

Linking social protection schemes: The joint effects of a public works and a health insurance program in Ethiopia

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Abstract

In developing countries and in particular in Sub-Saharan Africa, social protection schemes tend to operate in silos. However, schemes targeting the same geographical areas may have synergies that have not yet been examined. This paper contributes to this knowledge gap by examining the joint impacts of two social protection programmes in Ethiopia, that is, the Productive Safety Net Program and a Community Based Health Insurance Scheme. Based on three rounds of individual-level panel data and several rounds of qualitative interviews, we find that individuals covered by both programs, as opposed to neither or only one of the two programs, provide greater labor supply, have larger livestock holdings and have a lower amount of outstanding loans. Furthermore, joint participation is associated with greater use of modern health care facilities. These results show that bundling of interventions enhances protection against multiple risks and that linking social protection schemes yields more than the sum of their individual effects.

Key words: Ethiopia, Productive Safety Net Program, Community Based Health Insurance Scheme, joint effect, Sub-Saharan Africa

JEL Codes: J22, I15, O20

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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 protection may require the simultaneous implementation of multiple social protection interventions.

There is a large literature that 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 food consumption, health and educational outcomes (Hidrobo et al., 2018; Behrman and Hoddinott, 2005; Burchi et al., 2016; Fiszbein and Schady, 2009; Gertler, 2004), the effect of public works programs on asset-building, climatic risks and food security (Hidrobo et al., 2018; Anderson et al., 2011; Gilligan et al., 2009; Subbarao, 1997; Ravallion, 1991) and the effect of health insurance schemes on health care utilization and financial protection on the one hand (Strupat and Klohn, 2018; Limwattananon et al., 2015; Mebratie et al., 2013; 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, studies, which have examined the inter-linkages and the joint effects of participating in different social protection programs on welfare outcomes, are scarce. In contrast, there is a comparatively well-developed literature, which has examined the interlinkages between agricultural interventions and social protection programs, although papers

on Africa even in this literature are limited.¹ For instance, Pace et al. (2017) use difference-in-difference (DiD) with propensity score matching to analyze 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. Despite the lack of explicit coordination between the two programs, the authors find that the joint effect of participating in both programs increases total expenditure per adult equivalent by 24% as compared to the baseline mean for households who participate in both the programs and the value of production increases by at least 70% of the baseline mean. Daidone et al. (2017) also use a DiD approach to examine the joint effect of a homestead gardening program which targeted households who were eligible for a child grants program. They conclude that the positive effects of the programs on productive agricultural activities may be attributed to the joint effect of the two schemes. Turning to Ethiopia, in an evaluation that relied on propensity score matching, Gilligan et al. (2009) examined the joint effects of the Productive Safety Net Program (PSNP) and an agricultural intervention - Other Food Security Program (OFSP), and found that, among other effects, access to both programs enhanced food security and increased the use of agricultural technologies. However, access to both programs did not lead to faster asset growth as compared to households that did not have access to either of the programs. In a related paper, Hoddinott et al. (2012) used a dose-response model to investigate the joint effect of being a beneficiary of both the PSNP and the OFSP as compared to participation only in the PSNP. They find that participation in both programs tends to enhance agricultural investments.

Closest to the theme of this paper which deals with the joint effects of social protection programs, Jensen et al. (2017) examine the comparative individual effects as well as explore the

¹ Soares et al. (2016) provide a 37-study review of the combined effects of agricultural and social protection interventions. Of the studies included in their review, nine are from Africa of which four focus on Ethiopia. Agricultural interventions include programs that provide for instance, improved seeds, fertilizer and credit subsidies, extension services, and livestock transfers. Social protection programs include cash transfers, health and nutrition interventions, insurance schemes, public works programs.

joint impacts of a cash transfer program and a livestock insurance scheme in Northern Kenya. They find no evidence of positive synergies and attribute this to the minor overlap in coverage between the two programs. 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 focuses on Ethiopia, there are differences in terms of the scheme interactions that we explore and the context.²

Motivated by the findings that PSNP participants are substantially more likely to enrol in a Community Based Health Insurance (CBHI) scheme (Shigute et al. 2017) and by the limited research on the impacts of multiple social interventions, this paper examines the interplay between the CBHI and PSNP. In particular, the paper investigates 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. Consistent with the motivation for launching the CBHI and PSNP, we focus on the effects of the schemes on modern health care utilization, off-farm labor supply, livestock assets, loan uptake and the value of outstanding loans.³

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

² 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.

³ We focus on livestock assets as a measure of wealth as according to Dercon (2004), “livestock is by far the most important marketable asset and typically is accounting for more than 90% of the value of assets in rural Ethiopia”.

informant interview and focus group discussions conducted in 2012, 2014 and 2017. Our analysis of both sources of information yields a consistent picture.

We find that both programs complement each other and generate synergies. Individuals covered by both programs, as opposed to neither or only one of the two programs, provide more off-farm labor, have higher livestock wealth and have a lower amount of outstanding loans. Furthermore, joint participation is associated with greater use of modern health care facilities. Thus, our results indicate that the co-ordination of a public works and a health insurance scheme affords greater protection to vulnerable households.

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

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 based on 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 based on their labor contributions to public works projects.⁴ 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)

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

⁴The 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 tons of food.

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. For instance, 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.⁵ In particular, Yilma et al. (2014) show that households finance health care, in decreasing order of importance, by dissaving, asset sales and borrowing.⁶

In response to this situation, in June 2011, in an attempt to enhance access to health care and help defray costs while at the same time prevent the use of harmful coping strategies (asset sales, borrowing), the government launched, a voluntary CBHI. The pilot scheme was launched in 13 districts, of which nine were classified as food insecure and were covered by the PSNP.⁷ 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) vary between Birr 10.50 (US\$ 0.56) and Birr 15 (US\$0.80) per month with an additional monthly premium of 2.10 to 3 Birr per non-core household members. 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).

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 rollout phase

⁵ 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. Employer and other private insurance schemes cover the remainder (about 2%).

⁶ Support from social networks is limited and households do not appear to resort to increasing labor supply or reducing consumption.

⁷ The pilot CBHI was offered to about 300,000 households or about 1.8 million individuals.

involved a two-step process. First, the community decides 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.⁸

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 nine 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.

We also collected three rounds of qualitative information through key informant interviews and FGDs. These were conducted in 2012, 2014 and in 2017. Among other topics, these interviews

⁸ The year-specific number of observations is 4,332 individuals in 2011; 4,337 in 2012; 4,151 in 2013 (see Table 3).

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 towards not only enhancing access to health care and reducing out-of-pocket payments for medical services but will also allow households to reduce their reliance on borrowing and avoid asset sales.⁹

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, 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. Despite the

⁹ 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.

fact that the two schemes are not programmatically linked, the large effect of PSNP participation on CBHI uptake may be attributed to the keen sense of the links between the two programs as perceived by local 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 enrol. 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 enrol but local 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 labor contributions, which are needed to build rural infrastructures 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 PSNP participants who did not enrol in the CBHI.

The potential links between the two programs are not restricted to officials and a FGD participant in Oromia remarked,

“I can feed my family with the payment I get from PSNP public works 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 enrol. 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 enrol in the scheme” [Discussed in September 2014].

Similarly, a FGD 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 increase 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 programmes 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.¹⁰ With regard to assets, in the empirical work we focus on livestock, as it is the most important asset for Ethiopian rural households.

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 supply, livestock assets and borrowing.¹¹ 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 $PSNP$ indicate participation in either of the two programs, X_{ijt} is a vector of time-varying observables.¹² 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.¹³ The main coefficient of interest is β which indicates

¹⁰ 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 increases 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.

¹¹ Essentially, we look at four different outcomes. However, for some of the outcomes we have measures of incidence and intensity.

¹² 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.

¹³ As shown in Table A1, the sample is divided into three sets of woredas - those that 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.

the additional effect of participating in both the PSNP and the CBHI as compared to participating in only one of the two schemes.¹⁴

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 based on 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. While equation (1) includes individual fixed effects and controls for time-varying socio-economic attributes, it is still possible that unobserved time-varying factors such as changes in health status, which influence the outcomes of interest, also drive CBHI uptake.¹⁵ 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.

¹⁴ The specification used here to identify the joint effect of the two programs differs from that used in Pace et al. (2017). In their specification, the sample is divided into four mutually exclusive groups and their variable indicating joint participation takes on a value 1 and 0 otherwise and is not an interaction term. In our case, we use an interaction term. Regardless of the specification used, the results are not different.

¹⁵ As a robustness check, we also estimate specifications that 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.

5. Results

5.1 PSNP and CBHI - Uptake

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 (see Table 1). While the aggregate PSNP enrolment figures do not exhibit much variation over time, this is misleading, as over the three years it is not the same individuals who remain in the scheme. Some individuals graduate from the scheme while others join the scheme. With regard to the CBHI, 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 enrolls in the PSNP and the CBHI?

Table 4 provides descriptive statistics conditional on program status at baseline, that is, before the launch of the CBHI.¹⁶ The figures show a clear hierarchy in terms of socio-economic status and program participation. For instance, 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. Individuals belonging only to the CBHI are at the top rung, followed by those who are not members of 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. There is no evidence

¹⁶ Table 6 provides descriptive statistics conditional on program status for the full sample.

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 CBHI or both schemes.

Multinomial logit estimates of the probability of being in the four categories (Table 5) 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, those who participate in both programs have substantially lower livestock holdings and are far more likely to be engaged in off-farm work (see Table 4). At baseline, their utilization of health care is also 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 groups is strongly linked to socio-economic status and not to health status. The empirical estimates presented in the next section do control for a range of time-varying attributes, including socio-economic status and for individual fixed-effects. 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 are presented in Table 7.¹⁷ We begin with a discussion of the effect of the two schemes on health care utilization. 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 a 4.6 percentage point increase in the use of health care for those who belong to both programs as compared to those who belong to one of the two programs. 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 7 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 (see Table 2) 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 7, 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, the additional effect of

¹⁷ The detailed estimates are provided in Tables A3 and A4.

participating in both programs as compared to one of the two is positive and statistically significant (7 percentage points).

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 11 more hours per month to off-farm activities as compared to those who participate only in one of the two programs. 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 may reduce health-related absenteeism in public work activities of the PSNP.

On their own, the two social programs do not have an impact on the value of livestock assets (see Table 7). This is consistent with the findings on the effect of the CBHI on livestock assets as reported in Yilma et al. (2015) and also the effect of the PSNP on livestock assets as reported in Andersson et al. (2011).¹⁸ In contrast, belonging to both 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 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 28 percent reduction in debt.¹⁹

¹⁸ 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.

¹⁹ We also estimated household level regressions of livestock and borrowing (see Table A9). 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.

Overall, for almost all the outcomes, the interaction term is statistically significant and large implying that the joint effect of the two programmes is larger than the sum of the individual effects. These estimates suggest that the PSNP and the CBHI may be used as complementary instruments for enhancing health care utilization, off-farm labor supply, protecting household assets and reducing indebtedness.

5.4 Robustness checks

As has been shown in Table 4, 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 three robustness checks carried out to probe the sensitivity of the estimates.

First, we restricted the sample only to those who participate in the PSNP. As shown in Table 4, at baseline, those who participate only in the PSNP have similar characteristics as compared to those who participate in both programs.²⁰ While not as crisp as those reported in Table 7, 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 labor contribution in terms of hours of work is 31% 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.

²⁰ 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 0.374. Individually, none of the outcome variables are statistically different at least at the 5% level.

Second, we estimated the probability of enrolling in the CBHI as a function of characteristics at baseline and obtained estimates of the probability of enrolling in the program. Subsequently, we restricted the PSNP sub-sample to observations on common support and estimated a propensity-score weighted specification of equation (1). As shown in Table A7, estimates based on the reweighted sub-sample are very similar to those reported in Table A6.

Finally, 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 A8 show that this is not the case. The effects we identify emanate entirely from an increase in health care utilization from publicly financed health services and specifically from publicly run health centers as opposed to health posts and private clinics.

6. Discussion and concluding remarks

In developing countries and in particular in Sub-Saharan Africa, social protection schemes tend to operate in silos. However, the mutually reinforcing negative effects of the different types of risks, especially those confronting rural households in developing countries suggests that effective social protection may require multiple coordinated interventions. So far, the empirical literature on the joint effects of social protection schemes is limited. However, schemes targeting the same geographical areas of a country offer an opportunity to identify the potential of linking social protection schemes.

This paper exploited the geographical overlap of the Productive Safety Net Program (PSNP) and the Community Based Health Insurance (CBHI), two large social protection interventions in Ethiopia, to examine their joint effect on health care utilization, off-farm labor supply, livestock assets and outstanding loans. The analysis was based on three rounds of panel

data and informed by several rounds of qualitative interviews. We exploited the panel data, baseline and two follow-up surveys and controlled for individual and time fixed-effects as well as a range of time-varying traits to provide arguably credible estimates.

Despite the fact that the two social protection schemes are not formally linked, the qualitative interviews revealed that village-level officials were aware of the potential complementarities between the PSNP and the CBHI. Consistent with the expectations and actions of these officials we found that participating in both programs yields substantial additional benefits. Specifically, individuals who participate in both programs, as opposed to neither, 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 4 percent increase in livestock and a 28 percent decline in debt. Except for the effect on livestock, the estimates were not sensitive to a number of robustness checks. Despite this, given the targeted nature of the PSNP and voluntary enrolment into the CBHI we do not claim that these are causal effects, but estimates that are robust to a variety of confounding factors.

Our results demonstrate that at least in Ethiopia not only may participation in a public works programme be used to leverage greater uptake of health insurance, but that the existing village-level co-ordination of the two social protection interventions generates synergies and does provide greater protection to vulnerable households. The results of this paper support the idea that systematic linking of social protection schemes currently operating in Ethiopia, as envisaged among others by UNICEF (2016), are likely to generate positive effects. Indeed, 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 the combination of the two programs delivers more than the sum of the individual effects.

References

- Andersson, C., A. Mekonnen and J. Stage (2011) 'Impacts of the Productive Safety Net Program in Ethiopia on Livestock and Tree Holdings of Rural Households', *Journal of Development Economics* 94(1): 119-126.
- Banerjee, A., E. Duflo and R. Hornbeck (2014) 'Bundling Health Insurance and Microfinance in India: There Cannot be Adverse Selection if there is no Demand', *American Economic Review* 104(5): 291-297.
- Behrman, J.R. and J. Hoddinott (2005) 'Programme Evaluation with Unobserved Heterogeneity and Selective Implementation: The Mexican PROGRESA Impact on Child Nutrition', *Oxford Bulletin of Economics and Statistics* 67(4): 547-569.
- Berhane, G., J. Hoddinott, N. Kumar and A.S. Taffesse (2011) 'The Impact of Ethiopia's Productive Safety Nets and Household Asset Building Programme: 2006–2010', USAID, Washington, DC http://pdf.usaid.gov/pdf_docs/pnaec785.pdf Last retrieved on 15-07-2017.
- Berhane, G., J. Hoddinott and N. Kumar (2014) 'The Productive Safety Net Programme and the Nutritional Status of Pre-School Children in Ethiopia—preliminary Results', paper presented at DFID, Addis Ababa, August 2014.
- Biggeri, M., Burchi, F., Ciani, F., Herrmann, R. and Mauro, V. (2015), 'Impact Evaluation of the Durum Wheat Value Chain Development Project in Rural Ethiopia', paper presented at Pegnet Conference, Berlin, October 2015.
- Burchi, F., Scarlato, M. and D'Agostino, G. (2016), 'Addressing Food Insecurity in sub-Saharan Africa: The role of Cash Transfers', DIE Discussion Paper 17/2016.
- Daidone, S., B. Davis, J. Dewbre, B. Miguez, O. Niang and L. Pellerano (2017) 'Linking Agriculture and Social Protection for Food Security: The Case of Lesotho', *Global Food Security* 12: 146-154.
- Dercon, S. (2004) 'Growth and shocks: evidence from rural Ethiopia', *Journal of Development Economics* 74(2): 309-329.
- Di Falco, S., Veronesi, M. and Yesuf, M. (2011). 'Does adaptation to climate change provide food security? A micro-perspective from Ethiopia', *American Journal of Agricultural Economics* 93(3): 825-842.
- Escobar, M., C.C. Griffin and R.P. Shaw (2011) 'The Impact of Health Insurance in Low-and Middle-Income Countries'. *Brookings Institution Press*, Washington, DC, The Brookings Institution.
- Federal Democratic Republic of Ethiopia (2012), '2007 Population and Housing Census of Ethiopia', Administrative Report, Central Statistical Authority, April 2012, Addis Ababa, Ethiopia.
- Federal Ministry of Health Ethiopia (2014) 'Ethiopia's Fifth National Health Accounts 2010/2011', Addis Ababa, Ethiopia.
- Federal Ministry of Health Ethiopia (2010) 'Health Sector Development Programme IV: 2010/11-2014/15', <https://phe-ethiopia.org/admin/uploads/> Last retrieved on 10-05-2017.

- Federal Ministry of Health (2011) 'Health and Health Related Indicators for 2003 EC (2011 GC),' http://www.cnhde.org.et/wp-content/uploads/2013/04/Ind_2003.pdf. Last retrieved on 15-7-2017.
- Fiszbein, A. and N.R. Schady (2009) 'Conditional Cash Transfers: Reducing Present and Future Poverty', *A World Bank Policy Research Report*, The International Bank for Reconstruction and Development. The World Bank. <https://doi.org/10.1596/978-0-8213-7352-1>
- Gertler, P. (2004) 'Do Conditional Cash Transfers Improve Child Health? Evidence from PROGRESA's Control Randomized Experiment', *American Economic Review* 94(2): 336-341.
- Gilligan, D.O., J. Hoddinott and A.S. Taffesse (2009) 'The Impact of Ethiopia's Productive Safety Net Program and its Linkages', *Journal of Development Studies* 45(10): 1684-1706.
- Hamid, S.A., J. Roberts and P. Mosley (2011) 'Can Micro Health Insurance Reduce Poverty? Evidence from Bangladesh', *Journal of Risk and Insurance* 78 (1): 57-82.
- Hidrobo, M., J. Hoddinott, N. Kumar and M. Olivier (2018) 'Social Protection, Food Security, and Asset Formation', *World Development* 101: 88-103.
- Hoddinott, J., G. Berhane, D.O. Gilligan, N. Kumar and A. Seyoum Taffesse (2012) 'The Impact of Ethiopia's Productive Safety Net Programme and Related Transfers on Agricultural Productivity', *Journal of African Economies* 21(5): 761-786.
- Jensen, N.D., C.B. Barrett and A.G. Mude (2017) 'Cash Transfers and Index Insurance: A Comparative Impact Analysis from Northern Kenya', *Journal of Development Economics* 129: 14-28.
- Limwattananon, S., S. Neelsen, O. O'Donnell, P. Prakongsai, V. Tangcharoensathien, E. Van Doorslaer (2015) 'Universal Coverage with Supply-Side Reform: The Impact on Medical Expenditure Risk and Utilization in Thailand', *Journal of Public Economics* 121: 79-94.
- Mebratie, A.D., Sparrow, R., Yilma, Z., Alemu, G., Bedi, A.S., (2015), 'Enrollment in Ethiopia's community-based health insurance scheme', *World Development*, 74 (10), 58-76.
- Mebratie, A.D., R. Sparrow, Z. Yilma, D. Abebaw, G. Alemu and A. Bedi (2013) 'Impact of Ethiopian Pilot Community-Based Health Insurance Scheme on Health-Care Utilisation: A Household Panel Data Analysis', *The Lancet* 381: S92.
- Ministry of Agriculture (2014) 'Productive Safety Net Programme 4 Design Document', Addis Ababa, Ethiopia, Disaster Risk Management and Food Security Sector Food Security Coordination Directorate, Addis Ababa, Ethiopia.
- Ministry of Agriculture and Rural Development (2011) 'Productive Safety Net and Household Asset Building Programs, Annual Work Plan and Budget for 2011/12 (2004EFY) ', Addis Ababa, Ethiopia, Disaster Risk Management and Food Security Sector Food Security Coordination Directorate.
- Ministry of Agriculture and Rural Development (2010) 'Productive Safety Net Program, Program Implementation Manual', Addis Ababa, Ethiopia, Federal Government of Ethiopia.
- Ministry of Agriculture and Rural Development (2009b) 'Productive Safety Net Program, 2010-2014 Plan', Addis Ababa, Ethiopia: Federal Government of Ethiopia.

- Ministry of Agriculture and Rural Development (2009a) 'Food Security Program, 2010-2014 Plan', Addis Ababa, Ethiopia, Federal Government of Ethiopia.
- Ministry of Agriculture and Rural Development (2005) 'Community Based Participatory Watershed Guideline', Addis Ababa, Ethiopia, Federal Government of Ethiopia.
- Pace, N., Daidone S., Davis B., Handa S., Knowles M., Pickmans R. (2017) 'One plus one can be greater than two: Evaluating synergies of development programmes in Malawi' *The Journal of Development Studies*, doi: 10.1080/00220388.2017.1380794.
- Pagán, J.A., A. Puig and B.J. Soldo (2007) 'Health Insurance Coverage and the use of Preventive Services by Mexican Adults', *Health Economics* 16(12): 1359-1369.
- Ranson, M.K., Sinha, T., Chatterjee, M., Acharya, A., Bhavsar, A., Morris, S.S. & Mills, A.J. (2006) 'Making health insurance work for the poor: learning from the Self-Employed Women's Association's (SEWA) community-based health insurance scheme in India', *Social Science and Medicine* 62(3): 707-720.
- Ravallion, M., (1991) 'Reaching the rural poor through public employment: arguments, evidence, and lessons from South Asia', *The World Bank Research Observer*, 6(2): 153-175.
- Shigute, Z., A.D. Mebratie, R. Sparrow, Z. Yilma, G. Alemu, and A.S. Bedi (2017). 'Uptake of health insurance and the productive safety net program in rural Ethiopia', *Social Science and Medicine*, 176: 133-141.
- Soares, F.V., M. Knowles, S. Daidone and N. Tirivayi (2016) 'Combined Effects and Synergies between Agricultural and Social Protection Interventions: What is the Evidence so Far', *Food and Agriculture Organization, Rome*. <http://www.fao.org/3/a-i6589e.pdf>. Last retrieved on 28-11-2017.
- Strupat, C. and F. Klohn (2018). 'Crowding out of Solidarity? Public Health Insurance versus Informal Transfer Networks in Ghana'. forthcoming *World Development*.
- Subbarao, K. (1997) 'Public Works as an Anti-Poverty Program: An Overview of Cross-Country Experience', *American Journal of Agricultural Economics* 79(2): 678-683.
- Tilahun, H., Teklu, E., Michael, M., Fitsum, H. and Awulachew, S. B. (2011) 'Comparative performance of irrigated and rainfed agriculture in Ethiopia', *World Applied Sciences*, 14(2), 235-244.
- UNICEF (2016) 'Ethiopia Social Protection: Access of the Poor and Vulnerable to Basic Social Services. Good Practices: Linking safety net clients with complementary social services', UNICEF-Ethiopia, https://www.unicef.org/ethiopia/ECO_REPOM_Access_of_the_poor_and_vulnerable_interactive.pdf. Last retrieved on 15-10-2017.
- Wagstaff, A. and M. Pradhan (2005) 'Insurance Health Impacts on Health and Non-Medical Consumption in a Developing Country', The World Bank, *Policy Research Working Paper*, 3563, Washington DC.
- Yilma, Z., A. Mebratie, R. Sparrow, M. Dekker, G. Alemu and A.S. Bedi (2015) 'Impact of Ethiopia's Community Based Health Insurance on Household Economic Welfare', *The World Bank Economic Review* 29: S164-S173.

Yilma, Z., A. Mebratie, R. Sparrow, D. Abebaw, M. Dekker, G. Alemu et al. (2014) 'Coping with Shocks in Rural Ethiopia', *Journal of Development Studies* 50(7): 1009-1024.

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 (64.6)	1,035 (38.2)	1,445 (43.2)	380 (72.2)	1,260 (46.4)	1640 (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 membership status

Variables	Total Sample	CBHI* PSNP	CBHI	PSNP	No Program	<i>p</i> -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
Amount of loan (Birr)	2186.23	2052.73	2340.87	2485.57	2040.97	0.94
Covariates						
<i>Socioeconomic status</i>						
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
<i>Demographic characteristics</i>						
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 5
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				
2 nd Consumption Quintile (Ref: Poorest Quintile)	0.058*** (0.018)	-0.024** (0.010)	-0.012** (0.005)	-0.022*** (0.006)
3 rd Consumption Quintile	0.036*** (0.011)	0.031*** (0.011)	-0.031*** (0.002)	-0.036*** (0.002)
4 th Consumption Quintile	0.030*** (0.010)	0.023** (0.010)	-0.019*** (0.003)	-0.034*** (0.005)
5 th Consumption Quintile	0.020** (0.009)	0.089*** (0.008)	-0.046*** (0.003)	-0.062*** (0.004)
Informal Education (Ref: No Education)	-0.057** (0.027)	0.037** (0.017)	0.014*** (0.005)	0.006 (0.013)
Primary Education	-0.035*** (0.009)	0.018 (0.014)	0.007 (0.008)	0.009 (0.008)
Secondary & above Education	-0.021 (0.020)	0.007 (0.023)	-0.003 (0.011)	0.017 (0.012)
Land Cultivated	-0.004 (0.005)	0.061*** (0.004)	-0.022*** (0.002)	-0.036*** (0.003)
Experienced Shock	0.067*** (0.009)	-0.024** (0.012)	-0.005 (0.007)	-0.037*** (0.003)
Demographic characteristics				
Age	-0.0004 (0.0006)	-0.0002 (0.0005)	-0.00001 (0.0001)	0.0006 (0.0004)
Male	0.016 (0.014)	0.0007 (0.011)	-0.006 (0.006)	-0.011* (0.006)
Household Size	-0.011*** (0.002)	0.020*** (0.001)	-0.007*** (0.0007)	-0.002*** (0.0008)
Religion-Orthodox (Ref. category: Muslim)	0.010 (0.010)	0.198*** (0.019)	-0.170*** (0.018)	-0.038*** (0.005)
Religion-Protestant	-0.142*** (0.031)	0.189*** (0.026)	-0.020** (0.008)	-0.027*** (0.006)
Religion- Other religion or no religion	0.111** (0.049)	-0.119** (0.050)	0.021 (0.016)	-0.013 (0.013)
Health status				
Self-assessed health –good (Reference not good SAH)	-0.048*** (0.016)	0.016 (0.013)	0.014*** (0.005)	0.018*** (0.002)
Past illness	-0.002* (0.001)	0.001 (0.002)	0.0003 (0.0004)	0.0004 (0.0005)
Chronic illness	0.016 (0.024)	0.001 (0.034)	0.009 (0.012)	-0.026*** (0.0032)
Financial participation and networks				
Saving in bank account	0.002 (0.019)	0.049*** (0.010)	-0.006 (0.008)	-0.045*** (0.005)
Member of Iqqub	-0.009 (0.018)	-0.034** (0.014)	0.031*** (0.005)	0.012** (0.005)
Member of credit and saving association	-0.053*** (0.004)	0.024 (0.017)	-0.037*** (0.008)	0.066*** (0.011)
Official position held	-0.049*** (0.009)	0.063*** (0.012)	-0.006** (0.002)	-0.008*** (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 6
Descriptive statistics by membership status – Full sample

Variables	Total Sample	CBHI* PSNP	CBHI	PSNP	No Program	<i>p</i> - 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
Amount of loan (Birr)	2499.16	2468.38	3314.12	2392.75	2307.13	0.19
Covariates						
<i>Socioeconomic status</i>						
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
<i>Demographic characteristics</i>						
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 religion or no religion	0.03	0.02	0.01	0.04	0.04	0.03
<i>Health status</i>						
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
<i>Financial participation and networks</i>						
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
<i>Regions</i>						
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 7
Effect of CBHI and PSNP on health care utilization, off-farm labor 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)
CBHI*PSNP	0.046** (0.019)	0.037 (0.039)	0.067*** (0.024)	10.90*** (2.80)	886.4** (422.7)	-0.013 (0.031)	-1280.0*** (226.8)
CBHI	0.023* (0.012)	0.07*** (0.024)	0.008 (0.010)	-0.57 (1.34)	-176.2 (313.8)	-0.033** (0.016)	619.3*** (134.2)
PSNP	-0.017 (0.013)	-0.034 (0.025)	0.130*** (0.019)	6.12*** (2.20)	7.16 (399.4)	-0.012 (0.023)	45.18 (238.0)
Joint effect vs. no program	0.052*** (0.019)	0.073** (0.037)	0.205*** (0.025)	16.45*** (2.82)	717.38* (432.93)	-0.057* (0.031)	-615.57** (281.56)
Joint effect vs. only PSNP	0.069*** (0.017)	0.108*** (0.033)	0.075*** (0.023)	10.32*** (2.64)	710.22* (381.75)	-0.046 (0.029)	-660.75*** (187.42)
Joint effect vs. only CBHI	0.029 (0.020)	0.003 (0.041)	0.197*** (0.026)	17.02*** (2.98)	893.53* (465.23)	-0.025 (0.032)	-1234.85*** (291.75)
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: The first three rows provide estimates based on equation 1, while estimates in the last three rows show the effects of participating in both programs compared to a specific control group. 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	
<i>Socioeconomic status</i>	
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 (1 st) quintile), 2 nd quintile, 3 rd quintile, 4 th quintile, richest (5 th) 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.
<i>Demographic traits</i>	
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
<i>Financial participation and networks</i>	
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, outpatient health care payment & off-farm labor supply

Variables	Modern healthcare utilization (1/0)	Number of visits to modern health facility	Participation in Off-Farm Work (1/0)
Socioeconomic status			
CBHI*PSNP	0.046** (0.019)	0.037 (0.039)	0.067*** (0.024)
CBHI	0.023* (0.012)	0.071*** (0.0242)	0.008 (0.010)
PSNP	-0.017 (0.013)	-0.034 (0.025)	0.130*** (0.019)
2 nd Consumption Quintile (Ref: 1 st Quintile)	0.005 (0.010)	0.006 (0.021)	-0.001 (0.010)
3 rd Consumption Quintile	0.011 (0.011)	0.029 (0.021)	0.002 (0.010)
4 th Consumption Quintile	0.015 (0.012)	0.029 (0.023)	-0.001 (0.010)
5 th Consumption Quintile	0.018 (0.012)	0.057** (0.025)	-0.001 (0.012)
Informal Education (Ref: No Education)	0.025 (0.018)	0.030 (0.036)	0.009 (0.015)
Primary Education	0.011 (0.015)	0.043 (0.030)	0.018 (0.015)
Secondary & above Education	0.013 (0.022)	0.051 (0.046)	0.032 (0.021)
Demographic characteristics			
Household size	0.004 (0.005)	0.014 (0.010)	-0.004 (0.004)
Land cultivated	-0.013** (0.006)	-0.021* (0.011)	-0.001 (0.005)
Experienced shock	0.048*** (0.007)	0.087*** (0.013)	0.022*** (0.008)
Financial participation and networks			
Saving in bank account	0.003 (0.013)	0.003 (0.023)	0.020* (0.011)
Member of Iqqub	-0.007 (0.016)	-0.030 (0.033)	-0.011 (0.017)
Member of credit & saving association	0.024 (0.015)	0.011 (0.030)	0.019 (0.012)
Official position held	0.017 (0.011)	0.018 (0.020)	0.006 (0.009)
N	12,820	12,820	12,820
<i>Adj. R-sq</i>	0.012	0.014	0.031

Notes: Full estimates from specifications for Columns 2-5 of Tables 7a and 7b. 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 off-farm labor supply & asset accumulation

Variables	Number of Hours worked in Off-Farm	Value of Livestock Assets (Birr)	Loan Uptake (1/0)	Amount of Loan (Birr)
Socioeconomic status				
CBHI*PSNP	10.90*** (2.80)	886.4** (422.7)	-0.013 (0.031)	-1280.0*** (226.8)
CBHI	-0.57 (1.34)	-176.2 (313.8)	-0.033** (0.016)	619.3*** (134.2)
PSNP	6.12*** (2.20)	7.16 (399.4)	-0.012 (0.023)	45.18 (238.0)
2 nd Consumption Quintile (Ref: 1 st Quintile)	1.67 (1.27)	352.1 (255.5)	-0.027* (0.014)	-14.89 (109.3)
3 rd Consumption Quintile	1.30 (1.23)	981.8*** (267.4)	0.002 (0.015)	129.2 (143.5)
4 th Consumption Quintile	1.86 (1.37)	1501.3*** (287.0)	-0.017 (0.016)	-386.6** (158.5)
5 th Consumption Quintile	2.42 (1.49)	1974.6*** (316.9)	-0.001 (0.017)	139.8 (185.1)
Informal Education (Ref: No Education)	3.34* (1.89)	1241.0*** (421.3)	0.033 (0.022)	-334.0* (199.0)
Primary Education	1.13 (1.74)	890.9** (394.3)	-0.002 (0.020)	-218.1 (262.6)
Secondary & above Education	3.47 (2.69)	1897.6*** (627.1)	-0.019 (0.035)	-889.3* (535.4)
Demographic characteristics				
Household size	-0.62 (0.52)	763.5*** (112.3)	0.005 (0.006)	195.6*** (68.39)
Land cultivated	-0.16 (0.58)	1928.0*** (199.2)	-0.008 (0.007)	-0.804 (85.41)
Experienced shock	0.89 (1.03)	-611.7*** (211.4)	0.049*** (0.012)	-192.2* (115.8)
Financial participation and networks				
Saving in bank account	1.30 (1.40)	893.9*** (327.2)	0.0165 (0.015)	59.78 (109.1)
Member of Iqqub	-3.66* (2.02)	686.1* (379.8)	-0.043** (0.020)	16.36 (170.2)
Member of credit & saving association	3.48** (1.71)	-32.74 (339.2)	0.261*** (0.021)	297.4** (132.4)
Official position held	1.03 (1.04)	359.1 (265.4)	0.009 (0.014)	-111.1 (116.6)
N	12,820	12,820	12,820	3,840
<i>Adj. R-sq</i>	0.023	0.049	0.043	0.176

Notes: Full estimates from specifications for Columns 6-8 of Tables 7a and 7b. 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** (0.016)	0.046* (0.027)	0.117 (0.098)	0.269 (0.194)	0.041*** (0.013)	0.042* (0.025)
CBHI	-0.001 (0.010)	-0.006 (0.015)	0.014 (0.060)	-0.034 (0.116)	0.013* (0.008)	0.037** (0.015)
PSNP	-0.010 (0.011)	-0.008 (0.018)	-0.096* (0.055)	-0.144 (0.121)	-0.013 (0.009)	-0.023 (0.016)
<i>N</i>	9,029	9,012	835	825	23,255	23,133
<i>Adj. R-sq</i>	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 various outcomes: 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* (0.023)	0.041 (0.042)	0.10*** (0.031)	8.03** (3.86)	78.59 (463.9)	-0.014 (0.039)	-433.9* (216.8)
N	2,590	2,590	2,590	2,590	2,590	2,590	1,067
<i>Adj. R-sq</i>	0.021	0.010	0.036	0.042	0.066	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 on various outcomes: weighted by propensity score and restricted to PSNP sub-sample on common support

	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)
CBHI	0.043* (0.025)	0.054 (0.046)	0.108*** (0.036)	7.86* (4.21)	41.02 (516.1)	-0.015 (0.043)	-426.5* (225.7)
N	2,028	2,028	2,028	2,028	2,028	2,028	688
<i>Adj. R-sq</i>	0.016	0.008	0.058	0.035	0.045	0.083	0.418

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 A8
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** (0.019)	0.034** (0.016)	0.002 (0.005)	0.041** (0.018)	0.006 (0.008)
CBHI	0.023* (0.012)	0.033*** (0.010)	-0.0001 (0.003)	0.025** (0.011)	0.0003 (0.006)
PSNP	-0.017 (0.013)	-0.028*** (0.011)	0.004 (0.005)	-0.031** (0.012)	0.009** (0.005)
<i>N</i>	12,820	12,820	12,820	12,820	12,794
<i>Adj. R-sq</i>	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 parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9
Effect of CBHI and PSNP on asset accumulation and loan usage

	Value of livestock assets (Birr)	Loan Uptake (1/0)	Amount of loan (Birr)
CBHI*PSNP	963.0 (731.9)	-0.010 (0.046)	-856.3*** (280.2)
CBHI	-222.0 (435.7)	-0.042* (0.025)	430.4* (238.0)
PSNP	103.0 (759.1)	-0.019 (0.039)	134.9 (302.5)
<i>N</i>	4,589	4,589	1,323
<i>Adj. R-sq</i>	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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.