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ABSTRACT

Comprehensive Assessment of the Impact of Mandatory Community-Based Health Insurance in Burkina Faso*

Offering health coverage to informal workers and their families is an ongoing and major challenge in most Sub-Saharan countries. As anchoring insurance to employment contracts is not possible and the demand for insurance is too low to deploy voluntarily sustainable schemes, alternative initiatives are needed. Bundling health insurance to microcredit is an option that we evaluate in this paper. We conducted a two-year cluster randomized controlled trial (RCT) to evaluate the impact of a compulsory micro-health insurance scheme integrated into a micro-loan system for informal micro-entrepreneurs in Ouagadougou, Burkina Faso. Our sample comprised 101 microcredit groups of a partner microfinance institution (MFI), among which we surveyed 1200 individuals (mostly female informal workers). The members of the 47 randomly selected treatment groups had to adhere to health insurance to get access to microcredit. In contrast, members of the 54 control groups did not get health insurance. We assessed the impact of subscription to health insurance on financial protection, healthcare utilization, and health out-comes, and estimated both the intention-to-treat effect (ITT) and the local average treatment effect (LATE). We did not identify any selective attrition, therefore there was no rejection of the MFI due to the health insurance product. Our results reveal a significant and positive impact of health insurance on financial protection. Out-of-pocket expenditures are reduced, as are difficulties in paying for healthcare and the adverse effects of healthcare expenses on professional activities. Health insurance encourages respondents to seek care at modern healthcare facilities rather than relying on self-medication and traditional healers. However, we find no significant impact on health outcomes, whether physical or psychological. Compulsory health insurance has the potential to offer financial protection against health risks to MFI members, a population that lacks social protection, without jeopardizing the retention rate of the MFI. It can create incentives for individuals to seek appropriate healthcare when necessary rather than relying on self-medication. However, the potential impacts on health involve indirect and long-term mechanisms, making them challenging to identify.

JEL Classification:	I13, I15, O12, G21, O55
Keywords:	micro health insurance, financial protection, healthcare utilization, Informal sector, Burkina Faso

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1 Introduction

Identified as a cornerstone of the Sustainable Development Goals (SDGs) set in 2015 for 2030, Universal Health Coverage aims to ensure that all individuals have access to quality health services when and where they need them, without financial hardship. Despite substantial progress over the past decades, public health expenditures remain insufficient, and financing mechanisms are suboptimal in many countries to achieve UHC. Specifically, out-of-pocket payments often constitute the largest share of health expenditures in Africa (up to 57% in Chad and 73% in Cameroon), despite their significant impacts on economic inequalities and household impoverishment (Wagstaff et al., 2018). In high-income countries, out-of-pocket payments account for a substantially lower share of total health expenditures (e.g., 9% in France, 10% in the US according to the World Bank), highlighting the need for alternative financing mechanisms and risk-pooling systems (Hsiao and Yip, 2023).

Health insurance has been identified as a promising means of enhancing health protection at three levels (Das and Do, 2023; Ly et al., 2022a). As a component of social protection, it provides financial protection against health shocks: it has been shown to reduce out-of-pocket expenditures (Kuwawenaruwa et al., 2019; Powell-Jackson et al., 2014; Thornton et al., 2010), the prevalence of catastrophic expenditures (Fink et al., 2013; Levine et al., 2016), and the use of potentially harmful coping strategies such as debt (Yilma et al., 2015). Health insurance affects the utilization of the healthcare system, at least by redirecting consumption from non-impaneled to impaneled facilities (Levine et al., 2016; Rabbani et al., 2022; Thornton et al., 2010; Acharya et al., 2012). Lastly, it can affect health, even if the evidence is scarcer: no impact has been identified on physical health outcomes (Levine et al., 2016; Rabbani et al., 2022; Thornton et al., 2010), although one study found a positive impact on mental health through a decrease in stress (Haushofer et al., 2020).

The optimal configuration of a prepayment system is far from consensual, involving considerations of voluntary versus mandatory participation, contribution-based versus tax-based funding, and the choice between national- or community-based insurance structures. Alternative models have been assessed according to several criteria: resource mobilization for health, insurance coverage of the population, and financial protection (measured as a share of out-of-pocket expenditures) (Cashin and Dossou, 2021) and some conclusions have emerged from the literature.

Firstly, health insurance schemes on a voluntary basis always face low take-up rates due to a typical low demand for health insurance (Platteau et al., 2017), limiting the base for risk-pooling. Reasons for low enrollment include unattractive benefit packages, implementation flaws (Ridde et al., 2018; Schneider, 2023), socioeconomic factors (Michielsen and Criel, 2023; Mladovsky et al., 2023;

Mladovsky, 2014). Furthermore, if adverse selection is present (Akerlof, 1970), individuals willing to enroll may have specific characteristics leading to higher health expenses, jeopardizing the financial balance of the insurance scheme (Fink et al., 2013). Low take-up and adverse selection also make the identification of the impact of health insurance statistically and methodologically challenging. In contrast, compulsory health insurance improves risk mitigation in the pool and removes socioeconomic and information bias towards enrollment. It also raises fewer methodological concerns in the identification of the impact of health insurance. Secondly, contributory insurance has been shown to be ineffective on several levels (Yazbeck et al., 2023): premiums are a major barrier to enrollment (Banerjee et al., 2021; James and Acharya, 2022), raising equity concerns (Watson et al., 2021) and the benefits of this model in terms of additional resources mobilized for health are unclear (Barasa et al., 2021). Despite this, in Africa, the development of several insurance schemes has recently favored contributory community- and labor-based schemes (Barasa et al., 2021; Ly et al., 2022b). These schemes typically operate on a mandatory basis for formal employees and on a voluntary basis for informal workers (Cashin and Dossou, 2021), leaving important shares of their population uncovered.

In light of these considerations, advancing toward UHC in Sub-Saharan African countries requires alternative and effective ways to protect informal workers against health-related risks. Community-based health insurance (CBHI) schemes have a long history in Sub-Saharan Africa, but they have been mostly voluntary and have traditionally suffered from low take-up (Ridde et al., 2018; Waelkens et al., 2017). Two factors contribute to low demand for insurance: the lack of capacity to pay, of awareness (many people do not understand how insurance works or are unaware of the benefits it offers (Platteau and Ontiveros, 2021), and administrative barriers that can complicate adherence to insurance schemes (Wood, 2023). However, isolated successful experiences show the potential of CBHI when implemented adequately. In Ethiopia, a CBHI scheme embedded in the local social protection administration benefited from strong incentive mechanisms for the staff to enroll members and ensure take-up (Mebratie et al., 2019). The insurance increased healthcare utilization among members: suggesting that anchoring health insurance to an existing social structure can lead to high take-up and could amplify the impact of health insurance. Nonetheless, empirical evidence on such experiences remains scarce, especially in African settings. In Bangladesh, a factory included a micro health insurance subscription to the contracts with its suppliers (mostly female artisans). Enrollees of this inpatient-oriented health insurance adopted it, and the insurance broke even (Rabbani et al., 2022). The insurance scheme increased the use of hospital services, particularly among women, and a rise in visits to the impaneled hospitals. The literature assessing interventions bundling micro health insurance to microcredit raises additional issues of potential

rejection of the microcredit and is inconclusive. In India, a microfinance institution (MFI) bundled a health insurance product to the contraction of new microcredit (Banerjee et al., 2014) and faced a strong rejection by the MFI members. By contrast, a similar model was found to increase retention rate, especially on younger members of the MFI (Hussain and Ahmed, 2019).

This research evaluates the impacts of a mandatory health insurance scheme bundled to the attribution of microcredits for informal micro-entrepreneurs, using a cluster randomized controlled trial (RCT) conducted from January 2020 to January 2022 in Ouagadougou, the capital of Burkina Faso. This urban setting exhibits several typical characteristics of the sub-Saharan region. Almost half of its population lives below the poverty line, the economy is mostly informal (more than 80% of the active population according to the last census), and access to the formal banking system is insufficient (BCEAO, 2022), leaving many households vulnerable to disease or accidents. For two decades, the government has demonstrated its commitment to moving towards UHC, by removing user fees for maternal and infant care services (Ridde and Yaméogo, 2018) and supporting Universal Health Insurance, both community-based (Fink et al., 2013) and institution-based (Bicaba et al., 2020). To date, less than 10% of the population is covered by any form of health insurance (Demographic and Health Survey, 2021), but the implementation of National Health Insurance is ongoing. More than three million public and private workers should be insured by the end of 2025, while the most vulnerable should be insured without premiums. Nonetheless, the protection of informal workers is left to voluntary enrollment, justifying the emergence of alternative models. The evaluated intervention consisted of a micro health insurance subscription for each new loan obtained and throughout the loan duration. The benefit package was comprehensive, covering inpatient and outpatient services (including drugs and exams). We evaluate the impact of health insurance on several outcomes, including financial protection, health utilization, and overall health.

Our study enhances the understanding of providing financial protection against unexpected health expenditures in contexts where health insurance options are typically voluntary. We enrich the literature by several means:

The first contribution lies in using a cluster RCT to evaluate the impacts of a mandatory micro health insurance product that is financially viable and replicable in various contexts due to its linkage with a microfinance product. The compulsory nature of the insurance scheme ensures that all eligible workers are enrolled, reducing the risk of adverse selection and allowing for risk-pooling on a large number of beneficiaries. Additionally, we observed no significant rejection of the MFI following the introduction, as insured members did not opt out of the MFI more than non-insured individuals, which is an essential component of the model's viability.

Secondly, beyond the importance of the mandatory nature, the health insurance package includes a comprehensive benefit package, which is crucial for changing health behaviors. We expand the results of Rabbani et al. (2022), whose insurance product offered limited financial protection to beneficiaries as it covered mainly inpatient health expenses, and excluded drug and examination costs. This reduces the effectiveness of insurance in providing financial protection, as these latter costs are increasingly recognized as a source of catastrophic health expenditures, and the refusal and delay in seeking care are more likely to occur for outpatient services (Eze et al., 2022; Capuno et al., 2019). The health insurance studied in this article can potentially change health-seeking behaviors, as it reimburses hospital fees, medications, and complementary tests.

Furthermore, we examine the impact of this health insurance on a range of outcomes. The first outcome studied is financial protection. Instead of evaluating the effect on catastrophic out-of-pocket expenditures, whose thresholds and definitions are not consensual, we examine the impact on household health expenditures, credit repayment difficulties, and economic activity. We demonstrate the protective impact of health insurance on these various financial dimensions. Our second outcome concerns health-seeking behaviors. Previous studies primarily analyze healthcare seeking as a binary outcome (went to a facility or not, (Levine et al., 2016; Rabbani et al., 2022)). We show that health insurance has significantly increased access to appropriate formal healthcare facilities, while reducing reliance on traditional medicine and self-medication. It has also accelerated the seeking of care, with a significant impact on seeking appropriate care on the same day symptoms appear. Finally, like most studies, we do not observe effects on physical health, but emotional well-being improves when individuals benefit from health insurance.

This article is structured as follows: Section 2 presents the intervention and its implementation. Section 3 details the methods used to assess the program. Section 4 presents the impact evaluation results. The results are discussed in Section 5, and Section 6 concludes.

2 Health Micro-Insurance Intervention

2.1 Context

The intervention consists in a health micro-insurance product for members of a microfinance institution (MFI) based in Ouagadougou, developed collaboratively by two partner NGOs—one functioning as an MFI and the other as a micro-insurance organization. The MFI is structured into

administrative units called agencies, and its members are organized into microcredit groups consisting of 20 to 40 individuals who meet monthly. Members can save and/or borrow funds for productive activities and receive financial education and follow-up support. The loan interest rate ranges from 12% to 17%, depending on the loan duration, aligning with the maximal rates that qualify as *social* microfinance in Burkina Faso. While members are grouped together for informational purposes, they are not jointly liable for each other's loan repayments. One of the difficulties observed by the MFI in loan repayments was related to unforeseen healthcare expenses, which prompted the idea to extend social protection to its members. To address this issue, the MFI decided to provide them with health coverage through this mandatory health micro-insurance product.

The subscription process for the health insurance product is structured as follows: Animators from the MFI announce the program to group members, and an animator from the health insurance NGO is invited to attend the microcredit meetings on three occasions to present the health insurance product, including its benefits package and operational details. After these three informational meetings, group members become eligible to subscribe to the health insurance. For each new loan request, enrollment in the health insurance is mandatory and occurs on the same day as the loan agreement. Each new enrollee receives an insurance card and is informed about the reimbursement process, as well as provided with a list of nearby empaneled facilities where patients do not have to pay the co-payment. This list is also printed on the back of the insurance card. It includes all public facilities in the neighborhoods of the microcredit groups and some private ones. The list of empaneled facilities can be enlarged if the insurance receives several claims from a facility willing to be part of the scheme.

The enrollment fee is 1000 FCFA per month. This amount covers the subscriber and three additional household members and provides outpatient and inpatient care, including examinations, prescribed medication, and hospitalization costs. These services are available in modern health facilities (public or private) and are reimbursed at a rate of 60%, with no ceiling or deductible. Four categories of medical care are covered: hospitalization (observation, surgery, or medical), primary care (consultations with a nurse, general doctor, or midwife), specialized care (18 specialties including hematology, nephrology, otorhinolaryngology, odontology, traumatology, urology, cardiology, surgery, dentistry, dermatology, diabetology, gastroenterology, gynecology, neurology, ophthalmology, pulmonology, pediatrics, and rheumatology) and deliveries (normal or c-section).[1] In empaneled facilities, patients are required to pay only the remaining 40% at the time of care. In

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[1]Due to the user fee removal for maternal care implemented in Burkina Faso in 2016, claims are expected to be rare for delivery care

Table 1: Benefit Package of the Micro Health Insurance Product

Features	Description
Eligibility	Mandatory for new loan applicants ; optional for those only using savings services
Premium	1000 FCFA per month (including protection for the subscriber and up to three additional household members)
Coverage Period	Duration of the loan
Covered Services	General and specialized consultations, medications (all but drugs prescribed for chronic diseases), deliveries, hospitalization, tests, and examinations
Not Covered Services	Costs related to chronic diseases and certain specializations (e.g., ophthalmology, dentistry)
Deductible/Copayment	No deductible, no ceiling; 60% copayment
Payment Modality	Prepayment in empaneled facilities; reimbursement in others
Type of Providers	All public facilities around the localisation of microcredit groups; private facilities in the same area

non-empaneled facilities, they must pay the full amount upfront and are reimbursed afterward. The insurance staff includes doctors who review and validate or reject reimbursement requests based on the prescriptions submitted by beneficiaries. In addition to financial protection, the health insurance NGO provides medical and social support to its enrollees, believing that removing financial barriers alone is not enough to encourage proper healthcare-seeking behavior. More precisely, members can receive medical counseling over the phone to determine which health centers to visit. Additionally, they benefit from home or hospital visits to ensure proper recovery and adherence to the doctor's recommendations, such as taking medication and getting sufficient rest. A detailed overview of all micro-insurance features is provided in Table 1.

The benefit package was designed so that the premium revenue would fully cover the claims (both prepaid and reimbursed). For the first years of the scheme, the MFI and an external donor subsidized the staff costs (estimated at 1000 additional FCFA per contract), which were later financed by an increase in the premium (after the end of the research project).

2.2 Cluster randomized controlled experiment design

To assess the impact of health insurance on our outcomes of interest, we conducted a cluster randomized controlled trial[2] from January 2020 to January 2022 in which treatment assignment was determined at the microcredit group level. Cluster randomization was chosen to mitigate the risk of contamination between members of the same groups, and because assigning individuals to different treatments within a group was technically challenging and could have caused dissatisfaction and potential rejection of the program. First, we randomly selected 100 microcredit groups out of 158 with at least 20 members across two MFI agencies. These two agencies exhibited very similar characteristics: they were located in the same geographical area in Ouagadougou, their beneficiaries had similar profiles, and they offered comparable microcredit and microinsurance services. In the second step, we randomly assigned the sampled groups to either the treatment or control arms, stratified at the agency level to ensure that both agencies included control and treatment groups. In December 2019, we selected 47 treatment groups where micro-health insurance was introduced and implemented for all group members (regardless of survey participation) and 54 control groups where no members were eligible to join the micro-health insurance scheme (Figure A1). Control group members were informed that they would gain access to the insurance in the spring of 2022.[3] As membership in the micro health insurance scheme is individual and nominative, it was impossible for an individual belonging to a control group to benefit from it.

3 Empirical strategy

3.1 Data

Baseline data were collected between January and February 2020, six months before the implementation of the health insurance scheme in August 2020. At that time, no communication regarding the forthcoming implementation of health insurance had been made. Approximately 20 individuals per microcredit group were randomly selected to participate in the baseline survey. The endline data were collected two years later, in January and February 2022, allowing treated groups access to health insurance for eighteen months. We endeavored to retain the same sample for the endline survey as the baseline survey, with two modifications. First, attritors within a group were replaced by other members from the same group (Figure A1). Since the entire treated group, regardless of

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[2]The RCT was registered with the following number: AEARCTR-0008548

[3]The reason given to control groups for this extensive waiting period was that the program was new and could not yet be rolled out to all microcredit groups due to logistical and facilitator training constraints. Loan officers and facilitators in charge of this micro health insurance scheme did not report any dissatisfaction from the control groups due to their inability to access the insurance.

whether they participated in the baseline survey, gained the right to use health insurance starting in June 2020, this does not bias our internal validity. However, we are unable to control for baseline characteristics for these new respondents. Second, some groups completely disbanded over the two years between surveys. These groups were replaced by other groups of the same status, within which we randomly selected 20 individuals to interview. In the end, we were able to interview 1,509 respondents, among whom 44% had baseline characteristics that we observed. Our final sample comprises 1039 individuals who experienced an episode of illness in the six months preceding the endline survey. The baseline and endline questionnaires included household composition, economic activities, assets, healthcare behaviors, and time and risk preferences.

We complemented this survey data with data from the micro health insurance NGO, to monitor potential contamination and track the insurance uptake over the study period. Specifically, we could access both claim data, which we could match with our baseline and endline datasets, and the monthly number of ongoing insurance and new contracts over the study period and per agency. This data allowed us to observe patterns in insurance utilization, verify the integrity of the treatment and control groups, and ensure that the intervention was implemented without unintended cross-group influences.

3.2   Identification strategy and estimators

Although health insurance is compulsory for the treated individuals, some had not yet utilized this service at the time of the endline survey. To account for this, we adopted a conservative approach and estimated the intention-to-treat (ITT) effect. This approach focuses on the treatment assignment rather than the actual utilization of the health insurance scheme. The ITT effect provides a lower bound estimate of the true effects but is considered the most relevant treatment effect for policymaking purposes, as it captures the average changes in outcomes for all individuals targeted by the intervention, regardless of their compliance with it (Rabbani et al., 2022). Our main specification for estimating the ITT effects of the program is as follows:

$$Y_i = \alpha + \beta T_i + X'_{i1}\Theta + \epsilon_i$$

where Y_i represents the outcome variable for the individual i, T_i is the treatment assignment indicator, X'_{i1} represents a vector of covariates, Θ is a vector of corresponding coefficients, and ϵ_i is the error term.

The treatment assignment indicator T_i took a value of 1 if the individual was assigned to a treated loan group, and X_{i1} was a pre-specified vector of individual-level controls measured at baseline when available. These controls included gender, age, education status, wealth level (measured by asset ownership), employment status, loan amount, MFI seniority, number of household members, presence of chronic illness, and whether the household pooled income. The individual-specific error term was denoted as ϵ_i, and we clustered standard errors at the lending group level. The coefficient β represents the ITT effect of the micro-insurance program.

Additionally, we employed a two-stage procedure to estimate the local average treatment effects (LATE). In this approach, we instrumented the actual utilization of health insurance using the treatment assignment variable, denoted as T_i. LATE estimates allowed us to estimate the treatment effect for compliers, referring to individuals who were induced by their assignment to comply with the treatment. Unlike ITT estimates, LATE estimates tend to provide an upper bound because they estimate the treatment's effect on those who took it up. These individuals were often more likely to benefit from the treatment compared to those who did not take it up.

3.3   Outcome variables

We organized our outcome variable into three main categories: financial protection, healthcare utilization, and health outcomes. For financial protection, our main objective was to assess the effectiveness of integrating health insurance with microfinance credit in reducing the financial burden of health expenditures among the insured. Our first outcome variable was the declared occurrence of payment difficulties for medical treatment after an illness or accident involving a household member in the year preceding the survey. The second outcome was the amount of self-estimated healthcare and hospitalization expenses reported by the respondents for the year preceding the survey. Although this measure is subject to potential reporting bias, it served as a useful indicator of financial protection.[4] The third outcome variable was a binary variable equal to one if the respondent declared that healthcare expenditures affected their income-generating activities.

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[4]We could not estimate out-of-pocket health expenditures as a percentage of household income. During the pilot survey, questions about income were poorly received, with many respondents refusing to answer. Additionally, our study population primarily worked in the informal sector, leading to significant weekly income fluctuations and numerous reporting biases. However, we did ask respondents how much money they would lose if they did not work during the survey week, which could serve as an indirect measure of income. We related the annual healthcare expenditures to this indirect income measure (adjusted for the year).

Healthcare utilization is measured by considering the initial place where respondents sought care, if they sought care at all. Options included formal healthcare facilities (e.g., public and private hospitals and *CSPS*, modern health centers covered by the health insurance scheme), traditional healers, or self-medication (using previously obtained medications or directly purchasing medications from street vendors). Additionally, we measure the timeliness of seeking care by assessing the time elapsed between the appearance of symptoms and the respondent's decision to seek medical attention. Specifically, we considered the proportion of respondents who sought care on the same day symptoms appeared, and within two days, respectively indicating immediate and prompt healthcare-seeking behavior.

Finally, we measured both physical and emotional health status. Our first indicator was based on self-assessed health status, where respondents were asked to rate their overall health on a scale from 1 (excellent) to 4 (poor). The second health indicator involved an objective evaluation of respondents' health status. This standardized health indicator, ranging from 0 to 100, was composed of a series of questions assessing individuals' ability to perform certain tasks, such as carrying a bucket of water for 20 meters, walking for 5 kilometers, climbing two flights of stairs, and standing for 1 hour. We also investigated whether health insurance influenced the emotional well-being of individuals to determine if financial protection lowered anxiety and increased emotional well-being (Bialowolski et al., 2021; Rabbani et al., 2022). Inspired by the PHQ-9, participants were asked about the frequency over the past four weeks of experiencing a low emotional state, characterized by feelings of worry or anxiety, frequent crying or feeling like crying, trouble sleeping at night, waking up feeling depressed or lacking energy due to fear, difficulty concentrating, a decline in performance at work or daily activities, or feelings of loneliness.

As our outcome variables were grouped into homogeneous conceptual categories, we addressed the issue of multiple testing using the Benjamini et al. (2006) resampling procedure. This procedure allowed us to calculate sharpened q-values, which adjusted the p-values for multiple tests within each hypothesis (panel), but not across all outcomes in the analysis. By using sharpened q-values, we controlled the false discovery rate within each panel while accounting for the multiple comparisons conducted within that specific set of variables.

3.4 Internal validity

The probability of attrition was similar between the treatment and control groups (see Table A1 in the Appendix). Yet, it is plausible that individuals who left the MFI had different characteristics depending on whether they were assigned to the treatment or control group. Table A1 shows that the baseline differences between attritors from the treatment and control groups were minimal and mostly insignificant. Our findings indicate that attritors were more likely to be male and had lower credit amounts, suggesting that individuals left the MFI after repaying their loans. Table A2 confirms that the key baseline characteristics were balanced between the treatment and control groups. The random assignment of households to the treatment and control groups was implemented correctly.

Throughout the intervention, we ensured that only the beneficiaries of the treatment group could access health insurance starting from August 2020. Compliance was high, with 95% of the control group and 91% of the treatment group adhering to their assigned status. The estimation of impacts based on the initial assignment groups was valid and allowed for the estimation of causal impacts.

4 Results

4.1 Actual use of micro health insurance services

We observed 7,150 micro health contracts across 2020 and 2021 in the two agencies, including 3,370 first-time subscriptions. Between August 1, 2020 (the date of the first claims from intervention areas) and December 31, 2021, 4,325 claims were submitted, with 1,718 (40%) in the first agency and 2,607 (60%) in the second one. These numbers include both respondents to our surveys and non-respondents. These claims concerned 2,507 covered individuals and 1,472 subscribers (the person who enrolled). The average care cost is 10,630 FCFA, while the average amount reimbursed is 6,358 FCFA.

When looking at the diagnostic problems, malaria (both simple and severe) is the largest category, comprising 30% of claims. Regarding the types of healthcare services, nurse consultations constitute most healthcare interactions at 48.8%. General practitioner consultations follow at 10.1%, and hospital observations make up 22.9%. Other types of care represent smaller percentages. Analyzing the costs and reimbursement, hospitalization and specialized care claims have very close unit costs (almost 10000 FCFA), but hospitalization claims are more numerous submitted (1107 claims for

Figure 1: Characteristics of the claims, per type
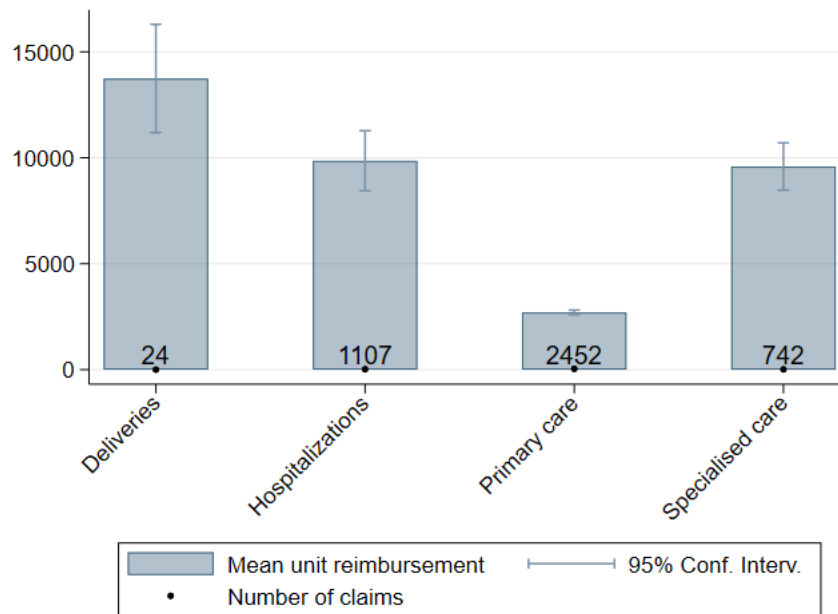
hospitalization, 742 for specialized care). Primary care claims cost significantly less (2700 FCFA) on average but are more prevalent (almost 2500 claims) (Figure 1). Delivery care exhibits the highest unit average cost, but as expected, it concerns only 24 cases. Indeed, since 2016 maternal care has been free of charge in Burkina Faso, therefore delivery reimbursements from the insurance NGO relate to facilities not included in the national policy, or isolated implementation flaws. All in all, hospitalization care accounts for 43.7% of all costs, specialized care for 28.5%, primary care for 26.5%, and deliveries for 1%.

Focusing on insurance utilization by the insured respondents of our endline survey sample only (414 individuals), half (50%) of their 1328 claims consisted of primary care (41% nurse consultations, 4% midwife consultations, and 15% general practitioner consultations). Hospitalizations accounted for 28% of claims (including 25% for observation hospitalization), while specialized outpatient care represented 22% of claims. More than 76% of the payments for these claims were prepayments rather than reimbursements, this proportion being significantly higher for primary care, in line with the priority given to primary care in the enlisted health facilities.

4.2   Sample descriptive statistics

Approximately 89.5% of the members from the microfinance NGO were women, with an average age of around 41.7 years. Less than half (46.1%) of the respondents had attended school, with 65.9% having primary-level education. Employment status was high, with 95.3% of respondents employed in the previous week. The main economic sectors were sedentary commerce (67.7%), agriculture/livestock (41%), itinerant commerce (16.6%), and crafts (10.3%). The poverty score (calculated based on multiple correspondence analysis of owned assets) was 48.2 on a scale of 0 to 100.

Regarding health outcomes, 12.2% of respondents rated their health as excellent, 76.2% as good, and 11.6% as poor. The objective health status had a mean score of 70.5 on a scale of 0 to 100. The emotional well-being status had a mean score of 43.5 on a scale of 0 to 100. Specific emotional well-being issues over the past four weeks included: 18.3% never felt worried or anxious, 42.9% never cried or felt like crying, 21.3% never had trouble sleeping, 34.1% never felt depressed, 35.2% never had difficulty concentrating, 36.3% never noticed a decline in performance, and 58.9% never felt lonely.

Among the 1,039 respondents who reported an episode of illness in the six months preceding the survey, a significant proportion sought healthcare (84.9%) when they felt sick, and 77.3% of them went to formal healthcare facilities. Additionally, 24.2% used self-medication, and 2.5% opted for traditional medicine. Many respondents used several types of healthcare, either simultaneously or successively. Only 39.1% of the respondents sought medical treatment on the same day they experienced their first symptoms during their previous illness, and 61.1% sought care within two days. Furthermore, 53.0% of the respondents reported that they typically wait before seeking care at the appearance of symptoms. Regarding financial protection, 13.0% reported having difficulties paying for medical treatment in the past year. The average self-estimated healthcare expense was 76,847 FCFA. Additionally, 26.8% of respondents indicated that healthcare expenses impacted their income-generating activities.

The balancing test results in Table A2 indicate that the randomization process effectively created comparable treatment and control groups across various demographic and socioeconomic characteristics. This balanced distribution of characteristics supports the study's internal validity, ensuring that any observed effects of the intervention can be attributed to the treatment rather than pre-existing differences between groups.

4.3 Impacts of health insurance

All tables follow the same structure. For each outcome, we present the coefficient and standard errors (in parentheses) of the lower bounds effects (ITT) and the upper bounds effects (LATE) estimations. Additionally, we report the p-value and the sharpened False Discovery Rate (FDR) q-values. To help interpret the magnitude of the results, we provide the mean value for the control group and the relative effect for each estimate within their respective tables.

4.3.1 Financial protection

The findings in Table 2 demonstrate that health insurance enrollment significantly decreases the likelihood of encountering payment difficulties. Specifically, the probability of experiencing payment difficulties is reduced by five percentage points, corresponding to a 30% reduction.

In January 2022, the average level of health expenditures was approximately 30,638 FCFA per year (Table B1). Our analysis reveals that individuals who received treatment experience significant reductions in health expenditures, ranging from 41% to 48%. By relating annual healthcare expenditures to the indirect income measure (computed from the amount respondents declared losing if they did not work for one week and adjusted for the year), we find that the treatment reduced this alternative measure of out-of-pocket expenditures by 33%.[5] Among the respondents, 26% reported a deteriorating impact of healthcare expenditures on their income-generating activities (Table B1). While we observe a decrease in this probability with access to insurance, the result is not statistically significant, although the sharpened q-value is lower than 10%. The initial level of this index was 63% for the control group. Treated individuals experience a significant increase of approximately four percentage points in this index (ITT estimates), reflecting a 6% improvement in financial protection.

4.3.2 Healthcare utilization

Access to health insurance also improved the utilization of the healthcare system in case of illness. Table 3 presents the estimates of healthcare utilization based on the type of care sought by respondents. Health insurance significantly reduces the overall search for healthcare, regardless of the type of care. However, a detailed examination of healthcare utilization reveals that access to health insurance increased the use of empaneled modern healthcare facilities by approximately 7%, which

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[5]Results can be shown upon request.

Table 2: Impact of micro-insurance on financial protection - illness episode last 6 months

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Payment difficulties		Ln health expenditure		Impact on activity		Financial protection Index[a]	
	ITT	LATE	ITT	LATE	ITT	LATE	ITT	LATE
Treat	-0.048*	-0.055*	-0.415***	-0.479***	-0.061	-0.070	0.038***	0.044***
	(0.025)	(0.029)	(0.101)	(0.117)	(0.037)	(0.043)	(0.012)	(0.014)
P-value	0.059	0.059	0.000	0.000	0.103	0.103	0.002	0.002
Sharpened q-value	[0.041]	[0.025]	[0.001]	[0.001]	[0.055]	[0.041]	[0.003]	[0.002]
Relative effect	-29.99	-34.62	-3.94	-4.55	-20.92	-24.16	6.08	7.02
Nb. Obs	1009	1009	776	776	963	963	1009	1009
Nb. cluster	95	95	93	93	95	95	95	95
Control Mean	0.16	0.16	10.53	10.53	0.29	0.29	0.63	0.63

Notes : [a] standardized weighted index (Swindex) of the three indicators (payment difficulties, health expenditure (ln) and impact on activity). Controls include gender, age, wealth, education, seniority in microcredit, total amount of credit, having a job and having a chronic illness. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

is particularly noteworthy given the already high initial utilization of these centers. Furthermore, the reliance on traditional medicine as the first choice of healthcare during an illness was reduced by half, from 4% in the control group to 2% in the treated group. Similarly, using self-medication as the primary type of care decreased by approximately 20% due to access to health insurance. Thus, the health insurance scheme positively influenced the choice of healthcare utilization type, encouraging the use of modern and conventionally covered facilities. This positive effect was confirmed by the significant impact on the global healthcare index.

Access to health insurance also influenced individuals' behavior in seeking timely healthcare (Table 4). The proportion of respondents who sought care on the same day symptoms appeared increased by approximately 24% (ITT) to 28% (LATE) following the introduction of health insurance. This indicates that access to health insurance encouraged more immediate healthcare-seeking behavior. However, aside from this effect on immediate healthcare utilization, we found no statistically significant impact on the probability of seeking healthcare within two days of experiencing the first symptoms or the reported habit of waiting before seeking medical treatment. Consequently, the overall healthcare utilization timing index is not statistically significant.

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Table 3: Impact of micro-insurance on healthcare use - illness episode last 6 months

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Use of healthcare		Modern healhcare		Traditional medecine		Self-medication	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	-0.058**	-0.067**	0.054*	0.063*	-0.018*	-0.020*	-0.052*	-0.061*
	(0.028)	(0.033)	(0.032)	(0.037)	(0.009)	(0.011)	(0.028)	(0.032)
P-value	0.042	0.042	0.095	0.095	0.066	0.066	0.065	0.065
Q-value	[0.097]	[0.081]	[0.097]	[0.081]	[0.097]	[0.081]	[0.097]	[0.081]
Relative effect space	-6.71	-7.75	7.26	8.38	-43.83	-50.60	-20.17	-23.28
Nb. Obs	1009	1009	846	846	846	846	846	846
Nb. cluster	95	95	95	95	95	95	95	95
Control Mean	0.87	0.87	0.75	0.75	0.04	0.04	0.26	0.26
Type	ITT	LATE	ITT	LATE	ITT	LATE	ITT	LATE

Notes : Controls include gender, age, wealth, education, seniority in microcredit, total amount of credit, having a job and having a chronic illness. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Impact of micro-insurance on delay - illness episode last 6 months

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	The same day		Within 2 days		Used to wait		Delay index [a]	
	ITT	LATE	ITT	LATE	ITT	LATE	ITT	LATE
Treat	0.085**	0.098**	0.038	0.043	-0.022	-0.026	0.045	0.052
	(0.041)	(0.047)	(0.037)	(0.042)	(0.040)	(0.046)	(0.030)	(0.035)
P-value	0.040	0.040	0.306	0.306	0.580	0.580	0.142	0.142
Sharpened q-value	[0.191]	[0.115]	[0.409]	[0.232]	[0.409]	[0.359]	[0.409]	[0.165]
Relative effect	24.18	27.92	6.38	7.36	-4.11	-4.74	9.20	10.62
Nb. Obs	846	846	846	846	658	658	846	846
Nb. cluster	95	95	95	95	95	95	95	95
Control Mean	0.35	0.35	0.59	0.59	0.54	0.54	0.49	0.49

Notes : [a] standardized weighted index (Swindex) of the three indicators (the same day, within two days and use to wait). Controls include gender, age, wealth, education, seniority in microcredit, total amount of credit, having a job and having a chronic illness. Standard errors are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

4.3.3 Health outcomes

We found no statistically significant differences in health outcomes between the treated and control groups following the introduction of health insurance. Initially, we observed a significant difference in emotional health status, which increased by approximately 7% from a baseline of 43 out of 100 in the control group. This improvement was primarily driven by reductions in stress and anxiety. However, after correcting for multiple hypothesis testing, this increase in emotional health was no longer statistically significant. Overall, the impact of health insurance on our index summarizing health outcomes is not significant.

Table 5: Impact of micro-insurance on health outcomes - illness episode last 6 months

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Physical health (subj)		Physical health (obj)		Emo. well-being		Health index [a]	
	ITT	LATE	ITT	LATE	ITT	LATE	ITT	LATE
Treat	-0.042	-0.048	-0.445	-0.514	2.783*	3.213*	0.003	0.003
	(0.034)	(0.039)	(0.895)	(1.033)	(1.569)	(1.812)	(0.009)	(0.010)
P-value	0.220	0.220	0.620	0.620	0.079	0.079	0.750	0.750
Sharpened q-value	[0.491]	[0.373]	[0.783]	[0.626]	[0.466]	[0.373]	[0.783]	[0.929]
Relative effect	-2.05	-2.37	1.57	1.82	6.50	7.51	0.52	0.60
Nb. Obs	1009	1009	1009	1009	1009	1009	1009	1009
Nb. cluster	95	95	95	95	95	95	95	95
Control Mean	2.02	2.02	-28.31	-28.31	42.79	42.79	0.55	0.55

Notes : [a] standardized weighted index (Swindex) of the three indicators (subjective physical health, objective physical health and emotional well-being). Controls include gender, age, wealth, education, seniority in microcredit, total amount of credit, having a job and having a chronic illness. Standard errors are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

5 Discussion

Access to healthcare for informal workers is a recognized issue, and few effective solutions are currently available. In Burkina Faso, many households pay for their medical expenses out of pocket, which represents a substantial financial burden given the high cost of treatments relative to their

low incomes. To cover their medical expenses, families often resort to borrowing money, selling valuable assets, or using savings dedicated to income-generating investments, which can lead to long-term financial difficulties and an increase in poverty. Many individuals opt for self-medication using medicines purchased from local shops or traditional herbal remedies, which are generally cheaper but may not be as effective as professional medical care (Fink et al., 2013). Integrating health insurance with microcredit presents several promising benefits in terms of health coverage. By protecting households from health expenses, it has the potential to financially secure subscribers their activity and, ultimately, their loan repayment. It can also improve healthcare-seeking and potential health outcomes. Through a cluster randomized controlled trial (RCT), we assessed a compulsory micro health insurance product for members of a microfinance institution (MFI) in Ouagadougou, Burkina Faso.

Our study confirms that access to health insurance significantly enhances financial protection for informal workers. The reduction in out-of-pocket expenditures and the decreased likelihood of facing financial difficulties when accessing healthcare align with findings from other studies in similar contexts (Acharya et al., 2012; Rabbani et al., 2022; Fink et al., 2013; Das and Do, 2023). For instance, Rabbani et al. (2022) observed that mandatory health insurance in Bangladesh reduced hospitalization costs, providing significant financial relief to the insured. Similarly, Acharya et al. (2012) found that insurance schemes in low- and middle-income countries often offer substantial protection from high out-of-pocket expenditures, though the impact on the poor can be weaker. This underscores the role of comprehensive benefits packages in improving financial protection, which includes coverage for a wide range of services, thereby reducing the burden of hidden costs that often deter individuals from seeking care (Eze et al., 2022; Capuno et al., 2019).

The impact of health insurance on healthcare utilization is also notable. Our findings show a significant shift towards the use of modern healthcare facilities and a reduction in reliance on traditional medicine and self-medication. This aligns with Rabbani et al. (2022), who found that insurance increased the use of formal healthcare services, particularly for inpatient care. Additionally, the immediate healthcare-seeking behavior encouraged by health insurance indicates a reduction in delays, which is crucial for improving health outcomes in the long term. The observed improvements in healthcare utilization can be attributed to several factors. The comprehensive and attractive benefits package, which included outpatient services, drugs, and examinations, likely increased the probability of utilizing the insurance. This is crucial as outpatient care is more frequent than hospitalizations and encourages visits to health centers rather than self-medication. Effective communication and sensitization efforts, including informational meetings and ongoing support, played

a significant role in ensuring that members were well-informed about the insurance benefits. The financial training provided by the MFI also likely facilitated the understanding and adoption of the insurance product, while regular group meetings fostered the sharing of positive experiences, further encouraging utilization. This is corroborated by findings from other studies, which emphasize the importance of information dissemination in enhancing the uptake and utilization of health insurance (Platteau et al., 2017; Bocoum et al., 2019).

Despite the positive impacts on financial protection and healthcare utilization, our study did not find significant improvements in physical health outcomes. This aligns with Rabbani et al. (2022), Acharya et al. (2012), Banerjee et al. (2014), who also reported no significant impact on physical health measures. The lack of significant health outcomes might be attributed to the study's relatively short duration and the indirect nature of the pathways through which health insurance can impact health. We observed an improvement in mental health, reflecting the "peace of mind" effect identified by Haushofer et al. (2020). Yet, these effects on emotional health were not robust after adjusting for multiple hypothesis testing. This suggests that while health insurance can alleviate some stress and anxiety related to financial uncertainties, its overall impact on mental health may be limited without complementary interventions addressing broader determinants of mental health.

Our study provides valuable insights into the benefits of combining health insurance with microfinance. Nevertherless, generalizing this model and scaling it up require careful consideration of key elements to avoid potential adverse effects.
First, ensuring the financial viability of the scheme is crucial. The design of the benefit package and the monitoring of the scheme require peculiar attention to avoid financial imbalance and achieve the financial sustainability of such programs. Some schemes cover only essential services like hospitalization and maternity costs to control expenses and reduce the risk of moral hazard (overutilizing healthcare services)(Rabbani et al., 2022; Banerjee et al., 2014). Conversely, the product studied in this article offers a comprehensive reimbursement package, including drugs and examinations. Its financial viability was guaranteed by two main components: the control of the prescriptions by an internal doctor to ensure adherence to standards of care and referral guidelines (no specialized care in *CSPS*, first-level facilities for instance) and by an increase of the premium after several years of deployment. Indexing insurance premiums to the amount of microcredit can ensure an equitable financial contribution from subscribers and support the acceptability of the premium increase. The phased deployment also allowed gradual adjustments based on client feedback and operational challenges. Regular monitoring via software that records each transaction and implementing necessary adjustments based on data and client feedback helps resolve issues quickly,

ensuring that the insurance program remains financially viable. Moreover, educating clients about the benefits and proper use of insurance improves acceptance and appropriate use, reducing abuses.

The second concern regards the potential drop-out of microcredit clients due to the implementation of health insurance, especially when it is mandatory. Indeed, the targeting of the eligible population is crucial and should address both adverse selection and low demand for insurance issues, that mandatory schemes mitigate. Nevertheless, they induce a risk of rejection of health insurance and the MFI when health insurance is not understood and accepted (Banerjee et al., 2014). Therefore, implementation needs to avoid feelings of coercion among participants. Technically, offering bundled services can enhance client loyalty and retention, as clients see more value in the combined offering, contributing to a stable revenue source for the institution. Banerjee et al. (2014) observe the opposite, with many clients (16 percentage points) preferring to forego their microfinance loans rather than pay a higher interest rate to keep the bundled health insurance. Similarly, mandatory health insurance led to a decline in loan renewals, even after removing the insurance mandate, suggesting that the bundling strategy negatively impacted client loyalty to the microfinance institution. In our context, the MFI did not observe a decline in clients due to the introduction of health insurance, but neither did they see an increase in clients following this offer. Despite the mandatory nature, treated clients were generally satisfied with the insurance and services provided. Clients appreciate the financial protection provided by bundled insurance, which helps them cover unexpected health expenses and repay their loans even in emergencies (confirming the results of Agier et al. (2016). Training also builds trust between the insurer and clients, as clients are more likely to trust a product they understand, leading to higher retention rates.

Thirdly, the quality of the implementation is essential and should be monitored by both the insured and the empaneled health providers. For the insured, administrative processes such as enrollment, premium collection, and reimbursement must be smooth and efficient to build trust and encourage usage. Lack of clarity and delays in administrative processes erodes the trust and loyalty of clients and is identified as a hurdle to insurance awareness and adoption in similar programs (Banerjee et al., 2014). For the empaneled health providers, reimbursements must also be timely and at a fair price to avoid reluctance in treating insured patients, as providers might offer lower quality of care to insured patients if they are not happy with the insurance scheme (Fink et al. (2013) in Burkina Faso, Banerjee et al. (2014) in India). Conversely, moral hazard can lead to overprescription if doctors provide more expensive treatments than necessary because they know that insurance will cover the costs. Moral hazard and its consequences on the quality of care and insurance sustainability need close monitoring (Das and Do, 2023), especially when drugs and examinations are included

in benefit packages. Achieving the "efficient" moral hazard induced by health insurance (increased healthcare utilization due to better healthcare, income effect) rather than the "inefficient" one (excessive increase in healthcare utilization, substitution effect) is a major challenge in implementing sustainable healthcare systems (Nyman et al., 2018; Li, 2023). In our case, the remaining payment rate of 40% was designed to address the risk of inefficient moral hazard.

While our study population might seem specific (members of a microfinance institution), it shares several characteristics with a substantial part of the Burkinabè population and other populations in the sub-region: urban informal workers with little or no formal education, economically vulnerable, and reliant on microfinance to manage their income-generating activities. In Burkina Faso, the government is implementing Universal Health Insurance, which relies on state-managed compulsory insurance for formal workers and a national network of insurance schemes for the rest of the population. Therefore, the support of community-based health insurance schemes in protecting the informal sector populations is a crucial component of the policy's potential to reach universal health coverage. However, the latest inventory of health mutuals (MS) conducted in 2021 shows that they are still limited in number and coverage capacity, with only 171 functional MS and very low penetration in urban areas like Ouagadougou (below 1%).

6   Conclusion

Based on an experimental design, our results confirm that bundling health insurance to microcredit contains health expenses and improves financial protection. This enhances financial stability for clients and institutions, ensuring a more resilient financial ecosystem. They can also improve health-seeking behaviors, substituting seeking formal health centers to self-medication. These impacts are meaningful for populations lacking formal coverage and employment. Indeed, informal workers represent the majority of the population in many Sub-Saharan countries, but their health coverage remains a persisting challenge despite the deployment of several national insurance schemes. Besides, microfinance institutions are important social and financing structures in informal settings, relying on regular gatherings and circulation of information within the groups. Therefore, integrating health insurance to microcredit allows for spreading financial risks across a large population and protecting loan portfolios from defaults caused by unexpected health expenditures.

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Appendix A : Design

Table A1: Test for selective attrition between baseline and endline

	Jan 2020 and June 2022		Jan 2020 only		Difference	
	Mean	St. Dev.	Mean	St. Dev.	Raw diff.	P-value
Treated	50.68	0.5	50.66	.5	.02	0.994
Woman (%)	88.8	0.32	92.32	0.27	-3.52	0.020
Age	40.47	9.94	39.94	10.33	0.53	0.319
Have been to school (%)	39.33	0.49	35.89	0.48	3.44	0.173
Wealth level (score)	50.05	18.02	49.91	18.39	0.14	0.883
Not from Ouagadougou (%)	9.23	0.29	10.2	0.3	-0.97	0.529
Has work last week	92.26	0.27	91.31	0.28	0.95	0.511
Total credit (ln FCFA)	12.11	0.85	12.00	0.83	0.11	0.011
MFI seniority (in months)	17.14	8.77	16.44	9.45	0.7	0.138
Subjective health (score 1-4)	1.93	0.62	1.96	0.63	-0.03	0.349
Pregnant (%)	9.22	0.29	11.96	0.32	-2.74	0.106

Note: T-tests on baseline characteristics. Omnibus F-test: 0.6
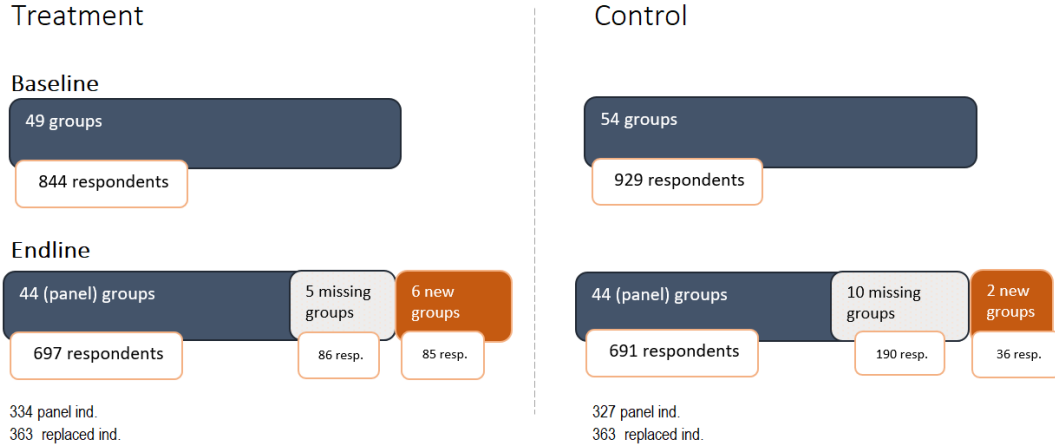
Figure A1: Treatment assignment

Table A2: Balancing test

	N	Control	Treatment	P-value Diff	Normalized diff
	(1)	(2)	(3)	(4)	(5)
Woman	1727	0.88	0.93	0.25	0.17
		(0.33)	(0.26)		
Age	1727	40.68	40.00	0.41	-0.07
		(10.43)	(9.80)		
Have been to school (%)	1727	0.37	0.39	0.25	0.04
		(0.48)	(0.49)		
Wealth level (score)	1727	50.11	50.34	0.88	0.01
		(18.77)	(18.15)		
Has worked last 7 days	1721	2.98	2.98	0.58	0.00
		(0.24)	(0.29)		
Not from Ouagadougou	1727	0.10	0.10	0.69	0.00
		(0.30)	(0.30)		
Total credit (ln FCFA)	1625	12.08	12.04	0.63	-0.05
		(0.82)	(0.85)		
MFI seniority (in months)	1726	16.57	16.97	0.76	0.04
		(9.23)	(9.16)		
Subjective health (score 1-4)	1726	1.93	1.97	0.34	0.07
		(0.62)	(0.60)		
Pregnant (%)	1557	0.10	0.12	0.30	0.06
		(0.30)	(0.32)		
p-value, F-test of joint orthogonality across groups (asymptotic)			0.99		

Appendix B : Descriptive statistics

Table B1: T-test between treated and control groups on main outcomes

	Mean	Min	Max	Control Mean	Control St.Dev.	Treated Mean	Treated St.Dev.	Standard Diff
Financial protection								
Payment difficulties	0.13	0	1	0.16	0.36	0.10	0.3	-0.06**
Health expenditure (ln)	10.33	5.3	15.2	10.53	1.26	10.13	1.32	-0.39***
Impact on activity	0.26	0	1	0.29	0.45	0.23	0.42	-0.06
Financial protection Index	0.65	0	1	0.63	0.16	0.67	0.15	0.04***
Healthcare use								
Modern healthcare	0.77	0	1	0.75	0.44	0.80	0.4	0.05*
Traditional medecine	0.02	0	1	0.04	0.18	0.01	0.12	-0.02**
Self-medication	0.24	0	1	0.26	0.44	0.22	0.42	-0.04
Healthcare index	0.34	0	1	0.34	0.07	0.34	0.06	0
Delay								
The same day	0.39	0	1	0.35	0.48	0.44	0.5	0.09***
Used to wait	0.61	0	1	0.59	0.49	0.63	0.48	0.05
Within 2 days	0.53	0	1	0.54	0.5	0.52	0.5	-0.03
Delay index	0.48	0	1	0.46	0.35	0.50	0.35	0.04
Health								
Physical health (subj)	1.99	1	3	2.02	0.47	1.97	0.51	-0.05
Physical health (obj)	70.52	0	100	70.69	16.52	70.36	15.85	-0.4
Emotional well-being	43.55	0	100	42.79	19.66	44.28	19.34	1.53
Health index	0.55	0	1	0.55	0.14	0.54	0.14	0.00