship and Business Innovation,* 3(1), 29-47. Available at 10.5296/jebi.v3i1.9525.

Amponsah, M. (2016). An RCT on an Innovative Loan Product for Female Entrepreneur in Ghana. Nairobi, Kenya: Partnership for Economic Policy.

Araar, A., Awel, Y,. Boka, J. B., Girma, H., Shafi, A.,Yitbarek, E. A., and Zerihun, M.(2019). Impact of Credit and Training on Enterprise Performance: Evidence from Urban Ethiopia. PEP Working Paper No. 2019-13. Nairobi, Kenya: Partnership for Economic Policy.

Arrow, K. J. (1963). Uncertainty and the Welfare Economics of Medical Care. *American Economic Review, 53*(3), 941-973.

Aterido, R., Beck, T. and Iacovone, L. (2013). Access to Finance in Sub-Saharan Africa: Is There a Gender Gap? *World Development*, *47*, 102-120. Available at https://doi.org/10.1016/j.worlddev.2013.02.013.

Attanasio, O., Augsburg, B., De Haas, R., Fitzsimons, E., and Harmgart, H. (2015). The Impacts of Microfinance: Evidence from Joint-Liability Lending in Mongolia. *American Economic Journal*, *Applied Economics*, *7*(1), 90-122.

Babbitt, L.G., Brown, D., and Mazaheri, N. (2015). Gender, Entrepreneurship, and the Formal-Informal Dilemma: Evidence from Indonesia. *World Development, 72*, 163-174. Available at doi.org/10.1016/j.worlddev.2015.02.019.

Bardasi, E., Sabarwal, S., and Terrell, K. (2011). How Do Female Entrepreneurs Perform? Evidence from Three Developing Regions. *Small Business Economics*, *37*(4), 417-441.

Becho, I. (2017). Performance des Entreprises Informelles en Côte d'Ivoire: Quelle Contribution du Microcrédit? *Journal of Economics and Finance, 8*(2), 50-64. Available at doi.org/10.9790/5933-0802015064.

Berge, L. I. O. and Pires, A. J. G. (2015). Gender, Social Norms, and Entrepreneurship. Arbeidsnotat Working Paper 05/15. Bergen, Norway: Centre for Applied Research at NHH. Available at https://core.ac.uk/download/pdf/30803705.pdf.

Bernhardt, A., Field, E., Pande, R., and Rigol, N. (2019). Household Matters, Revisiting the Returns to Capital among Female Microentrepreneurs. *American Economic Review, Insights*, *1*(2), 141-160.

Bhatt, N. and Tang, S. Y. (2001). Delivering Microfinance in Developing Countries, Controversies and Policy Perspectives. *Policy Studies Journal*, *29*(2), 319-333.

Bourguignon, F., Fournier, M., and Gurgand, M. (2007). Selection Bias Corrections Based on the Multinomial Logit Model, Monte Carlo Comparisons. *Journal of Economic Surveys*, *21*(1), 174-205.

Bruhn, M. (2009). Female-Owned Firms in Latin America: Characteristics, Performance, and Obstacles to Growth. World Bank Policy Research Working Paper 5122. Washington, DC: The World Bank. Available at https://doi.org/10.1596/1813-9450-5122.

Campero, A. and Kaiser, K. (2013). Access to Credit: Awareness and Use of Formal and Informal Credit Institutions. Banco de México Working Paper 2013-07. Available at https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.432.2134&rep=rep1&type=pdf.

Carter, S, and Rosa, P. (1998). The Financing of Male- and Female-Owned Businesses. *Entrepreneurship and Regional Development*, *10*(3), 225-241.

Chowdhury, T. Y., Yeasmin, A., and Ahmed, Z. (2018). Perception of Women Entrepreneurs to Accessing Bank

Credit. *Journal of Global Entrepreneurship Research*, 8(32). Available at https://doi.org/10.1186/s40497-018-0119-1.

Coleman, S. and Kariv, D. (2013). Gender, Performance and Financial Strategy, A Dynamic Capabilities Perspective. *Journal of Developmental Entrepreneurship*, 18(3), 1-24.

Coleman, S. and Robb, A. (2009). A Comparison of New Firm Financing By Gender: Evidence from the Kauffman Firm Survey Data. *Small Business Economics, 33*(397). Available at https://doi.org/10.1007/s11187-009-9205-7.

Crépon, B., Devoto, F., Duflo, E., and Parienté, W. (2015). Estimating the Impact of Microcredit on Those Who Take It Up, Evidence from a Randomised Experiment in Morocco. *American Economic Journal, Applied Economics, 7*(1), 123-150.

Dahoun, D. B, Vodonou, O.M.C., Mongan, S-M., Mededji, D., and Alofa, J. (2013). Microcrédit, Pauvreté et Autonomisation des Femmes au Bénin. PEP Working Paper, 2013-13. Nairobi, Kenya: Partnership for Economic Policy.

De Mel, S., McKenzie, D., and Woodruff, C. (2012). One-Time Transfers of Cash or Capital Have Long-Lasting Effects On Microenterprises in Sri Lanka. *Science, 335*(6071), 962-966.

Diagne, A. and Zeller, M. (2001). Access to Credit and Its Impact on Welfare in Malawi. IFPRI Research Report No. 116. Washington, DC: International Food Policy Research Institute.

Doligez, F. (2002). Microfinance et Dynamiques Économiques: Quels Effets après Dix Ans d'Innovations Financières? *Revue Tiers Monde*, 43(172), 783-808.

Dubin, J. A. and McFadden, D. L. (1984). An Econometric Analysis of Residential Electric Appliance Holdings and Consumption. *Econometrica: Journal of The Econometric Society, 52*(2), 345-362.

Dupas, P. and Robinson, J. (2013). Savings Constraints and Microenterprise Development, Evidence from a Field Experiment in Kenya. *American Economic Journal, Applied Economics, 5*(1), 163-192.

Dutta, A. and Banerjee, S. (2018). Does Microfinance Impede Sustainable Entrepreneurial Initiatives Among Women Borrowers? Evidence from Rural Bangladesh. *Journal of Rural Studies, 60,* 70-81.

Economic Contribution of Women (2012, 20 October). *The Economist.* Available at https//:www.economist.com/news/economic-and-financialindicators/21564857.

Fafchamps, M., McKenzie, D., Quinn, S., and Woodruff, C. (2014). Microenterprise Growth and the Flypaper Effect: Evidence from a Randomized Experiment in Ghana. *Journal of Development Economics, 106*, 211-226.

Fairlie, R. and Robb, A. (2009). Gender Differences in Business Performance: Evidence from the Characteristics of Business Owners Survey. *Small Business Economics*, 33(4), 375-395.

Fetterolf, J. (2017, 7 March). In Many Countries, At Least Four-in-Ten in the Labor Force Are Women. Washington, DC: Pew Research Center. Available at http://pewrsr.ch/2mSNdDo.

Fiala, N. (2018). Returns to Microcredit, Cash Grants and Training for Male and Female Microentrepreneurs in Uganda. *World Development, 105*, 189-200.

Fonds Monétaire International (2016, January). Benin: Questions Générales. Rapport du FMI No. 16/7. Washington, DC: International Money Fund

Food and Agriculture Organization of the United Nations (2019). Women's Access to Rural Finance, Challenges and Opportunities. Rome: FAO. Available at http://www.fao.org/documents/card/en/c/ca5167en.

Galli, E. and Rossi, S. P. S. (2016). Bank Credit Access and Gender Discrimination: Some Stylized Facts. In S. Rossi and R. Malavasi, Eds., *Financial Crisis, Bank Behaviour and Credit Crunch: Contributions to Economics*, 111-123. Switzerland: Springer International Publishing.

Gichuki, C. N., Mulu-Mutuku, M., and Kinuthia, L. N. (2014). Performance of Women Owned Enterprises Accessing Credit from Village Credit and Savings Associations in Kenya. *Journal of Global Entrepreneurship Research, 4*(16), 1-13. Available at doi.org/10.1186/s40497-014-0016-1.

Gifford, J. L. (2004). Utilizing, Accumulating and Protecting Livelihood Assets: The Role of Urban Informal Financial Services in Kampala, Uganda. In H. Lont and O. Hospes, Eds., *Livelihood And Microfinance: Anthropological and Sociological Perspectives on Savings and Debt*. Delft: Eburon.

Guerin, I., Roesch, M., Morvant-Roux, S., Fouillet, C., and Hillenkamp, I. (2007). La Microfinance Aujourd'Hui: Une Utilité Incontestable Mais des Effets Mitigés en Matière de Lutte Contre la Pauvreté et les Inégalités. *Annuaire Suisse Du Développement*, 26, 103-121.

Hoff, K. and Stiglitz, J. E. (1990). Introduction, Imperfect Information and Rural Credit Markets: Puzzles and Policy Perspectives. *The World Bank Economic Review*, *4*(3), 235-250.

International Labour Organization (2020). ILOSTAT Explorer. Labour Force Participation Rate by Sex and Age: ILO Modelled Estimates, Nov. 2020. Available at https://www.ilo.org/shinyapps/bulkexplorer30/?lang=en&segment=indicator&id=EAP_2WAP_SEX_AGE_RT_A.

Jakiela, P. and Ozier, O. (2016). Does Africa Need a Rotten Kin Theorem? Experimental Evidence from Village Economies. *Review of Economic Studies, 83*(1), 231-268.

Jayachandran, S. (2020). Microentrepreneurship in Developing Countries. NBER Working Paper 26661. Cambridge, MA: National Bureau of Economic Research. Available at https://doi.org/10.3386/w26661.

Kassie, M., Teklewold, H., Marenya, P., Jaleta, M. and Erenstein, O. (2015). Production Risks and Food Security Under Alternative Technology Choices in Malawi, Application of A Multinomial Endogenous Switching Regression. *Journal of Agricultural Economics*, *66*, 640-659.

Mahmud, W. and Osmani, S. R. (2017). *The Theory and Practice of Microcredit*. London: Routledge.

McKenzie, David (2017). Identifying and Spurring High-Growth Entrepreneurship, Experimental Evidence from a Business Plan Competition. *American Economic Review, 107*(8), 2278-2307.

Mhando, C. and Kiggundu, M. N. (2018). Introduction to Special Issue -Managing Africa's Informal Economy, Research, Practice and Advocacy. *Africa Journal of Management*, *4*(3), 219-224.

Mundlak, Y. (1978). On the Pooling of Time Series and Cross Section Data. *Econometrica*, *46*(1), 69-85.

Muravyev, A., Talavera, O., and Schäfer, D. (2009). Entrepreneurs' Gender And Financial Constraints, Evidence From International data. *Journal Of Comparative Economics*, *37*(2), 270-286. Available at https://Available at doi.Org/10.1016/J.Jce.2008.12.001.

Nadege, D. J., Novignon, J., Bénédicte A. T., and Araar, A. (2020). Understanding Youth Entrepreneurship In Benin: The Role Of Microcredit Uptake And Entrepreneur Capacity Building. PEP Working Paper 2020-16. Nairobi, Kenya: Partnership for Economic Policy(PEP). Available at https://portal.pep-net.org/document/download/34669

Niyongabo, E. (2008). Défis du Financement Agricole et Rural, Rôle pour la Microfinance et Implications pour les Politiques Publiques en Afrique Subsaharienne: Pistes de Recherche Basées sur le Cas du Burundi. Centre Emile Bernheim de Recherche Interdisciplinaire en Gestion Working Paper No. 08/024. Brussels, Belgium: Université Libre de Bruxelles-Solvay Business School.

Pérez, J. I. G. and Sanz, Y. R. (2005). Wage Changes Through Job Mobility In Europe, A Multinomial Endogenous Switching Approach. *Labour Economics*, *12* (4), 531-555.

Selvavinayagam, K. (1995). Improving Rural Financial Markets for Developing Microenterprises. FAO Investment Centre Occasional Paper Series. Rome, Italy: Food and Agriculture Organization of the United Nations. Available at http://www.fao.org/3/ae363e/ae363e00.htm.

Sossa, T. (2011). Microfinance et Inclusion Financière au Bénin. In *La Microfinance au Bénin*. Geneva: Graduate Institute Publications. Available at http://books.openedition.org/iheid/355.

Sultakeev, K., Karymshakov, K., and Sulaimanova, B. (2018). The Impact of Microfinance on Entrepreneurship in Kyrgyzstan. *Acta Oeconomica Pragensia*, *26*(2), 24-40.

Wampfler, B. (2000). Le Financement de 'Agriculture dans un Contexte de Libéralisation: Quelle Contribution de la Microfinance? *Techniques Financières et Développement*, *59-60*, 61-70.

Wasihum, R. and Paul, I. (2011). Growth Determinants of Women Operated Micro and Small Enterprises in Addis Ababa, Ethiopia. International Journal of Economic Development : Research and Investment, *2(1), 57-69.*

Wenner, M., Navajas, S., Trivelli, C., and Tarazona, A. (2007). Managing Credit Risk in Rural Financial Institutions in Latin America. Sustainable Development Department Best Practices Series. Washington, DC: Inter-American Development Bank.

World Food Programme (2017). Analyse Globale de la Vulnérabilité et de la Sécurité Alimentaire: Rapport Final. Rome, Italy: United Nations World Food Programme.

Appendix

Figure A1: Heterogeneity of Financing Market in Benin

Financing sources	Features

Financial context in Benin: heterogeneity of financing market

Conventional financing

Banks
- priority to tertiary sector (business/service) with low risk
- little attention to primary sector perceived as too risky

Microfinancing institutions

Mutual institutions or savings and credit cooperatives
- mobilization of savings to meet credit needs of members
- prior savings constitute guarantee of credit

Direct credit institutions
- favor credit as central activity without prior savings
- some operate under solidarity credit regime (risk sharing)

NGOs & development projects with a "microcredit" component
- **hold** small market share because credit not main focus
- support poor in achieving certain autonomy
- more present in rural areas

Informal financing
- **aid** (donations, interest-free loans)
- Deposit/loans from family proximity or social networks
- Pooled investment schemes

Self-financing

Source: Authors and Sossa (2011).

Figure A2: Main Source of Financing for Microenterprises in Rural Benin
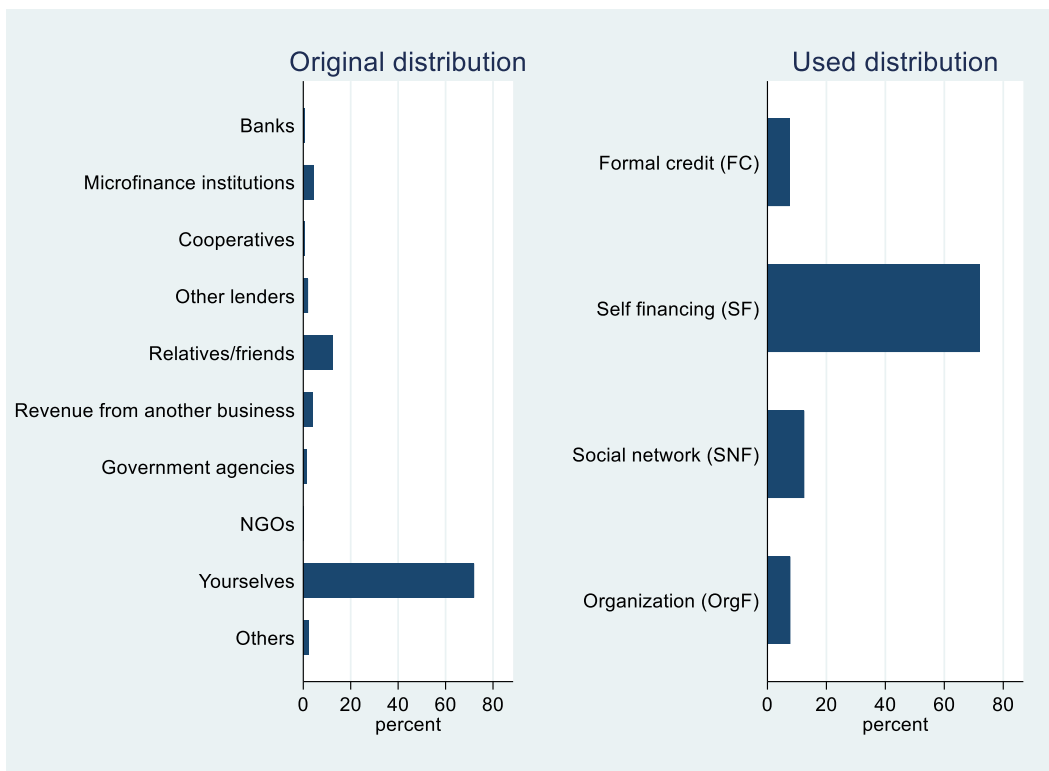
Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

Table A1: Definitions of the Variables Used in the Econometric Analysis

Variables	Description of the variables
Outcome variable (performance)	
Profit Margins	Average monthly profit (net of all costs) in the twelve months prior to the survey/revenue (sales) generated by the microenterprise during these months
Treatment variable (types of financing)	
Formal-based financing	Financing from formal credit source (banks, microfinance institutions, cooperatives, or other lenders)
Self-financing	Financing from the owner of the microenterprise
Social-network-based financing	Financing from relatives or friends
Organization-based financing	Financing stems from revenue/income of another business (microenterprise), government agencies, NGOs, or others
Individual and household characteristics	
Male	Owner of microenterprise is male
Age	Age of owner
Literacy	Owner of microenterprise is literate (in French or in a national or a foreign language)
No education	Owner has no schooling
Primary education	Owner has primary education
At least secondary education	Owner has at least secondary education
Single	Owner is single
Married	Owner is married
Divorced/Widow	Owner is a divorced or a widow
Head	Owner is the household head
Husband or wife	Owner is the husband or wife of the household head
Other family link	Owner has other family link with the household head
Traditional & other	Owner is in traditional and other religion
Christian	Owner is a Christian
Muslim	Owner is a Muslim
Adja	Owner is Adja or related ethnic group
Bariba	Owner is Bariba or related ethnic group
Fon	Owner is Fon or related ethnic group
Yoruba	Owner is Yoruba or related ethnic group
Other ethnicity	Owner is of another ethnic group
Chief/advisor	The owner is chief/advisor in her or his community

Table A1: Definitions of the Variables Used in the Econometric Analysis

Variables	Description of the variables
Outcome variable (performance)	
Member of or an officer of an association	Owner is a member of or an officer of an association
No status	Owner has no formal social status in an association
Household size	Number of people in the owner's household
Number of plots	Number of plots owned by the household
Businesses characteristics	
Single owner	Owner is sole proprietor of the microenterprise
Years in activity	Number of years the microenterprise has existed
Salaried number	Number of non-household member employees (workers)
Salary (in FCFA)	Amount of wages paid to employees
Total cost (in local currency FCFA)	Total cost of operating the microenterprise
Months of operation	Number of months of operation in the twelve months prior the survey
Processing of agricultural products	Owner operates an agricultural-products-processing activity
Craft	Owner operates a craft activity
Trade	Owner operates a trade activity
Agriculture	Owner operates an agriculture activity
Service	Owner operates a service activity
Community variables	
Market	Existence of a market in the village or within 10 km of the village
Shop	Existence of a shop in the village or within 10 km of the village
Transportation	Existence of regular public transportation service in the village or within 10 km of the village
Distance (in Km)	Distance from the village to an asphalt road
Use of mobile phone	Mobile phone use possible in the village
Access to electricity	Access to electricity in the village
Village associations	Existence of village associations
Development projects	Existence of development programs/projects in the village
Excluded variables	
Microcredit NGO	Existence of microfinance NGOs in the community
Pooled investment schemes and community fund	Existence of pooled investment schemes or other community fund
Trader and lender	Existence of merchants and usurers in the community

Table A2: Selection Model Results from Multinomial Regression (Base Outcome Is Self-Financing)

	Formal credit-based financing	SE	Social-network-based financing	SE	Organization-based financing	SE
Male	-0.701***	(0.268)	-0.550**	(0.216)	-0.182	(0.241)
Age	-0.009	(0.027)	-0.092***	(0.022)	-0.053**	(0.025)
Age squared	0.000	(0.000)	0.001***	(0.000)	0.000*	(0.000)
Literacy	0.784**	(0.310)	-0.037	(0.241)	0.342	(0.326)
Primary-school education (reference category: no education)	-0.652*	(0.345)	0.107	(0.252)	-0.645*	(0.366)
At least secondary education	-0.842*	(0.430)	0.164	(0.330)	-0.091	(0.410)
Married (Ref: Single)	-0.147	(0.311)	-0.344	(0.225)	-0.359	(0.296)
Divorced/Widow	-0.385	(0.397)	-0.186	(0.329)	-0.037	(0.414)
Husband or wife (Ref: Head)	0.019	(0.221)	0.656***	(0.227)	-0.098	(0.232)
Other family link	0.534*	(0.304)	1.291***	(0.228)	0.360	(0.290)
Christian (Ref: traditional & other)	-0.119	(0.146)	-0.134	(0.131)	0.614***	(0.168)
Muslim	0.516**	(0.249)	0.072	(0.207)	0.705***	(0.268)
Bariba (Ref: Adja)	-0.362	(1.127)	-0.729	(0.638)	-0.205	(0.767)
Fon	0.350	(0.309)	0.317	(0.367)	-0.473	(0.363)
Yoruba	-0.340	(0.367)	0.153	(0.410)	-0.566	(0.448)
Other ethnicity	-1.171	(0.994)	0.302	(0.597)	0.064	(0.708)
Member of or officer of an association (Ref: Chief/advisor)	-0.139	(0.310)	-0.081	(0.398)	-0.086	(0.351)
No Status	-0.848***	(0.290)	0.025	(0.361)	-0.051	(0.314)
Household size	-0.052**	(0.022)	0.044***	(0.016)	0.093***	(0.018)
Number of plots	-0.010	(0.051)	0.060	(0.042)	0.082*	(0.045)
Single owner	-0.795***	(0.249)	-0.599***	(0.220)	-1.393***	(0.211)

Year in activity	-0.017**	(0.008)	-0.014*	(0.007)	-0.011	(0.007)
Craft (Ref: Processing of agricultural products)	-0.312	(0.251)	0.705***	(0.196)	0.111	(0.240)
Trade	-0.223	(0.153)	0.223*	(0.134)	0.070	(0.162)
Agriculture	-0.465	(0.325)	0.137	(0.234)	-0.327	(0.297)
Service	-0.826***	(0.316)	-0.194	(0.258)	0.584**	(0.234)
Market	0.054	(0.216)	-0.083	(0.146)	0.124	(0.183)
Shop	0.187	(0.173)	-0.214	(0.133)	0.243	(0.172)
Transportation	0.031	(0.290)	-0.343	(0.255)	0.333	(0.343)
Distance	0.010*	(0.005)	-0.014***	(0.004)	-0.003	(0.005)
Use of mobile phone	0.586**	(0.285)	1.009***	(0.296)	0.924***	(0.313)
Access to electricity	0.017	(0.170)	0.035	(0.141)	-0.160	(0.174)
Village associations	-0.497**	(0.220)	-0.231	(0.182)	-0.188	(0.209)
Development projects	-0.427**	(0.207)	-0.184	(0.177)	-0.152	(0.202)
Microcredit NGO	-0.070	(0.158)	0.206	(0.137)	-0.011	(0.170)
Pooled investment schemes and community fund	-0.409	(0.293)	-0.454*	(0.247)	0.896***	(0.345)
Trader and lender	0.172	(0.173)	0.367**	(0.155)	0.101	(0.203)
Constant	-1.399	(1.493)	-0.684	(1.078)	-0.954	(1.097)
Observations	3,949		3,949		3,949	

Standard errors in brackets. Significance levels are indicated with *** $p<0.01$, ** $p<0.05$, * $p<0.10$. Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.

Table A3: Joint Test of Excluded Variables in the Selection and Outcome Models

| Excluded variables | Multinomial regression (base outcome is: Self-financing) | | | Linear regression: dependent variable is Profit margins | | | |
	Formal credit-based financing	Social network-based financing	Organization-based financing	Formal credit-based financing	Self-financing	Social network-based financing	Organization-based financing
Microcredit NGO	-0.070	0.206	-0.011	0.414	0.891**	-0.217	0.182
Pooled investment schemes and community fund	-0.409	-0.454*	0.896***	-0.328	0.023	0.259	0.503
Trader and lender	0.172	0.367**	0.101	-0.358	0.190	0.212	-0.193
Test of excluded instruments:							
χ2(3)	2.82	11.14**	7.48*	3.33	5.72	5.60	3.44
Prob > χ2	0.419	0.011	0.058	0.344	0.126	0.13	0.328
Observations	3,949	3,949	3,949	301	2846	494	308

Notes: Control variables included but not reported. Parameters for all the other variables in the selection model are reported in Table A2. Significance levels are indicated with *** p<0.01, ** p<0.05, * p<0.10. Source: Calculations based on data from the Plans Fonciers Ruraux d'Evaluation d'Impact 2011.