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The Joint Effects of a Health Insurance and a Public Works Scheme in Rural Ethiopia

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ABSTRACT

The Joint Effects of a Health Insurance and a Public Works Scheme in Rural Ethiopia*

Rural households in Ethiopia are exposed to a variety of covariate and idiosyncratic risks. In 2005, the Ethiopian government introduced the Productive Safety Net Program (PSNP) and in 2011 launched the Community Based Health Insurance Scheme (CBHI). This paper analyses the interaction between the two schemes and their joint effect on health care utilization, labor supply, asset accumulation and borrowing. The empirical analysis relies on three rounds of individual-level panel data collected in 2011, 2012 and 2013 and on several rounds of qualitative work. We find that individuals covered by both programs, as opposed to neither, are 5 percentage points more likely to use outpatient care and are 21 percentage points more likely to participate in off-farm work. Furthermore, participation in both programs is associated with a 5 percent increase in livestock, the main household asset, and a 27 percent decline in debt. These results suggest that at least in Ethiopia bundling of interventions enhances protection against multiple risks and shows the potential of linked social protection schemes.

JEL Classification: J22, I15

Keywords: Ethiopia, Productive Safety Net Program, Community Based Health Insurance Scheme, joint effect

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1. Introduction

As in other developing countries, rural Ethiopian households are exposed to a variety of natural, economic and health risks (Yilma et al., 2014). Continued dependence on rain-fed agriculture as the main livelihood source (Di Falco et al., 2011; Tilahun et al., 2011) coupled with the lack of well-developed credit and insurance markets, intensifies the effects of these risks. For instance, in the absence of health insurance, exposure to a health shock may lead to borrowing and selling of assets and reinforce existing poverty and in turn harm the ability of households to cope with non-health related risks. The potential interplay and mutually reinforcing negative effects of different types of shocks suggests that effective social protection may require the simultaneous implementation of multiple interventions.

There is a large literature which has examined the effect of specific social protection instruments. For instance, in the context of low and middle income countries a number of papers have demonstrated the effect of cash transfer programs on nutrition, health and educational outcomes (Behrman and Hoddinott, 2005; Fiszbein and Schady, 2009; Gertler, 2004), the effect of public works programs on asset-building, climatic risks and food security (Anderson et al., 2011; Gilligan et al., 2009; Subbarao, 2003; Subbarao, 1997; Ravallion, 1991) and the effect of health insurance schemes on health care utilization and financial protection on the one hand (Limwatthananon et al., 2015; Mebratie et al., 2013; Klohn and Strupat, 2013; Bender, 2011; Baeza and Packard, 2006; Escobar et al., 2010; Pagán et al., 2007; Wagstaff and Pradhan, 2005) and on borrowing and assets sales on the other (Yilma et al., 2015).

Despite this large body of work, papers which have examined the inter-linkages between different social protection instruments and the joint effect of participating in multiple social

interventions on welfare outcomes are scarce.[1] Indeed, based on their analysis of intervention programs operating in seven countries, Slater et al. (2016) point out that there is limited coordination between agricultural and social protection programs even though they often target similar households and have similar aims. Recent policy declarations also urge greater cross-sectoral coordination and call for social protection interventions to be integrated within broader food security and nutrition programming (Committee on World Food Security, 2012). To investigate the payoff from combining interventions, Daidone et al. (2015) analyse the joint effect of Malawi's, Farm Input Subsidy Program (FISP) and Social Cash Transfer Program (SCTP), which target poor and ultra-poor households, on household expenditure and production. They find that participation in both programs has a larger effect on production (22%) and on expenditure (15%) as compared to the sum of the individual effects. In contrast to these complementary effects, in their analysis of the joint impact of a cash transfer program and a livestock insurance scheme in Northern Kenya, Jensen et al. (2015) find no evidence of positive synergies. They attribute this to the minor overlap in coverage between the two programs. Similarly, in their analysis of the joint effects of a conditional cash transfer program (PROGRESA) and a program linked to agricultural production (PROCAMPO), Handa et al. (2010) tend to find zero effects except in the case of health visits where there is a negative effect which the authors attributed to time conflicts.

In the Ethiopian context, Berhane et al. (2014) examine the effect of the Productive Safety Net Programme (PSNP) and the community-based nutrition (CBN) program in localities where both schemes are operating. Their investigation reveals that there are no joint effects on various indicators of child nutrition. However, they also point out that the two schemes are "loosely meshed" and are co-located but not linked programmatically. While our paper also

[1] A related body of literature examines the bundling of health insurance with microfinance loans (Banerjee et al., 2014; Hamid et al., 2011; Ranson et al., 2006). Evidence on the effectiveness of such an approach is mixed. For instance, Banerjee et al. (2014) find that the poor quality of the insurance product leads to negative effects and a withdrawal from the microfinance scheme. In contrast, Hamid et al. (2011) find that microcredit clients who had access to health insurance were more likely to be food sufficient as compared to microcredit clients who did not have access to the insurance product.

focuses on Ethiopia, there are differences in terms of the scheme interactions that we explore and the context.

In 2005, in order to enhance food security in chronically food-insecure areas, the government of Ethiopia launched the PSNP which requires labor contributions in return for payments in cash or kind. In 2011, to enhance access to health care and provide financial protection the government launched a pilot voluntary Community Based Health Insurance (CBHI) scheme. In related work, Shigute et al. (2017) have examined whether participation in the PSNP may be used to encourage CBHI uptake.[2] Motivated by the findings that PSNP participants are substantially more likely to enroll in the CBHI and by the limited research on the joint effects of multiple social interventions as well as the potential offered by program-bundling in enhancing social protection, this paper examines the joint effect of the PSNP and the CBHI on various outcomes. While a more detailed discussion of the potential interactions between the two schemes appears later in the text, consistent with the motivation for launching the CBHI we expect that individuals and households enrolled in the CBHI scheme will be more likely to use heath care and less likely to rely on asset sales and borrowing to finance health care. Similarly, we expect that since they receive payments in lieu of their labor contributions, PSNP participants will have higher off-farm labor contributions but should also be less likely to rely on asset sales and borrowing in the event of shocks that threaten food security. Thus, the paper focuses on the effects of the two schemes on health care utilization, off-farm labor supply, asset accumulation and borrowing.

The paper relies on three rounds of individual panel data. The first edition of the individual data was collected in 2011, that is, before the launch of the CBHI and subsequent rounds were collected in 2012 and 2013. We also draw on qualitative information collected through key informant interview and focus group discussions conducted in 2012, 2014 and 2017. To preview our results, we find that individuals covered by both programs as compared to those

[2] Shigute et al. (2017) find that PSNP participation increases the probability of enrolling in the CBHI by 24 percentage points and increases renewal by 10 percentage points.

not covered by either of the programs, are 5 percentage points more likely to use outpatient care from modern providers and are 21 percentage points more likely to participate in off-farm work. Furthermore, participation in both programs is associated with a 5 percent increase in livestock, the main household asset, and a 27 percent decline in debt.

The paper unfolds by providing in the next section a brief description of the two programs. Section 3 discusses the data while section 4 outlines an analytical and an empirical framework. Section 5 discusses the findings while section 6 contains concluding observations.

2. A brief overview of the PSNP and the CBHI

This paper investigates the joint effects of two important social protection schemes, the PSNP and the CBHI on various outcomes in Ethiopia. The PSNP is the Ethiopian government's flagship food security program and the CBHI, which has been rapidly scaled up since its introduction in 2011, is expected to help households deal with the costs of financing health care. The following paragraphs describe the key features of the two programs.

2.1 The Productive Safety Net Program (PSNP)

Before 2005, efforts to enhance food security and deal with natural disasters, chiefly drought, were based on providing emergency assistance (MoARD 2009a, MoARD 2005). With the objective of relieving households from dependence on emergency assistance, the government in collaboration with donor agencies designed the PSNP. The PSNP attempts to shift the trend from meeting short term food needs to addressing the root causes of food insecurity by building durable community assets – mainly natural resource management projects designed to reduce soil erosion, control floods and harvest and conserve water (MoARD 2009b, MoARD 2010).

The program focuses on food insecure households residing in food insecure areas. Participation is not voluntary but is based on a combination of geographical and community-based targeting. At the first stage, government officials identify food-insecure districts on the basis of previous food aid allocation data. Within districts, local administrators identify chronically food-insecure villages and allocate the PSNP resources within these villages.

Household-level targeting is based on selecting households who have received emergency aid in the past and on other criteria such as assets (landholdings, livestock), income from non-agricultural activities and from alternative sources of employment. However, communities have the discretion to modify this approach and to annually update their lists of food-insecure households based on local conditions.

The program differentiates between two types of beneficiaries - direct support and public works - and offers support in cash or in kind to eligible households with no able-bodied members while public works beneficiaries receive payments on the basis of their labour contributions to public works projects.[3] In the short run, the program expects to enhance food security by meeting the immediate needs of food insecure households and in the medium to longer run by preventing sales of productive assets and promoting sustainable livelihoods through the construction of rural infrastructure.

Unlike previous food security efforts, a key objective of the PSNP in its current design is to integrate existing and future development interventions. As stated in the Program Implementation Manual (MoARD, 2010: 6), "The PSNP is not a project but a key element of local development planning." This approach has been re-emphasized in the most recent PSNP design document (MoA, 2014: 3) which aims to ensure that "poor and vulnerable households benefit from an essential suite of services including safety net transfers, livelihood interventions, key health and nutrition services, community assets constructed through public works and support to households up to, during and beyond safety net graduation to ensure that the improvements they have achieved are sustainable."

2.2 Community Based Health Insurance (CBHI)

[3] The latter component accounts for 70 to 85 percent of the total beneficiaries (about 6 million individuals) and budget (MoARD 2010, MoARD 2011). The program operates in 319 food insecure districts (40% of the total districts) in eight regions of the country (MoARD, 2011; FDRE, 2012). In 2013-14 the program had a cash budget of about $205 million and access to 274,844 metric tonnes of food.

Over the past decade, Ethiopia has invested heavily in its rural health infrastructure and recorded notable progress in a number of population health outcomes (see Mebratie et al., 2015). For instance child mortality per 1,000 live births has fallen from 166 in 2000 to 88 in 2011 and maternal mortality rates have declined from 871 to 676 per 100,000 live births (Mebratie et al. 2015 and Federal Ministry of Health, 2011). Despite these improvements and investments in infrastructure, as is evident from the figures, challenges remain. Despite increases in utilization of some specific services, overall utilization rates remain low. According to the Ethiopian Demographic and Health Survey, in 2011, annual per capita outpatient health care utilization was about 0.3 visits, that is, 3 visits for every 10 persons. This low utilization rate is accompanied by a high reliance on out-of-pocket (OOP) payments to finance health care.[4] In particular, Yilma et al. (2014) show that households finance health care, in decreasing order of importance, by dissaving, asset sales and borrowing.[5]

In response to this situation, in June 2011, in an attempt to enhance access to health care and help defray costs care while at the same time preventing the use of harmful coping strategies (asset sales, borrowing), the government launched, as a pilot, a voluntary CBHI in 13 districts, of which 9 are classified as food insecure and are also covered by the PSNP.[6] The CBHI scheme covers outpatient and inpatient health care services in public health facilities and does not cover treatment with largely cosmetic value. Monthly contributions for core household members (parents and minor children), varies between Birr 10.50 (US$ 0.56) to Birr 15 (US$0.80) per month with an additional monthly premium of 2.10 to 3 Birr per non-core household member. Average monthly premiums amount to about 0.5 percent of household monthly income. There are no co-payments or deductibles (for additional details, see Mebratie et al. 2015).

[4] FMoH (2010) estimates that local and international donors finance about 40% of health care, out-of-pocket (OOP) expenditure accounts for about 37% and central and local governments cover about 21% of the expenditure. The remainder (about 2%) is covered by employer and other private insurance schemes.

[5] Support from social networks is limited and households do not appear to resort to increasing labor supply or reducing consumption.

[6] The pilot CBHI was offered to about 300,000 households or about 1.8 million individuals.

While the scheme is government-driven there is a degree of community engagement in scheme management and supervision. At the design phase, regional governments were involved in determining benefit packages, registration fees, and premium payments. The roll-out phase involved a two-step process, with first the community deciding whether to participate in the scheme and subsequently households choose whether to enrol or not. Based on our survey data, in 2013, almost 51% percent of individuals in the pilot districts had enrolled in the scheme.

3. Data

The paper is based on three rounds of panel data. The first round was collected in March-April 2011, that is, a few months before the launch of the CBHI while subsequent rounds were collected in March-April 2012 and March-April 2013. Data collection followed a stratified sampling design and the survey was fielded in sixteen districts located in four main regions of the country (Amhara, Oromia, Tigray and SNNPR). Within each district, six villages were randomly selected and within each village 17 households were randomly surveyed, yielding a total sample of 1,632 households. The follow-up survey in 2012 revisited 1,599 households and the 2013 edition covered 1,583 households (3% attrition). The analysis reported in the paper focuses on working-age adults (aged 15 to 65) and is based on an unbalanced panel of 12,820 observations.[7]

In each region the survey covered three CBHI pilot districts and one non-pilot district. The non-pilot districts were chosen based on the same criteria used to select the pilot districts. Of the sixteen districts there are 9 districts where both the CBHI and the PSNP operate, 3 where the CBHI operates but not the PSNP and 4 where the PSNP operates but the CBHI was not offered (see Table A1). The questionnaire included questions on PSNP and CBHI membership, modules on individual and household socio-economic characteristics and demographics, assets, employment, consumption expenditure, health and health care use, access to credit, social networks, and shocks.

[7] The year-specific number of observations is 4,332 individuals in 2011; 4,337 in 2012; 4,151 in 2013 (see Table 3).

We also collected three rounds of qualitative information through key informant interviews and focus group discussions (FGD). These were conducted in 2012, 2014 and in 2017. Among other topics these interviews and discussions focused on factors that determine participation in the CBHI and the experience of officials and FGD participants with the two interventions.

4. Analytical framework and empirical approach

4.1 Analytical Framework

Our objective is to examine whether participating in both the CBHI and the PSNP provides additional protection to households as compared to participating in only one of the schemes or as compared to not participating in either of the schemes. Potentially, the two schemes may have an effect on a variety of outcomes, and based on the main channels through which they are expected to operate, this section outlines and motivates the key outcomes that are the focus of this paper.

The main aim of the CBHI is to enhance access to health care use and to protect households against the costs of financing health care. As shown in Yilma et al. (2014), in the absence of access to insurance, households meet their health expenses by reducing savings, borrowing and selling assets. Informal insurance arrangements and support from family and friends in the form of remittances are not a major source of support. Hence, it may be expected that insurance will work not only towards enhancing access to health care but will also allow households to reduce their reliance on borrowing and avoid asset sales.[8]

The PSNP is expected to enhance food security by providing payments for labor contributions. It is also expected to prevent households from borrowing and resorting to asset sales during times of crises. Thus, simply due to the needs of the scheme, PSNP participants may be expected to provide more off-farm labor as compared to non-participants. Furthermore,

[8] Indeed, Yilma et al. (2015) show that participation in the CBHI leads to a reduction in borrowing while there are no effects on asset holdings. Whether participation in both the CBHI and the PSNP enhances these effects is the subject of this paper.

these labor contributions are important not only from the perspective of households but also from the perspective of PSNP program managers as labor is needed to construct public works. As discussed in Shigute et al. (2017), participation in the PSNP has a strong effect on CBHI uptake and a part of this may be attributed to the keen sense of the links between the two programs as perceived by officials. For instance, based on the qualitative information gathered through the key informant interviews we found that government officials have been taking measures to integrate different development interventions such as agricultural extension, education, and health programs. In particular, health extension workers focus on PSNP beneficiaries and during PSNP-related meetings or while workers are taking a break from their PSNP work, they provide information on personal hygiene and sanitation, child and maternal health issues and health insurance. They also encourage PSNP beneficiaries to enroll. This approach is illustrated by a statement made by a key informant in the Tigray region,

> "Continuous education on health issues including about the recently introduced community-based health insurance scheme is provided to those people who are covered under PSNP. Moreover, during the distribution of PSNP payments, the participants are asked if they would like to register for CBHI.." [Interviewed in December 2012].

More recently, in fieldwork conducted in May 2017 in SNNPR district, key informants at the woreda and the regional level argued that being a member of the CBHI delivers greater benefits for PSNP members since they are food insecure and they cannot afford to cover unexpected expenses of health shocks.

Not only are PSNP participants encouraged to enroll but officials expect enrolment to translate into greater health care utilization, quicker recovery from their illnesses and influence the ability of the PSNP participants to provide labor. During a discussion on the CBHI scheme a key informant in Oromia region remarked,

> "We inform PSNP members to join the [CBHI] scheme because we want them to get immediate treatment when they get sick. If they are not treated immediately, it affects their performance in public works. These beneficiaries do development work and we don't want them to fall sick so the idea is if they buy insurance and get care then it may also improve their health outcomes" [Interviewed in October 2014].

At the village level the same government officials are responsible for implementing both the PSNP and the CBHI and this clearly provides an incentive for officials to push both schemes. CBHI uptake is expected to encourage timely access to health care and might reduce illness-related losses in labour contributions which are needed to build rural infrastructure through the PSNP. Timely access to health care implies that PSNP participants who are also CBHI members may be expected to provide more labor as compared to non-CBHI, PSNP participants.

The potential links between the two programs is not restricted to officials and a focus group discussion participant in Oromia remarked,

> "I can feed my family with the payment I get from PSNP PW and my kids can go to school not worrying about whether and what they will eat. Because of my CBHI, I and my kids can get proper treatment whenever we get sick. If it wasn't for CBHI I might have to go around my neighborhood and ask for borrowing which is very difficult" [Discussed in September 2014].

Discussing her own situation, another individual in the discussion pointed out that,

> "I am the head of my household. Before I enrolled in the CBHI, I used to be absent from public works for days when either myself or my kids get sick. I used to run into arguments during payments justifying my long absence to the foreman. Going to the health center was not easy for my family. When they informed us about CBHI, I was the first one to enroll. Now, thanks to my membership, I don't get any more complaints for being absent as I immediately go to the health center when either I or my children get health problems and continue working on the public works. I now tell my non-CBHI neighbors to enroll in the scheme" [Discussed in September 2014].

Similarly, a focus group discussion participant in SNNPR articulated the links between the two schemes and stated that the CBHI is a very useful intervention for food insecure households,

> "So far we used to get some money from PSNP in order to purchase food. Now we are getting health services almost for free after joining CBHI. What shall I say simply I would like to thank God." [Discussed in May 2017].

Overall, the CBHI on its own is expected to lead to an increase in health care utilization and to protect households from resorting to borrowing and asset sales. The PSNP is expected to lead to an increase in off-farm labor and through provision of payments in lieu of labor it is expected to prevent food-insecure households from borrowing and selling assets to meet their consumption needs. Given the partially overlapping aims of the two interventions and the potential linkages between the PSNP and the CBHI we expect that those who participate in both the PSNP and the CBHI will provide more off-farm labor, they should also be less likely to take

up a loan and to sell assets in order to cope with shocks.[9] With regard to assets, in the empirical work we focus on livestock as it is the most important asset for Ethiopian rural households.[10]

4.2 Empirical approach

Based on the preceding discussion, the empirical analysis focuses on examining the joint effects of the two programs on health care use, off-farm labor, livestock assets and borrowing. To identify the joint effects of the CBHI and PSNP we exploit individual-level panel data and estimate several variants of a difference-in-difference (DiD) model. That is,

$$Y_{ijt} = (CBHI * PSNP)_{ijt}\beta + CBHI_{ijt}\gamma + PSNP_{ijt}\delta + X_{ijt}\eta + T_t\theta + (W * T)_{jt}\sigma + \lambda_i + \varepsilon_{ijt}\ , \quad (1)$$

where, Y_{ijt}, represents the outcome of interest for individual *i* residing in woreda *j* at time *t,* the interaction term $(CBHI * PSNP)_{ijt}$ indicates participation in both the CBHI and the PSNP (both are binary variables), while CBHI and PSNP indicates participation in only one of the two programs, X_{ijt} is a vector of time-variant observables.[11] We include two sets of time effects, T_t represents a time fixed effect, $(W * T)_{jt}$ is a woreda-specific time-effect, λ_i is an individual fixed effect and ε_{ijt} is a time-variant individual error term.[12] The main coefficient of interest is β which indicates the additional effect of participating in both the PSNP and the CBHI as compared to participating in only one of the two schemes.

[9] While the channels through which the PSNP and CBHI are expected to influence borrowing and assets are self-evident, the expected effects of the CBHI on labor supply are perhaps not as straightforward. Our expectation buttressed by the qualitative interviews is that the CBHI increases timely use of health care use and consequently reduces the incidence or duration of illnesses and thereby raise labor supply. Unfortunately, we do not have sufficiently accurate information on the sickness history of individuals to demonstrate that access to health care has prevented illnesses or reduced illness durations.

[10] According to Dercon (2004), in rural Ethiopia, "livestock is by far the most important marketable asset and typically is accounting for more than 90% of the value of assets".

[11] The vector of time varying variables includes demographic characteristics of the individual (age, household size), socio-economic status (consumption quintile, education, land cultivated), experience of any type of shock in the 12 months preceding the survey, and variables capturing financial participation and networks. We also estimated specifications that excluded consumption and included three time-varying health status variables. The estimates are robust to the inclusion/exclusion of the consumption and health status variables.

[12] As shown in Table A1, the sample is divided into three sets of woredas- those which have only the CBHI, those with only the PSNP and those where both the CBHI and the PSNP offer. We allow woreda-specific time effects for each of these three types of woredas.

While it is straightforward to estimate equation (1), there are a number of potential identification concerns that require discussion. As mentioned in section 2, participation in the PSNP is not voluntary and households cannot self-select themselves into the scheme. Beneficiaries are selected on the basis of community identification of their food-insecure status as well as an assessment of their assets and employment status. While this does not preclude the possibility that unobserved factors such as local influence and social networks may influence beneficiary selection, unless such factors are changing over time it is perhaps reasonable to argue that equation (1) which controls for time-varying socio-economic characteristics and individual fixed-effects is likely to be able to deal with endogeneity of PSNP participation.

A perhaps more challenging issue is the endogeneity of CBHI membership. As described in section 2, households choose whether to join the CBHI and it is possible that CBHI membership is driven by unobserved characteristics that are systematically associated with the outcomes, and thereby confound scheme effects. For example, health status may influence the demand for health care as well as the demand for health insurance, or, if health status declines over time this may influence CBHI uptake and lead to increased use of health care which may not be attributable to CBHI membership. While equation (1) includes individual fixed effects and controls for time-varying observed socio-economic attributes and in some cases time-varying measures of health status and whether households have experienced shocks, it is still possible that unobserved time-varying factors that influence the outcomes of interest also drive CBHI uptake.[13] Keeping in mind the potential selection issues, prior to discussing estimates of equation (1), we explore differences between CBHI participants and non-participants and also examine what drives scheme uptake.

5. Results

5.1 PSNP and CBHI - Uptake

[13] We include three time-varying measures of health status and experience of any type of shock (health, natural, economic, social, institutional, market or other) in the twelve months preceding the survey.

In 2011, before the launch of the CBHI, about 21 percent of the sample respondents were enrolled in the PSNP. The figure increased slightly in 2012 (22 percent) but fell to 18 percent in 2013. While the aggregate PSNP enrolment figures do not seem to exhibit much variation over time, this is misleading, as over the three years it is not the same individuals who remain in the scheme. Within a year of its launch, CBHI enrolment reached 43 percent and in 2013, rose to 51 percent (Table 1). PSNP beneficiaries are far more likely to participate in the CBHI scheme. For instance, in 2012 about 65 percent of PSNP beneficiaries enrolled in the scheme as compared to an enrolment rate of 38 percent amongst non-beneficiaries while in 2013 the corresponding figures were 72 and 46 percent (Table 2). By 2013, 52 percent of sample was not enrolled in either of the two schemes, 30 percent were enrolled only in the CBHI, 9 percent in both schemes and 8 percent only in the PSNP (Table 3).

5.2 Who enrols in the PSNP and the CBHI?

Table 4 provides descriptive statistics for a range of socio-economic, demographic and health status variables conditional on PSNP membership, while Table 5 contains estimates from a logit model of the probability of participating in the PSNP. These statistics are for 2011, that is, before the launch of the CBHI. Consistent with the PSNP's focus on food insecure households, the descriptive statistics show that 33 percent of PSNP members are in the lowest consumption quintile as compared to 20 percent of non-members. PSNP members are more likely to be uneducated (44 versus 38 percent) and own less land (0.78 versus 1.2 hectares). PSNP members are also less likely to be embedded in formal and informal financial networks. In contrast to the sharp differences in socio-economic status, differences in health status across membership status is muted. None of the three health status variables are statistically different across PSNP membership.

The regression estimates echo the patterns discussed above with individuals in the richest consumption quintile 9 percentage points less likely to join the scheme and a higher probability of membership for those with lower land holdings. With regard to health status, individuals with

good self-rated health status are 4.5 percentage points more likely to be PSNP members while the other health status indicators have no bearing on PSNP membership. Overall, the descriptive statistics and the regression estimates support the argument that PSNP membership is driven by socio-economic status and it is not that those with weaker health status are more likely to join the PSNP.

Turning to the CBHI, Table 6 provides descriptive statistics at baseline conditional on insurance status in 2012 while Table 7 contains logit estimates for the probability of enrolling in the CBHI in 2013 and 2012 as a function of characteristics in the preceding year. Based on the descriptive statistics, the link between socio-economic status and enrolment status is not straightforward. While land size and access to participation in financial networks are positively associated with enrolment, the effect of consumption on enrolment seems to be non-linear, with individuals belonging to the poorest and the richest quintiles more likely to join the scheme. As shown in Table 2, participation in the PSNP is linked to higher CBHI enrolment rates. Perhaps contrary to expectations, the health status variables indicate that those with good self-assessed heath status and a lower incidence of chronic disease are more likely to enrol in the scheme. Logit estimates of the probability of enrolling in the CBHI scheme paint a similar picture. That is, individuals belonging to the richest consumption quintile, with larger land holdings and greater participation in financial networks are more likely to enrol in the scheme but at the same time individuals from the weakest socio-economic category (PSNP members) and from the lowest consumption quintile are more likely to join the scheme as compared to those in quintiles 2, 3 and 4. With regard to health status, there is no evidence that individuals with poorer health status – either self-assessed or based on the incidence of recent illness or the prevalence of chronic conditions are more likely to join the scheme. If anything, the estimates indicate that those with better self-assessed health status and a lower incidence of illness are more likely to join the scheme.

The profiles of the PSNP and CBHI members and the role of the PSNP in influencing CBHI enrolment suggests that individuals belonging to both the PSNP and the CBHI are likely to belong to the weakest socio-economic category. This is clearly visible in Table 8 which shows that 46 percent of the individuals who are in both the programs belong to the poorest consumption quintile as compared to 20 percent amongst those in no program. There is a clear hierarchy in terms of socio-economic status with individuals belonging only to the CBHI at the top rung, followed by those who are not members of either program, PSNP members and finally those who participate in both schemes. This clear-cut pattern based on socio-economic status is in sharp contrast to health status. Across the four categories, there are small differences in the three health status variables. Multinomial logit estimates of the probability of being in the four categories (Table 9) yields the same message. Individuals in the highest consumption quintile are about 6 percentage points less likely to belong to both programs and 9 percentage points more likely to enrol in the CBHI. Similarly, households with larger land endowments are 4 percentage points less likely to belong to both programs and 6 percentage points more likely to enrol in the CBHI. With regard to health status, past illness has no bearing on program status, the incidence of chronic illness reduces the probability of being in both programs by 3 percentage points and has no bearing on determining entry into the CBHI. If anything those with better self-assessed health status are more likely to join both programs and self-assessed health status does not influence insurance uptake.

With regard to the outcomes, at baseline, consistent with the consumption data and land-ownership patterns, those belonging to both programs have substantially lower livestock holdings and are far more likely to be engaged in off-farm work (see Table 8). At baseline, their utilization of health care is lower as compared to those who do not belong to both programs or those who eventually participate only in the CBHI. The clear picture emerging from this section is that selection into the four different states is strongly linked to socio-economic status and not to health status. Furthermore, the substantially lower socio-economic status and lower health

care use, at baseline, for those who belong to both programs, suggests negative selection into this category and supports the idea that, if at all, estimates of the effect of belonging to both social programs are likely to be downward biased.

5.3 The joint effect of CBHI and PSNP

Estimates of the joint and individual effect of the two programs on health care utilization, labor supply, livestock and borrowings is provided in Tables 11a and 11b. We begin with a discussion of the effect of the two schemes on health care use. Participating in the CBHI increases the probability of using outpatient health care by 2.3 percentage points or 26 percent compared to those who don't participate in either program. In contrast, PSNP membership on its own does not have a statistically significant effect on health care use. However, the additional effect of belonging to both programs is 4.6 percentage points or a 5.2 percentage point increase in the use of health care for those who belong to both programs as compared to those who belong to neither. Compared to non-participants this is a 58 percent increase in the probability of using health care. Joint membership also has a positive effect on the frequency of using modern health care, although the effect is not precise. While the estimates in Table 11a focus only on adults, we also estimated the effect of participation in the two schemes on other household members, that is, young children (less than 15) and older adults (65 and above) and for the full sample (see Table A5). These estimates confirm the finding that joint membership increases both the probability of using health care and the frequency of use. Thus, not only does participating in the PSNP translate into greater enrolment in the CBHI (Tables 2 and 7) it also translates into greater use of health care amongst those belonging to both programs.

As discussed in Section 4, government officials use the PSNP as a platform to encourage greater uptake of CBHI not only to fulfil enrolment targets but also to mitigate the effect of health-related reasons for not providing PSNP labor contributions. If this is valid then participation in both programs may be expected to translate not only into greater health care use but also into greater off-farm labor supply. As shown in Table 11a, participating in the PSNP

increases the probability of providing off-farm work by 13 percentage points. Given the nature of the PSNP, which requires off-farm work in order to obtain benefits this may be expected. In contrast, on its own CBHI membership has no effect on labor supply. However, PSNP members who are also members of the CBHI are 7 percentage points more likely to work in off-farm activities. Thus, as compared to individuals who do not participate in either of the two programs, participating in both the programs increases the probability of engaging in off-farm work by 21 percentage points (Table 11b). The large, positive and statistically significant effect of joint membership is also evident in terms of hours of off-farm labor supply. An individual participating only in the PSNP provides an additional 6 hours of work as compared to those who do not participate in any program while individuals belonging to both programs provide 16 more hours per month to off-farm activities as compared to those who do not participate in either of the two programs. While we are unable to determine whether the additional off-farm labor supply is directed to the PSNP, the increase in health care use and the increase in off-farm labor supply is consistent with the claim of government officials and the view of participants who are members of both programs (see Section 4) that the CBHI helps individuals access health care in a timely manner and thereby reduces health-related absenteeism in the PSNP.

On their own the two social programs do not have the capability of helping households build assets. Both CBHI and the PSNP on their own have no impact on the value of livestock assets (Table 11a). This is consistent with the findings on the effect of the CBHI on livestock assets as reported in Yilma et al. (2015) and the effect of the PSNP, also on livestock assets in Andersson et al. (2011).[14] In contrast, belonging to both social programs is associated with a 717 Birr increase in the value of livestock or a modest increase of about 4 percent as compared to those who don't belong to either program. With regard to the incidence of borrowing, the effect emanates almost entirely from CBHI membership. PSNP on its own does not influence the

[14] In contrast to the finding reported in Andersson et al. (2011), Berhane et al. (2011) find that five years of participation in the public works programs raises livestock holdings by 0.38 tropical livestock units (TLU) relative to those who have participated for only one year. The effect is statistically significant.

probability of borrowing and the joint effect is zero. In contrast, conditional on borrowing, while CBHI membership encourages greater borrowing, membership of both programs works towards reducing the debt burden of households. Belonging to both programs is associated with a 616 Birr or 27 percent reduction in debt.[15]

5.4 Robustness checks

As has been shown in Table 8, at baseline, there are clear differences in the socio-economic status of those who are enrolled in both schemes versus those who are not enrolled in either scheme or enrolled only in the CBHI. While our estimates do control for individual fixed-effects and time-varying traits, it is still possible that pre-existing unobservable differences at baseline may influence the trajectory of the outcome variables in subsequent years and contaminate the effects of the CBHI and the PSNP. This section reports on two robustness checks carried out to probe the sensitivity of the estimates.

In an attempt to examine the effects of working with groups that are very different at baseline, we re-estimated the specifications reported in Table 11a based only on those who participate in the PSNP. As maybe seen in Table 8, at baseline, those who participate only in the PSNP have similar traits as compared to those who participate in both programs. Statistically, at baseline, at least at the 10% level, there is no difference in the outcome variables between these two groups.[16] While not as crisp as those reported in Table 11a, estimates conditioning on PSNP status (see Table A6) reveal a similar pattern. That is, PSNP participants who are enrolled in the CBHI are 4 percentage points more likely to use health care and 10 percentage points more likely to engage in off-farm labor. Their labour contributions in terms of hours of work are 31%

[15] We also estimated household level regressions of livestock and borrowing (see Table A8). The effect of joint membership on livestock is positive but statistically insignificant while the effect on the amount of borrowing remains in the same range as reported earlier.

[16] A joint test for differences in means of the six outcome variables (excluding loan amount as the number of observations differs) yields a p-value of 0.099. Individually, except for the probability of taking a loan, differences in means for all outcomes variables is statistically insignificant.

higher than their non-CBHI enrolled counterparts. While there is no effect on livestock assets, their participation in the CBHI is associated with an 18% reduction in borrowing.

The CBHI scheme is meant to enhance access to health care only from public health centers and hospitals as opposed to publicly provided health posts (which provide free access) and privately run health centers. If we are picking up spurious effects then it is possible that joint participation in the CBHI and PSNP will also have an effect on health care utilization from health posts and from privately run clinics. Estimates provided in Table A7 show that the effect we are identifying emanates entirely from an increase in health care utilization from publicly provided health care and specifically from publicly run health centers as opposed to health posts and privately provided care.

6. Discussion and concluding remarks

The Productive Safety Net Program (PSNP) and the Community Based Health Insurance (CBHI) are two large social protection interventions in Ethiopia. Motivated, in part, by policy declarations which urge greater coordination between social protection interventions and the potential offered by the two programs in jointly dealing with the multiple shocks faced by rural Ethiopian households, this paper examined the effect of participating in both the CBHI and the PSNP on health care utilization, off-farm labor supply, livestock assets and borrowing.

The analysis was based on three rounds of panel data and informed by several rounds of qualitative work. We exploited the panel data, baseline and two follow-up surveys at least with respect to the CBHI, controlled for individual and time fixed-effects as well as a range of time-varying traits to provide arguably credible estimates. We found that individuals covered by both programs were 5 percentage points more likely to use outpatient care and 21 percentage points more likely to participate in off-farm work. Participation in both programs was associated with a 5 percent increase in livestock and a 27 percent decline in debt. The estimates were insensitive to a number of robustness checks. Despite this, given the targeted nature of the PSNP and

voluntary enrolment into the CBHI we don't pretend to offer causal effects, but estimates that are reasonably well-identified.

Our results display that at least in Ethiopia not only may participation in the PSNP be used to leverage greater uptake of health insurance but that co-ordinating the efforts of safety net transfers and health related interventions is well-founded and affords greater protection to vulnerable households. Unlike Winston Smith in Orwell's 1984 who worries whether a strong state will assert that "two plus two equals five", in the current case it does seem that the combination of the two programs delivers more than the sum of the individual effects.

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Table 1
Participation in PSNP and CBHI

Program	2011		2012		2013	
	Membership		Membership		Membership	
	%	N	%	N	%	N
PSNP	21.2	918	21.8	940	17.6	732
CBHI	0	0	43.2	1,445	50.6	1,640

Table 2
CBHI uptake and PSNP participation

Enrolled in the CBHI	2012			2013		
	PSNP member	Non-members	Total	PSNP member	Non-member	Total
Enrolled	410	1,035	1,445	380	1,260	1640
	(64.6)	(38.2)	(43.2)	(72.2)	(46.4)	(50.6)
Total	635	2,707	3,342	526	2,715	3241

Notes: Observations are restricted to the districts where CBHI was offered.

Table 3
Participation in CBHI and PSNP – Full Sample

Program	2011		2012		2013		Sample total	
	Membership		Membership		Membership		Membership	
	%	**N**	**%**	**N**	**%**	**N**	**%**	
PSNP only	21.2	918	12.2	530	8.5	352	14.0	1,800
CBHI only	-	-	23.9	1,035	30.4	1,260	17.9	2,295
Both programs	-	-	9.4	410	9.2	380	6.2	790
No program	78.8	3,414	54.5	2,362	52.0	2,159	61.9	7,935
Total		**4,332**		**4,337**		**4,151**		**12,820**

Notes: Observations include districts where CBHI was not offered.

Table 4
Descriptive statistics conditional on PSNP status in 2011

Variable	PSNP Membership					Total	
	Member		Non-member		p-value		
	Mean	SD	Mean	SD		Mean	SD
Socioeconomic status							
Poorest consumption quintile	0.33	0.47	0.20	0.40	0.00	0.23	0.42
2nd consumption quintile	0.27	0.45	0.20	0.40	0.00	0.22	0.41
3rd consumption quintile	0.17	0.37	0.20	0.40	0.04	0.19	0.39
4th consumption quintile	0.15	0.36	0.20	0.40	0.00	0.19	0.40
Richest consumption quintile	0.08	0.27	0.20	0.40	0.00	0.17	0.38
Education- No education	0.43	0.50	0.38	0.49	0.01	0.39	0.49
Education- Informal	0.05	0.21	0.07	0.26	0.00	0.07	0.25
Education- Primary	0.40	0.49	0.43	0.49	0.11	0.42	0.49
Education-Secondary and above	0.12	0.33	0.12	0.32	0.58	0.12	0.32
Land cultivated	0.78	0.56	1.18	0.97	0.00	1.09	0.91
Experienced shock	0.86	0.35	0.89	0.32	0.02	0.88	0.32
Demographic traits							
Age	32.8	13.4	32.2	12.9	0.20	32.3	13.0
Male	0.49	0.50	0.52	0.50	0.09	0.51	0.50
Household size	6.2	2.1	6.6	2.2	0.00	6.5	2.2
Religion-Orthodox	0.62	0.49	0.45	0.50	0.00	0.49	0.50
Religion-Protestant	0.16	0.37	0.23	0.42	0.00	0.22	0.41
Religion-Muslim	0.19	0.40	0.29	0.45	0.00	0.26	0.44
Religion- Other religion or no religion	0.03	0.16	0.03	0.17	0.58	0.03	0.16
Health status							
Self-assessed health - good	0.81	0.39	0.80	0.40	0.21	0.80	0.40
Self-assessed health - not good	0.19	0.39	0.20	0.40	0.21	0.20	0.40
Past illness event	1.8	6.8	1.9	6.9	0.67	1.8	6.9
Chronic illness for more than 30 days	0.06	0.24	0.06	0.24	0.84	0.06	0.24
Financial participation and networks							
Savings in bank account	0.11	0.31	0.14	0.35	0.01	0.13	0.34
Member of Iqqub – informal rotating savings/credit group	0.04	0.19	0.08	0.27	0.00	0.07	0.25
Member of a formal credit & saving association	0.05	0.23	0.13	0.34	0.00	0.11	0.32
Official position held	0.20	0.41	0.27	0.44	0.00	0.25	0.44
Regions							
Tigray	0.61	0.49	0.10	0.30	0.00	0.21	0.41
Amhara	0.14	0.34	0.30	0.46	0.00	0.27	0.44
Oromia	0.06	0.23	0.30	0.46	0.00	0.24	0.43
SNNPR	0.20	0.40	0.30	0.46	0.00	0.28	0.45
Observations	918		3,414			4,332	

Table 5
Probability of enrolling in the PSNP in 2011 - marginal effects after logit (std. error)

Variables	2011
Socioeconomic status	
2nd consumption quintile (Ref.: Poorest Quintile)	-0.021**
	(0.009)
3rd consumption quintile	-0.055***
	(0.005)
4th consumption quintile	-0.063***
	(0.005)
Richest consumption quintile	-0.089***
	(0.006)
Education- Primary (Ref.: No & Informal Education)	-0.007
	(0.011)
Education- Secondary and above	0.014
	(0.015)
Land Cultivated	-0.053***
	(0.005)
Experienced Shock	-0.027***
	(0.004)
Demographic Traits	
Age	0.0004
	(0.0003)
Male	-0.004
	(0.015)
Household size	-0.007***
	(0.001)
Religion - Orthodox (Ref: Muslim)	-0.239***
	(0.006)
Religion – Protestant	-0.015
	(0.028)
Religion-Other religion or no religion	0.006
	(0.025)
Health status	
Self-assessed health – good (ref: SAH- not good)	0.045***
	(0.008)
Past illness event	0.0004
	(0.0005)
Chronic illness	0.009
	(0.015)
Financial participation and networks	
Saving in bank account	-0.005
	(0.006)
Member of Iqqub	-0.041***
	(0.007)
Member of credit and saving association	0.034**
	(0.017)
Official position held	0.025***
	(0.007)
Observations	4,275
Pseudo R-squared	0.315
Log pseudo likelihood	-1511.95

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The specification also includes regional fixed effects.

Table 6
Descriptive statistics conditional on CBHI membership status

Variable	CBHI Enrolment				p-value	Total	
	Enrolled		Not-enrolled				
	Mean	SD	Mean	SD		Mean	SD
Socioeconomic status							
Poorest consumption quintile	0.25	0.43	0.21	0.41	0.01	0.23	0.42
2nd consumption quintile	0.20	0.40	0.22	0.41	0.21	0.21	0.41
3rd consumption quintile	0.19	0.39	0.22	0.41	0.21	0.21	0.41
4th consumption quintile	0.18	0.38	0.21	0.41	0.02	0.20	0.40
Richest consumption quintile	0.18	0.38	0.14	0.34	0.00	0.15	0.36
Participation in PSNP	0.25	0.43	0.12	0.33	0.00	0.18	0.38
Education- No education	0.36	0.48	0.39	0.49	0.07	0.38	0.48
Education- Informal	0.08	0.28	0.05	0.22	0.00	0.06	0.25
Education- Primary	0.43	0.50	0.43	0.50	0.88	0.43	0.50
Education-Secondary and above	0.13	0.33	0.13	0.33	0.93	0.13	0.33
Land cultivated	1.3	1.2	1.1	0.83	0.00	1.2	0.99
Experienced shock	0.83	0.37	0.91	0.29	0.00	0.88	0.33
Demographic traits							
Age	32.2	13.2	32.1	13.1	0.80	32.2	13.1
Male	0.52	0.50	0.51	0.50	0.67	0.52	0.50
Household size	6.8	2.2	6.4	2.2	0.00	6.6	2.2
Religion-Orthodox	0.60	0.49	0.55	0.50	0.01	0.57	0.50
Religion-Protestant	0.20	0.40	0.25	0.43	0.00	0.23	0.42
Religion-Muslim	0.19	0.39	0.17	0.37	0.13	0.18	0.38
Religion-Other religion of no religion	0.01	0.11	0.03	0.17	0.00	0.02	0.15
Health status							
Self-assessed health – good	0.81	0.39	0.76	0.43	0.00	0.78	0.42
Self-assessed health - not good	0.19	0.39	0.24	0.43	0.00	0.22	0.42
Past illness event	1.8	6.9	1.9	6.7	0.55	1.9	6.8
Chronic illness for more than 30 days	0.05	0.22	0.08	0.26	0.01	0.07	0.26
Financial participation and networks							
Savings in bank account	0.17	0.37	0.14	0.35	0.05	0.15	0.36
Member of Iqqub – informal rotating savings/credit group	0.08	0.28	0.07	0.26	0.18	0.08	0.27
Member of a formal credit & saving association	0.18	0.38	0.11	0.31	0.00	0.14	0.35
Official position held	0.31	0.46	0.22	0.41	0.00	0.26	0.44
Regions							
Tigray	0.18	0.39	0.23	0.42	0.00	0.21	0.40
Amhara	0.30	0.46	0.22	0.42	0.00	0.26	0.44
Oromia	0.28	0.45	0.22	0.42	0.00	0.24	0.43
SNNPR	0.24	0.43	0.33	0.47	0.00	0.29	0.46
Observations	1,405		1,879			3,284	

Notes: CBHI enrolment in 2012 and all characteristics based on the 2011 survey.

Table 7
Probability of enrolling in the CBHI - marginal effects after logit (std. error)

Variables	2013		2012	
Socioeconomic status				
2nd Consumption Quintile (Ref: Poorest Quintile)	-0.203***	-0.200***	-0.087***	-0.064***
	(0.021)	(0.021)	(0.022)	(0.017)
3rd Consumption Quintile	-0.082***	-0.053***	-0.111***	-0.084***
	(0.010)	(0.012)	(0.009)	(0.009)
4th Consumption Quintile	-0.009	0.025*	-0.124***	-0.088***
	(0.014)	(0.015)	(0.019)	(0.018)
5th Consumption Quintile	-0.018	0.019	-0.001	0.051***
	(0.013)	(0.015)	(0.023)	(0.019)
Participation in PSNP		0.322***		0.432***
		(0.007)		(0.016)
Informal Education (Ref: No Education)	0.072	0.064	0.057***	0.073***
	(0.047)	(0.051)	(0.022)	(0.020)
Primary Education	0.047***	0.042**	0.013	0.019
	(0.017)	(0.017)	(0.011)	(0.015)
Secondary & above Education	0.078**	0.081*	0.007	-0.004
	(0.039)	(0.042)	(0.029)	(0.028)
Land Cultivated	0.085***	0.113***	0.033***	0.051***
	(0.011)	(0.011)	(0.005)	(0.005)
Experienced Shock	-0.106***	-0.068***	-0.160***	-0.133***
	(0.017)	(0.013)	(0.021)	(0.018)
Demographic characteristics				
Age	0.001	0.001	0.0006	0.0002
	(0.001)	(0.001)	(0.001)	(0.0008)
Male	-0.044**	-0.040**	-0.011	-0.008
	(0.019)	(0.016)	(0.013)	(0.013)
Household Size	0.015***	0.017***	0.020***	0.024***
	(0.003)	(0.003)	(0.002)	(0.003)
Religion-Orthodox (Ref.: Muslim)	-0.074***	-0.052***	-0.048***	-0.018
	(0.018)	(0.019)	(0.012)	(0.016)
Religion-Protestant	-0.132***	-0.130***	0.009	0.007
	(0.026)	(0.026)	(0.0290)	(0.027)
Religion: Other religion or no religion	-0.372***	-0.376***	-0.151***	-0.181***
	(0.014)	(0.016)	(0.030)	(0.036)
Health status				
Self-assessed health – good (Ref.: SAH- not good)	0.102***	0.087***	0.077***	0.051***
	(0.020)	(0.021)	(0.009)	(0.013)
Past illness	0.003**	0.002	0.003	0.002
	(0.001)	(0.002)	(0.00170)	(0.002)
Chronic illness	0.015	0.034	-0.072***	-0.065**
	(0.010)	(0.114)	(0.027)	(0.029)
Financial participation and networks				
Saving in bank account	0.107***	0.113***	-0.066***	-0.077***
	(0.017)	(0.017)	(0.014)	(0.017)
Member of Iqqub	0.001	0.005	-0.035	-0.002
	(0.035)	(0.034)	(0.024)	(0.023)
Member of credit and saving association	0.013	-0.003	0.124***	0.112***
	(0.028)	(0.027)	(0.007)	(0.011)
Official position held	0.064***	0.083***	0.106***	0.102***
	(0.016)	(0.015)	(0.010)	(0.012)
Observations	3218	3212	3266	3239
Pseudo R-squared	0.154	0.184	0.056	0.104
Log pseudo likelihood	-1887.532	-1816.722	-2102.200	-1981.740

Notes: All explanatory variables are at their 2012/2011 values; Standard errors in parentheses; *** p<0.01, ** p<0.05, *p<0.1. The specification also includes a set of regional fixed effects. The specification for 2013 additionally control for understanding of health insurance and knowledge and involvement in the CBHI.

Table 8
Descriptive statistics conditional on membership status

Variables	Total Sample	CBHI* PSNP	CBHI	PSNP	No Program	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)
Outcome variables						
Utilization of modern health care (1/0)	0.10	0.07	0.11	0.09	0.10	0.04
Number of visits to modern health facilities	0.17	0.12	0.18	0.15	0.17	0.16
Off-farm worker (1/0)	0.13	0.29	0.1	0.31	0.09	0.00
Number of hours worked off-farm (in a month)	11.02	22.4	7.7	23.0	7.7	0.00
Value of Livestock (Birr)	19963.74	13031.1	29897.0	12815.6	17585.27	0.00
Loan uptake (1/0)	0.32	0.50	0.34	0.41	0.27	0.00
Amout of loan (Birr)	2186.23	2052.73	2340.87	2485.57	2040.97	0.94
Covariates						
Socioeconomic status						
Poorest consumption quintile	0.23	0.46	0.17	0.28	0.20	0.00
2nd consumption quintile	0.21	0.25	0.18	0.27	0.21	0.04
3rd consumption quintile	0.19	0.13	0.21	0.16	0.20	0.00
4th consumption quintile	0.20	0.12	0.20	0.21	0.20	0.00
Richest consumption quintile	0.17	0.03	0.24	0.08	0.19	0.00
No education	0.39	0.40	0.34	0.43	0.41	0.98
Informal education	0.07	0.04	0.10	0.05	0.06	0.14
Primary education	0.42	0.42	0.44	0.43	0.41	0.96
Secondary education and above	0.12	0.14	0.12	0.09	0.12	0.33
Land cultivated	1.1	0.69	1.6	0.79	1.0	0.00
Experienced shock	0.88	0.83	0.83	0.88	0.91	0.00
Demographic characteristics						
Age	32.3	32.6	32.1	32.5	32.2	0.59
Male	0.51	0.48	0.54	0.47	0.52	0.14
Household size	6.5	6.7	6.9	5.9	6.4	0.06
Religion- Orthodox	0.49	0.55	0.61	0.60	0.40	0.00
Religion- Protestant	0.21	0.28	0.17	0.12	0.25	0.14
Religion – Muslim	0.27	0.13	0.21	0.25	0.32	0.00
Religion- other religion or no religion	0.03	0.04	0.00	0.03	0.04	0.96
Health status						
Self-assessed health-good	0.80	0.84	0.80	0.80	0.80	0.06
Self-assessed health-not good	0.20	0.16	0.20	0.20	0.20	0.06
Past illness event	1.8	1.5	1.9	1.8	1.8	0.31
Chronic illness for more than 30 days	0.06	0.03	0.06	0.07	0.06	0.02
Financial participation and networks						
Savings in bank account	0.13	0.03	0.22	0.10	0.12	0.00
Member of Iqqub – informal rotating savings/credit group	0.07	0.06	0.09	0.04	0.07	0.86
Member of a formal credit & saving association	0.11	0.09	0.21	0.02	0.10	0.68
Official position held	0.25	0.13	0.38	0.19	0.23	0.00
Regions						
Tigray	0.21	0.48	0.07	0.61	0.13	0.00
Amhara	0.26	0.07	0.39	0.17	0.26	0.00
Oromia	0.25	0.07	0.35	0.07	0.27	0.00
SNNPR	0.28	0.37	0.19	0.15	0.33	0.12
Observations (N)	4,259	390	1,011	512	2,346	

Notes: CBHI and PSNP membership status in 2012 values. All other characteristics are based on the 2011 survey. P-value for comparison of means in columns 2 and 5.

Table 9
Probability of participating in PSNP and CBHI- Multinomial Logit Marginal Effects Estimates (std. error)

Variables	No program	CBHI only	PSNP only	Both programs
Socioeconomic status				
2nd Consumption Quintile (Ref: Poorest Quintile)	0.058***	-0.024**	-0.012**	-0.022***
	(0.018)	(0.010)	(0.005)	(0.006)
3rd Consumption Quintile	0.036***	0.031***	-0.031***	-0.036***
	(0.011)	(0.011)	(0.002)	(0.002)
4th Consumption Quintile	0.030***	0.023**	-0.019***	-0.034***
	(0.010)	(0.010)	(0.003)	(0.005)
5th Consumption Quintile	0.020**	0.089***	-0.046***	-0.062***
	(0.009)	(0.008)	(0.003)	(0.004)
Informal Education (Ref: No Education)	-0.057**	0.037**	0.014***	0.006
	(0.027)	(0.017)	(0.005)	(0.013)
Primary Education	-0.035***	0.018	0.007	0.009
	(0.009)	(0.014)	(0.008)	(0.008)
Secondary & above Education	-0.021	0.007	-0.003	0.017
	(0.020)	(0.023)	(0.011)	(0.012)
Land Cultivated	-0.004	0.061***	-0.022***	-0.036***
	(0.005)	(0.004)	(0.002)	(0.003)
Experienced Shock	0.067***	-0.024**	-0.005	-0.037***
	(0.009)	(0.012)	(0.007)	(0.003)
Demographic characteristics				
Age	-0.0004	-0.0002	-0.00001	0.0006
	(0.0006)	(0.0005)	(0.0001)	(0.0004)
Male	0.016	0.0007	-0.006	-0.011*
	(0.014)	(0.011)	(0.006)	(0.006)
Household Size	-0.011***	0.020***	-0.007***	-0.002***
	(0.002)	(0.001)	(0.0007)	(0.0008)
Religion-Orthodox (Ref. category: Muslim)	0.010	0.198***	-0.170***	-0.038***
	(0.010)	(0.019)	(0.018)	(0.005)
Religion-Protestant	-0.142***	0.189***	-0.020**	-0.027***
	(0.031)	(0.026)	(0.008)	(0.006)
Religion- Other religion or no religion	0.111**	-0.119**	0.021	-0.013
	(0.049)	(0.050)	(0.016)	(0.013)
Health status				
Self-assessed health –good (Reference not good SAH)	-0.048***	0.016	0.014***	0.018***
	(0.016)	(0.013)	(0.005)	(0.002)
Past illness	-0.002*	0.001	0.0003	0.0004
	(0.001)	(0.002)	(0.0004)	(0.0005)
Chronic illness	0.016	0.001	0.009	-0.026***
	(0.024)	(0.034)	(0.012)	(0.0032)
Financial participation and networks				
Saving in bank account	0.002	0.049***	-0.006	-0.045***
	(0.019)	(0.010)	(0.008)	(0.005)
Member of Iqqub	-0.009	-0.034**	0.031***	0.012**
	(0.018)	(0.014)	(0.005)	(0.005)
Member of credit and saving association	-0.053***	0.024	-0.037***	0.066***
	(0.004)	(0.017)	(0.008)	(0.011)
Official position held	-0.049***	0.063***	-0.006**	-0.008***
	(0.009)	(0.012)	(0.002)	(0.003)
Observations	4,214	4,214	4,214	4,214
Pseudo R-squared	0.193	0.193	0.193	0.193
Log pseudo likelihood	-3895.630	-3895.630	-3895.630	-3895.630

Notes: All explanatory variables are at their 2011 values; Standard errors in parentheses; *** p<0.01, ** p<0.05, *p<0.1.

Table 10
Descriptive statistics by membership status – Full sample

Variables	Total Sample	CBHI* PSNP	CBHI	PSNP	No Program	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)
Outcome variables						
Utilization of modern health care (1/0)	0.09	0.11	0.11	0.08	0.09	0.06
Number of visits to modern health care facilities	0.14	0.14	0.19	0.13	0.13	0.62
Off-farm worker (1/0)	0.12	0.33	0.06	0.31	0.07	0.00
Number of hours worked off-farm (in a month)	11.50	30.0	6.6	25.69	7.8	0.00
Value of Livestock Assets (Birr)	19375.3	13560.6	27765.0	12703.6	19041.1	0.00
Loan uptake (1/0)	0.30	0.41	0.27	0.41	0.27	0.00
Amout of loan (Birr)	2499.16	2468.38	3314.12	2392.75	2307.13	0.19
Covariates						
Socioeconomic status						
Poorest consumption quintile	0.22	0.35	0.16	0.30	0.21	0.00
2nd consumption quintile	0.22	0.25	0.17	0.26	0.21	0.01
3rd consumption quintile	0.20	0.19	0.21	0.18	0.20	0.37
4th consumption quintile	0.19	0.14	0.23	0.17	0.19	0.00
Richest consumption quintile	0.17	0.07	0.22	0.09	0.19	0.00
No education	0.38	0.36	0.32	0.43	0.39	0.09
Informal education	0.06	0.04	0.09	0.05	0.06	0.00
Primary education	0.43	0.45	0.44	0.41	0.43	0.15
Secondary education and above	0.13	0.15	0.16	0.11	0.12	0.02
Land cultivated	1.06	0.64	1.5	0.74	1.05	0.00
Experienced shock	0.77	0.59	0.74	0.76	0.79	0.00
Demographic characteristics						
Age	32.6	32.7	32.8	33.1	32.5	0.71
Male	0.51	0.47	0.53	0.47	0.52	0.01
Household size	6.5	6.7	6.8	6.0	6.5	0.05
Religion- Orthodox	0.49	0.57	0.65	0.60	0.41	0.00
Religion- Protestant	0.22	0.27	0.15	0.15	0.25	0.15
Religion - Muslim	0.26	0.14	0.19	0.21	0.30	0.00
Religion- other relgion or no religion	0.03	0.02	0.01	0.04	0.04	0.03
Health status						
Self-assessed health - good	0.81	0.86	0.80	0.83	0.80	0.00
Self-assessed health - not good	0.19	0.14	0.20	0.17	0.20	0.00
Past illness event	1.5	1.5	1.5	1.6	1.4	0.80
Chronic illness for more than 30 days	0.04	0.04	0.04	0.06	0.04	0.51
Financial participation and networks						
Savings in bank account	0.13	0.12	0.21	0.07	0.12	0.63
Member of Iqqub – informal rotating savings/credit group	0.07	0.07	0.08	0.05	0.07	0.56
Member of a formal credit & saving association	0.11	0.10	0.16	0.06	0.11	0.78
Official position held	0.23	0.16	0.35	0.17	0.22	0.00
Regions						
Tigray	0.21	0.49	0.13	0.60	0.12	0.00
Amhara	0.26	0.07	0.40	0.14	0.27	0.00
Oromia	0.24	0.07	0.29	0.07	0.28	0.00
SNNPR	0.29	0.37	0.18	0.19	0.33	0.05
Observations (N)	12,820	790	2,295	1,800	7,935	

***Notes*:** The p-value is for differences in means between columns 2 and 5

Table 11a
Effect of CBHI and PSNP on health care utilization, off-farm labour supply and asset accumulation

	Modern health care utilization (1/0)	Number of visits to modern health facility	Participation in off-farm work (1/0)	Number of hours worked off-farm	Value of livestock assets (Birr)	Loan uptake (1/0)	Outstanding loan (Birr)
CBHI*PSNP	0.046**	0.037	0.067***	10.90***	886.4**	-0.013	-1280.0***
	(0.019)	(0.039)	(0.024)	(2.80)	(422.7)	(0.031)	(226.8)
CBHI	0.023*	0.071***	0.008	-0.57	-176.2	-0.033**	619.3***
	(0.012)	(0.024)	(0.010)	(1.34)	(313.8)	(0.016)	(134.2)
PSNP	-0.017	-0.034	0.130***	6.12***	7.16	-0.012	45.18
	(0.013)	(0.025)	(0.019)	(2.20)	(399.4)	(0.023)	(238.0)
N	12,820	12,820	12,820	12,820	12,820	12,820	3,840
Adj. R-sq	0.012	0.014	0.031	0.023	0.049	0.043	0.176

Notes: Specifications include individual fixed effects, time fixed effects, woreda-specific time trends, socioeconomic characteristics (consumption quintiles, education, crop land ownership and experience of shock), time-varying demographic characteristics (household size) and access to formal and informal financial institution. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11b
Effect of CBHI and PSNP on health care utilization, off-farm labour supply and asset accumulation

	Modern health care utilization (1/0)	Number of visits to modern health facility	Participation in Off-Farm Work (1/0)	Number of Hours worked in Off-Farm	Value of Livestock Assets (Birr)	Loan Uptake (1/0)	Outstanding Loan (Birr)
Joint effect vs. No program	0.052***	0.073**	0.205***	16.45***	717.38*	-0.057*	-615.57**
	(0.019)	(0.037)	(0.025)	(2.82)	(432.93)	(0.031)	(281.56)
Joint effect vs. only CBHI	0.029	0.003	0.197***	17.02***	893.53*	-0.025	-1234.85***
	(0.020)	(0.041)	(0.026)	(2.98)	(465.23)	(0.032)	(291.75)
Joint effect vs. only PSNP	0.069***	0.108***	0.075***	10.32***	710.22*	-0.046	-660.75***
	(0.017)	(0.033)	(0.023)	(2.64)	(381.75)	(0.029)	(187.42)
N	12,820	12,820	12,820	12,820	12,820	12,820	3,840
Adj. R-sq	0.012	0.014	0.031	0.023	0.049	0.043	0.176

Notes: Specifications include individual fixed effects, time fixed effects, woreda-specific time trends, socioeconomic characteristics (consumption quintiles, education, crop land ownership and experience of shock), time-varying demographic characteristics (household size) and access to formal and informal financial institution. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A1
District level intersection of CBHI and PSNP

	Region			
	Amhara	**Oromia**	**SNNPR**	**Tigray**
PSNP = 1 **CBHI = 1**	Tehuledere	Deder Kuyu	Dale Denboya Damot Woyde	Kelite Awlalo Ahferon Tahitay Adiabo
PSNP = 1 **CBHI = 0**	Qallu	Kersa	Awasa Zurya	Saesy Tseadamba
PSNP = 0 **CBHI = 1**	Fogera	Gimbichu	-	-

Table A2
Description of Variables

Variable	Description
Outcome variables	
Modern health care utilization	Visited a modern health care facility for outpatient healthcare (OHC) in the two months preceding the survey
Number of visits to modern health facility	Number of times a modern health care facility is visited for OHC in the two months preceding the survey.
Participation in off-farm activities	Engaged in off-farm work in the four weeks preceding the survey
Number of hours worked off-farm	Number of hours of off-farm work in the four weeks preceding the survey
Value of Livestock Assets	Value of livestock assets owned by the household, in Birr. Livestock includes, the number of oxen, bulls, cows, horses, donkeys, mules, camels, goats, sheep and chicken; we use median prices for each type of livestock based on a price survey conducted in 2014 (Biggeri et al. 2015)
Loan	Currently household has an outstanding loan
Amount of Loan	Amount of the outstanding loan in Birr
Explanatory Variables	
Socioeconomic status	
CBHI*PSNP	Enrolled in the CBHI and the PSNP
CBHI	Enrolled in the CBHI
PSNP	Enrolled in the PSNP
Consumption quintiles	Classification of individuals based on monthly consumption expenditure (in Birr) excluding health care spending (poorest (1st) quintile), 2nd quintile, 3rd quintile, 4th quintile, richest (5th) quintile)
Education	Education level of an individual (no education, informal education, primary education, secondary and above education)
Land cultivated	Size of land cultivated in hectares
Household shock experience	Experience of any type of shock (health, natural, economic, social, institutional, market or other) in the twelve months preceding the survey.
Demographic traits	
Age	Age in complete years
Male	Male
Household size	Number of household members
Health status	
SAH-good	Self-assessed health is rated as good (includes very good and excellent)
SAH- not good	Self-assessed health is rated as not good (includes average)
Past illness event	Total number of days ill in the two months preceding the survey
Chronic Illness	Disease symptoms have persisted for more than 30 days
Financial participation and networks	
Savings in bank account	At least one member of the household has savings in bank account
Member of iqqub	At least one member of the household participates in iqqub
Member of credit & saving association	At least one member of the household participates in credit and saving association
Official position held	At least one member of the household held or still holds official (kebele or traditional) position.

Table A3
Effect of CBHI and PSNP on health care utilization and off-farm labour supply

Variables	Modern healthcare utilization (1/0)	Number of visits to modern health facility	Participation in Off-Farm Work (1/0)	Number of Hours worked in Off-Farm
Socioeconomic status				
CBHI*PSNP	0.046**	0.037	0.067***	10.90***
	(0.019)	(0.039)	(0.024)	(2.80)
CBHI	0.023*	0.071***	0.008	-0.57
	(0.012)	(0.0242)	(0.010)	(1.34)
PSNP	-0.017	-0.034	0.130***	6.12***
	(0.013)	(0.025)	(0.019)	(2.20)
2nd Consumption Quintile (Ref: 1st Quintile)	0.005	0.006	-0.001	1.67
	(0.010)	(0.021)	(0.010)	(1.27)
3rd Consumption Quintile	0.011	0.029	0.002	1.30
	(0.011)	(0.021)	(0.010)	(1.23)
4th Consumption Quintile	0.015	0.029	-0.001	1.86
	(0.012)	(0.023)	(0.010)	(1.37)
5th Consumption Quintile	0.018	0.057**	-0.001	2.42
	(0.012)	(0.025)	(0.012)	(1.49)
Informal Education (Ref: No Education)	0.025	0.030	0.009	3.34*
	(0.018)	(0.036)	(0.015)	(1.89)
Primary Education	0.011	0.043	0.018	1.13
	(0.015)	(0.030)	(0.015)	(1.74)
Secondary & above Education	0.013	0.051	0.032	3.47
	(0.022)	(0.046)	(0.021)	(2.69)
Demographic characteristics				
Household size	0.004	0.014	-0.004	-0.62
	(0.005)	(0.010)	(0.004)	(0.52)
Land cultivated	-0.013**	-0.021*	-0.001	-0.16
	(0.006)	(0.011)	(0.005)	(0.58)
Experienced shock	0.048***	0.087***	0.022***	0.89
	(0.007)	(0.013)	(0.008)	(1.03)
Financial participation and networks				
Saving in bank account	0.003	0.003	0.020*	1.30
	(0.013)	(0.023)	(0.011)	(1.40)
Member of Iqqub	-0.007	-0.030	-0.011	-3.66*
	(0.016)	(0.033)	(0.017)	(2.02)
Member of credit & saving association	0.024	0.011	0.019	3.48**
	(0.015)	(0.030)	(0.012)	(1.71)
Official position held	0.017	0.018	0.006	1.03
	(0.011)	(0.020)	(0.009)	(1.04)
N	12,820	12,820	12,820	12,820
Adj. R-sq	0.012	0.014	0.031	0.023

Notes: Full estimates from specifications for Columns 2-5 of Tables 11a and 11b. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4
Effect of CBHI and PSNP on asset accumulation

Variables	Value of Livestock Assets (Birr)	Loan Uptake (1/0)	Amount of Loan (Birr)
Socioeconomic status			
CBHI*PSNP	886.4**	-0.013	-1280.0***
	(422.7)	(0.031)	(226.8)
CBHI	-176.2	-0.033**	619.3***
	(313.8)	(0.016)	(134.2)
PSNP	7.16	-0.012	45.18
	(399.4)	(0.023)	(238.0)
2nd Consumption Quintile (Ref: 1st Quintile)	352.1	-0.027*	-14.89
	(255.5)	(0.014)	(109.3)
3rd Consumption Quintile	981.8***	0.002	129.2
	(267.4)	(0.015)	(143.5)
4th Consumption Quintile	1501.3***	-0.017	-386.6**
	(287.0)	(0.016)	(158.5)
5th Consumption Quintile	1974.6***	-0.001	139.8
	(316.9)	(0.017)	(185.1)
Informal Education (Ref: No Education)	1241.0***	0.033	-334.0*
	(421.3)	(0.022)	(199.0)
Primary Education	890.9**	-0.002	-218.1
	(394.3)	(0.020)	(262.6)
Secondary & above Education	1897.6***	-0.019	-889.3*
	(627.1)	(0.035)	(535.4)
Demographic characteristics			
Household size	763.5***	0.005	195.6***
	(112.3)	(0.006)	(68.39)
Land cultivated	1928.0***	-0.008	-0.804
	(199.2)	(0.007)	(85.41)
Experienced shock	-611.7***	0.049***	-192.2*
	(211.4)	(0.012)	(115.8)
Financial participation and networks			
Saving in bank account	893.9***	0.0165	59.78
	(327.2)	(0.015)	(109.1)
Member of Iqqub	686.1*	-0.043**	16.36
	(379.8)	(0.020)	(170.2)
Member of credit & saving association	-32.74	0.261***	297.4**
	(339.2)	(0.021)	(132.4)
Official position held	359.1	0.009	-111.1
	(265.4)	(0.014)	(116.6)
N	12,820	12,820	3,840
Adj. R-sq	0.049	0.043	0.176

Notes: Full estimates from specifications for Columns 6-8 of Tables 11a and 11b. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5
Effect of CBHI and PSNP on health care utilization: Children, older adults and full sample

	Children (<15 years)		Older adults (65 and above)		Full sample	
	Modern health care utilization (1/0)	Number of visits to modern health facility	Modern health care utilization (1/0)	Number of visits to modern health facility	Modern health care utilization (1/0)	Number of visits to modern health facility
CBHI*PSNP	0.033**	0.046*	0.117	0.269	0.041***	0.042*
	(0.016)	(0.027)	(0.098)	(0.194)	(0.013)	(0.025)
CBHI	-0.001	-0.006	0.014	-0.034	0.013*	0.037**
	(0.010)	(0.015)	(0.060)	(0.116)	(0.008)	(0.015)
PSNP	-0.010	-0.008	-0.096*	-0.144	-0.013	-0.023
	(0.011)	(0.018)	(0.055)	(0.121)	(0.009)	(0.016)
N	9,029	9,012	835	825	23,255	23,133
Adj. R-sq	0.006	0.004	0.025	0.009	0.008	0.008

Notes: Specifications include individual fixed effects, time fixed effects, woreda-specific time trends, socioeconomic characteristics (consumption quintiles, education, crop land ownership and experience of shock), time-varying demographic characteristics (household size) and access to formal and informal financial institution. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6
Effect of CBHI on health care utilization, off-farm labour supply and asset accumulation: PSNP sub-sample

	Modern health care utilization (1/0)	Number of visits to modern health facility	Participation in off-farm work (1/0)	Number of hours worked off-farm	Value of livestock assets (Birr)	Loan uptake (1/0)	Outstanding loan (Birr)
CBHI	0.040*	0.041	0.10***	8.03**	78.59	-0.014	-433.9*
	(0.023)	(0.042)	(0.031)	(3.86)	(463.9)	(0.039)	(216.8)
N	2,590	2,590	2,590	2,590	2,590	2,590	1,067
Adj. R-sq	0.021	0.010	0.036	0.042	0.0061	0.041	0.140

Notes: Specifications include individual fixed effects, time fixed effects, socioeconomic characteristics (consumption quintiles education, crop land ownership and experience of shock), time-varying demographic characteristics (household size) and access to formal and informal financial institution. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A7
Effect of CBHI and PSNP on health care utilization by source

	Modern health care utilization (1/0)	Modern health care utilization from Health Centers (1/0)	Modern health care utilization from Health Post (1/0)	Modern health care utilization from Public Providers (1/0)	Modern health care utilization from Private Providers (1/0)
CBHI* PSNP	0.046**	0.034**	0.002	0.041**	0.006
	(0.019)	(0.016)	(0.005)	(0.018)	(0.008)
CBHI	0.023*	0.033***	-0.0001	0.025**	0.0003
	(0.012)	(0.010)	(0.003)	(0.011)	(0.006)
PSNP	-0.017	-0.028***	0.004	-0.031**	0.009**
	(0.013)	(0.011)	(0.005)	(0.012)	(0.005)
N	12,820	12,820	12,820	12,820	12,794
Adj. R-sq	0.012	0.010	0.001	0.010	0.003

Notes: Specifications include individual fixed effects, time fixed effects, woreda-specific time trends, socioeconomic characteristics (consumption quintiles, education, crop land ownership and experience of shock), time-varying demographic characteristics (household size) and access to formal and informal financial institution. Standard errors in pare

Table A8
Effect of CBHI and PSNP on livestock assets: livestock & borrowing

	Value of livestock assets (Birr)	Loan Uptake (1/0)	Amount of loan (Birr)
CBHI*PSNP	963.0	-0.010	-856.3***
	(731.9)	(0.046)	(280.2)
CBHI	-222.0	-0.042*	430.4*
	(435.7)	(0.025)	(238.0)
PSNP	103.0	-0.019	134.9
	(759.1)	(0.039)	(302.5)
N	4,589	4,589	1,323
Adj. R-sq	0.024	0.040	0.125

Notes: Specifications include fixed effects, time fixed effects, woreda-specific time trends, socioeconomic characteristics (consumption quintiles, household head education and crop land ownership), time-varying demographic characteristics (household size and composition), access to formal and informal financial institution. Standard errors in parentheses are clustered at kebele level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.ntheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.