ESSAYS ON EVALUATION OF SOCIAL PROTECTION PROGRAMMES IN ETHIOPIA

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To my late father, Shigute Shuka

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Acronyms

CBD	Community Based Development
CBHI	Community-Based Health Insurance
CBPWD	Community Based Participatory Watershed Development
CDD	Community Driven Development
EFSSs	Ethiopian Food Security Surveys
EHIA	Ethiopian Health Insurance Agency
FDRE	Federal Democratic Republic of Ethiopia
FGDs	Focus Group Discussions
FSP	Food Security Program
GDP	Gross Domestic Product
HABP	Household Asset Building Programme
KIIs	Key Informant Interviews
MoA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
MoH	Ministry of Health
MoLSA	Ministry of Labour and Social Affairs
OOP	Out-of-pocket
OSNP	Other Safety Net Programs
PSNP	Productive Safety Net Program
SNNPR	Southern Nations Nationalities and Peoples' Region
SRG	Structure Response Group
SWC	Soil and Water Conservation
TLU	Tropical Livestock Units
UHC	Universal Health Coverage

UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States Dollar
WB	World Bank
WEF	World Economic Forum
WHIA	Woreda Health Insurance Agency
WHO	World Health Organization

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Abstract

Fuelled by large scale investments in infrastructure, construction, and the forging of tighter links between agriculture and manufacturing, Ethiopia has recorded economic growth of about 10 percent per annum in the last ten years. Strong economic growth combined with relatively prudent economic management and greater ability at managing weather-related shocks have contributed to changing the image of a country known for "famines" to an example of a "developmental state". Throughout this period, the government has continued to develop and implement policies and strategies to enhance social protection. These interventions include, but are not limited to, a Disaster Risk Management strategy, Social Insurance (Pension) Program, Food Security Programs, particularly the extension of the Productive Safety Net Program (PSNP), a National Nutrition Program, Health Insurance schemes, in particular, a Community Based Health Insurance (CBHI) scheme for rural areas.

Despite strong economic growth and a wide range of social protection schemes, rural households remain vulnerable to shocks both at the individual and the aggregate level. Recognizing the interplay between different shocks whereby exposure to, for example, health shocks increases vulnerability to weather and climate related shocks, a recent trend in the country's social protection landscape has been to "bundle" or develop greater interlinkages between various schemes and to go beyond the "protection" motive of such schemes and to sustainably enhance household resilience to shocks. Emblematic of these motives are the country's flagship programs - the Productive Safety Net Program (PSNP) launched in 2005, and the pilot Community Based Health Insurance (CBHI) launched in 2011. The PSNP provides payments to food insecure households in exchange for labour which is used to build soil- and water-conserving rural infrastructure assets while the CBHI attempts to enhance access to health care and provide financial protection against health shocks.

Set against this background, and motivated by the "bundling" and "beyond social protection" rhetoric, this thesis, examines (i) the interactions between the Productive Safety Net Program (PSNP) and the Community Based Health Insurance (CBHI) scheme and (ii) whether these programs are able to deliver quality rural infrastructure assets. The first two essays deal with the "bundling" theme while essays 3 and 4 focus on going "beyond social protection".

The first essay examines whether the PSNP may be used to leverage uptake of the voluntary CBHI scheme and also reduce dropout? The essay is based on three rounds of household level panel data, one round of health facility survey and several rounds of qualitative information. The analysis shows that indeed, participating in the PSNP increases the probability of CBHI uptake by 24 percentage points and enhances scheme retention by 10 percentage points. The bulk of the effect may be attributed to pressure applied by government officials on PSNP beneficiaries. While the merits of using such an approach to enhance "voluntary" uptake are debatable, the findings do support the idea that membership in existing social protection programs may be used to address key challenges faced by developing countries in implementing voluntary health insurance schemes.

Flowing from the first essay and based on the same empirical base, the second essay investigates whether participation in both the PSNP and the CBHI enhances social protection. The key findings are that individuals who participate in both programmes, as opposed to neither, are 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 is associated with a 4 per cent increase in livestock and a 28 per cent decline in debt. In short, bundling of interventions enhances protection against multiple risks and linking social protection schemes yields more than the sum of their individual effects.

The third essay focuses on whether the CBHI scheme translates into higher health care quality. The essay draws on two rounds of a health facility survey and three rounds of household survey data. The analysis shows that CBHI affiliated facilities experience a 111 percent increase in the annual volume of out-patient visits and annual revenues from patient cards and drug sales increase by 184 and 76 percent, respectively. As part of a virtuous circle, the increased revenues are used to purchase drugs and medical equipment and translate into a decline in drug shortages and increases in patient satisfaction. Patient satisfaction amongst those who sought outpatient health care

from CBHI-contracted health centres is 11 percentage points higher as compared to those who received the service from non-contracted health centres. Furthermore, despite the increase in patient volume there is no discernible increase in waiting time to see medical professionals.

Building and maintaining durable infrastructure assets built through social protection programs is a costly issue faced by developing countries. Motivated by this issue, and paralleling the third essay, the fourth essay deals with the quality of public infrastructure built through the PSNP. Specifically, it examines the extent of community participation in 12 decisions regarding the PSNP and subsequently the effect of participation on the quality of infrastructure constructed through the PSNP. The essay is based on a cross- section survey of 249 soil and water conservation projects and includes technical assessments of the structure carried out by engineers as well as qualitative information gathered through interviews and discussions. The essay reveals high but variable rates of participation across communities and clearly shows that projects in which beneficiaries play a larger role in project monitoring and evaluation are substantially less likely to be damaged.

Overall, this thesis shows that at the very least, in Ethiopia, "bundling" of social protection schemes and community participation are scheme design factors that are worth considering. However, there is no reason to expect that such design elements or related variants cannot also be used in other developing countries.

Samenvatting

Grootschalige investeringen in de infrastructuur en de bouw en nauwere banden tussen landbouw en industrie hebben de afgelopen tien jaar in Ethiopië geresulteerd in een economische groei van ongeveer 10 procent per jaar. Een sterke economische groei in combinatie met een relatief voorzichtig economisch beleid en een toegenomen vermogen om met het weer verband houdende fluctuaties te beheersen hebben bijgedragen aan een imagoverandering. Een land dat bekend stond om zijn hongersnoden is een voorbeeld van een 'land in ontwikkeling' geworden. In deze periode heeft de regering zich doorlopend ingezet voor de ontwikkeling en uitvoering van beleid en strategieën ter verbetering van de sociale bescherming. Deze interventies omvatten onder andere een strategie voor Disaster Risk Management (beheersing van het risico op rampen); een socialezekerheids-(pensioen)stelsel; voedselzekerheidsprogramma's zoals de uitbreiding van het Productive Safety Net Program (PSNP; een vangnetprogramma), een nationaal voedingsprogramma en zorgverzekeringen, zoals een Community Based Health Insurance (CBHI)-programma (zorgverzekering op gemeenschapsbasis) voor het platteland.

Ondanks de sterke economische groei en een breed scala aan sociale beschermingsregelingen blijven plattelandshuishoudens kwetsbaar voor tegenspoed op zowel individueel als collectief niveau. Gezien de wisselwerking tussen verschillende typen tegenvallers, zoals bijvoorbeeld gezondheidsproblemen die leiden tot een verhoogde kwetsbaarheid voor tegenspoed veroorzaakt door weer en klimaat, is een recente trend in het landelijke socialebeschermingsbeleid om verschillende regelingen te 'bundelen' of meer met elkaar te verbinden. Daarmee overstijgt het beleid het beschermingsdoel van dergelijke regelingen en wordt het vermogen van huishoudens om tegenvallers op te vangen duurzaam vergroot. Kenmerkend voor dit beleid zijn de landelijke speerpuntenprogramma's: het in 2005 gelanceerde Productive Safety Net Program (PSNP) en het in 2011 gelanceerde proefproject Community Based Health Insurance (CBHI). Het

PSNP verstrekt uitkeringen aan voedselonzekere gezinnen in ruil voor arbeid die wordt ingezet voor de bouw van bodem- en waterbesparende infrastructuurvoorzieningen op het platteland. Het doel van de zorgverzekering CBHI is om de toegang tot gezondheidszorg te verbeteren en financiële bescherming te bieden tegen gezondheidsproblemen.

Tegen deze achtergrond en ingegeven door de retoriek van 'bundeling' en 'verder gaan dan sociale bescherming' gaat dit onderzoek over (i) de wisselwerking tussen het Productive Safety Net Program (PSNP) en het Community Based Health Insurance (CBHI)-programma en (ii) de vraag of deze programma's in staat zijn om kwalitatief hoogstaande rurale infrastructuurvoorzieningen te leveren. De eerste twee essays gaan over het thema bundeling en essays drie en vier behandelen het overstijgen van sociale bescherming.

In het eerste essay wordt onderzocht of het PSNP kan dienen om het gebruik van de vrijwillige CBHI-regeling te bevorderen en ook om uitval te verminderen. Het onderzoek is gebaseerd op paneldata die in drie rondes zijn verzameld onder huishoudens, een enquête onder zorginstellingen en kwalitatieve informatie die in verschillende rondes is verzameld. Uit het onderzoek blijkt dat deelname aan het PSNP de kans op het gebruik van CBHI met 24 procentpunten verhoogt en trouw aan het programma met 10 procentpunten verbetert. Het grootste deel van het effect kan worden toegeschreven aan de druk die overheidsambtenaren uitoefenen op de PSNP-begunstigden. Hoewel er vraagtekens kunnen worden geplaatst bij deze manier om de 'vrijwillige' invoering te bevorderen, zijn de resultaten in overeenstemming met het idee dat het lidmaatschap van bestaande programma's voor sociale bescherming een oplossing kan bieden voor de belangrijkste knelpunten waarmee ontwikkelingslanden worden geconfronteerd bij de implementatie van vrijwillige zorgverzekeringsstelsels.

Het tweede essay bouwt voort op het eerste en heeft dezelfde empirische basis. Het gaat over de vraag of deelname aan zowel het PSNP als de CBHI de sociale bescherming verhoogt. De belangrijkste bevindingen zijn dat personen die deelnemen aan beide programma's 5 procentpunten vaker gebruik maken van poliklinische zorg en 21 procentpunten vaker deelnemen aan werkzaamheden buiten de boerderij in vergelijking met personen die aan geen van beide deelnemen. Deelname aan beide programma's gaat samen met een toename van de veestapel met 4 procent en een daling van de schuldenlast met 28 procent. Kortom, bundeling van interventies verbetert de bescherming tegen meerdere risico's en het koppelen van

socialebeschermingsregelingen levert meer op dan de opgetelde effecten van de afzonderlijke programma's.

Het derde essay gaat over de vraag of de CBHI-regeling leidt tot een hogere kwaliteit van de gezondheidszorg. Het essay is gebaseerd op een enquête onder zorginstellingen in twee rondes en een enquête onder huishoudens in drie rondes. Uit het onderzoek blijkt dat het jaarlijks aantal bezoeken van ambulante patiënten aan bij het CBHI-programma aangesloten instellingen met 111 procent toeneemt en de jaarlijkse omzet uit patiëntenkaarten en geneesmiddelenverkoop met respectievelijk 184 en 76 procent stijgt. Als onderdeel van een opwaartse spiraal worden de hogere inkomsten gebruikt om geneesmiddelen en medische apparatuur aan te schaffen, wat zich vertaalt in een daling van het tekort aan geneesmiddelen en een toename van de tevredenheid van de patiënten. De patiënttevredenheid onder degenen die poliklinische zorg kregen in een bij het CBHI-programma aangesloten gezondheidscentrum is 11 procentpunten hoger dan onder degenen die een niet-aangesloten gezondheidscentrum bezochten. Bovendien brengen mensen ondanks de toename van het aantal patiënten niet meer tijd door in de wachtkamer.

De bouw en het onderhoud van duurzame infrastructurele voorzieningen door middel van programma's voor sociale bescherming is een kostbare aangelegenheid voor ontwikkelingslanden. Daarom, en in lijn met het derde essay, gaat het vierde essay over de kwaliteit van de openbare infrastructuur die via het PSNP is aangelegd. In het bijzonder wordt ingegaan op de mate waarin de gemeenschap betrokken is bij twaalf beslissingen met betrekking tot het PSNP en op het effect van de participatie op de kwaliteit van de via het PSNP aangelegde infrastructuur. Het essay is gebaseerd op een cross-sectionele analyse van 249 bodem- en waterbesparingsprojecten die zowel technische beoordelingen van de infrastructuur door ingenieurs omvat als kwalitatieve informatie verzameld in interviews en discussies. Het onderzoek toont een hoge, maar variabele participatiegraad van de verschillende gemeenschappen en laat duidelijk zien dat projecten waarbij de begunstigden een grotere rol spelen in de monitoring en evaluatie aanzienlijk minder snel schade oplopen.

Over het geheel genomen toont deze dissertatie aan dat het in ieder geval in Ethiopië de moeite waard is om factoren als het 'bundelen' van regelingen voor sociale bescherming en gemeenschapsparticipatie te overwegen. Dit laat echter onverlet dat dergelijke of aanverwante beleidsmaatregelen ook in andere ontwikkelingslanden bruikbaar kunnen zijn.

1 Introduction

In the last ten years, Ethiopia has been amongst the fastest growing economies in the world, with an annual average growth rate of about 10% per annum (World Bank, 2018). This growth may be attributed mainly to large scale investments in infrastructure (roads, railways, dams), construction, and the forging of links between agriculture and manufacturing. These developments have contributed to reduction in poverty (the national headcount poverty has declined from 38 percent in 2004/2005 to 23.5 percent in 2015/16) and have helped alter the image of a country known for "famines" to an example of a "developmental state" (UNDP, 2018; Clapham, 2017; Shiferaw, 2017). Symptomatic of this ability to deal with crises was the government's ability to reduce the impact of a drought outbreak in 2016-17 through effective crisis management and in particular the early opening and use of a railway line connecting Djibouti port to Ethiopia (WEF, 2018).

These changes in the economic sphere have been matched by perhaps even more noteworthy changes in the political sphere. Since 2015, the country has experienced political and ethnic protests especially in the two largest regions of the country, Oromia and Amhara. These protests culminated in the resignation of the Prime Minister in March 2018 and the election/nomination of a new reformist Prime Minister.

Throughout this period of rapid economic and political changes, with the aim of ensuring "pro-poor, accelerated, and sustainable development" (MoLSA, 2014: 22), the government has continued to develop and implement policies and strategies to reduce poverty and enhance social protection. These interventions included a Social Insurance (Pension) Program, Food Security Programs, most notably the extension of the Productive Safety Net Program, a National Nutrition Program, Health Insurance schemes, in particular, a Community Based Health Insurance scheme for

rural areas, and Disaster Risk Management and Support to Older Persons (MoLSA, 2012). This thesis focuses on two of these major social protection interventions, that is, the Productive Safety Net Program (PSNP) and the Community Based Health Insurance (CBHI) scheme. The thesis consists of four essays and a concluding chapter. Each of these essays examines specific issues related to these two programs. These issues are briefly outlined below.

One of the key issues plaguing the successful roll-out and implementation of voluntary health insurance programs such as the CBHI is low enrolment. The first essay examines whether existing social protection programs may be used to leverage uptake of new programs. In the current context the first essay investigates the role of the PSNP in influencing uptake of the CBHI and reducing dropout from the CBHI.[1] Building on this first essay, the second essay examines the joint effects of the PSNP and the CBHI enhancing social protection.[2] The third and the fourth essay deal with a relatively underexplored issue, that is, the quality of public infrastructure. While there is a large body of literature on the effects of health insurance schemes on health care utilization and financial protection, the role of such scheme in raising resources and enhancing the quality of care is limited. The third essay contributes to the literature by examining both, the effect of the CBHI scheme on revenues to service providers and the effect on the quality of health care. The final essay extends this idea to the PSNP and focuses on the quality of public infrastructure built through the PSNP. Specifically, the essay conceptualizes and measures community participation and examines the link between participation and the operational and physical status of infrastructure built through the PSNP.

The thesis relies on both quantitate and qualitative sources of data. The quantitative database consists of three rounds of panel data collected in 2011, 2012 and 2013), two rounds of health facility data collected in 2011 and 2014) and a cross section data collected in 2014/ 2015. The panel data and the health facility survey cover 16 districts located in the four main regions (Amhara, Oromia, SNNPR and Tigray) of the country while the cross section data was gathered from four food insecure districts in Oromia. The quantitative data base is complemented by several rounds of qualitative data gathered through key informant interviews and focus group discussions. Details are provided in in each essay.

Notes

[1] A shorter version of this essay has been published in *Social Science and Medicine* Vol. 176, (2017), pages 133-141. A longer version is also available as IZA Discussion Paper No. 9833 (2016).

[2] A shorter version of this essay has been published in the *Journal of Development Studies,* (2019) DOI*:* 10.180/00220388.2018.1563682 (2019). A longer version is also available as IZA Discussion Paper No. 10939 (2017).

2 Uptake of Health Insurance and the Productive Safety Net Program in Rural Ethiopia[1]

Abstract

Due to lack of well-developed insurance and credit markets, rural families in Ethiopia are exposed to a range of covariate and idiosyncratic risks. In 2005, to deal with the consequences of covariate risks, the government implemented the Productive Safety Net Program (PSNP), and in 2011, to mitigate the financial consequences of ill-health, the government introduced a pilot Community Based Health Insurance (CBHI) Scheme. This paper explores whether scheme uptake and retention is affected by access to the PSNP. Based on several rounds of household level panel data and qualitative information, the analysis shows that participating in the PSNP increases the probability of CBHI uptake by 24 percentage points and enhances scheme retention by 10 percentage points. Analysis of the channels through which the PSNP influences CBHI uptake indicates that the bulk of the effect may be attributed to explicit and implicit pressure applied by government officials on PSNP beneficiaries. Whether this is a desirable approach is debatable. Nevertheless, the results suggest that membership in existing social protection programs may be leveraged to spread new schemes and potentially accelerate poverty reduction efforts.

2.1 Introduction

Rural households in Ethiopia face substantial covariate and idiosyncratic risks. As in the case of other developing countries, dependence on volatile rain-fed agriculture and absence of well-developed markets for insurance and credit exacerbate the effects of these risks. At the same time, exposure to multiple-risks increases vulnerability (Dercon 2002, Rosenzweig 2001, Wagstaff 2007). For instance, when faced with illnesses, poor households

may not be able to afford health care which may impair their health status. Borrowing or selling assets to meet health care expenses may lead to impoverishment which further weakens their ability to withstand non-health related shocks. The potential interplay between different types of shocks suggests that multiple interventions may simultaneously be needed to provide effective social protection for vulnerable groups (Ranson 2002, Ssewamala et al. 2010, Wagstaff 2007). Although there is no dearth of studies which analyse access to and the impact of different types of interventions, research which focuses on potential links between different social protection programs is scarce.

In recent years, a number of developing countries have introduced voluntary community based health insurance schemes to mitigate the potentially impoverishing effects of ill-health. A common problem plaguing such voluntary health insurance schemes is low enrolment and high dropout rates (for a review see Mebratie et al. 2013) and in an attempt to increase demand for insurance, bundling of health insurance with microfinance loans has been suggested as a potential strategy (Banerjee et al. 2014, Dror et al. 2009, Hamid et al. 2011, Ranson 2002, Ranson et al. 2006). Evidence on the effectiveness of such an approach yields a mixed picture. For instance, Banerjee et al. (2014) used data from 201 villages in India of which 101 were offered a product which combined microfinance and health insurance while 100 villages served as controls, to analyse the effectiveness of offering health insurance through a microfinance scheme. They concluded that this experiment was unsuccessful as the poor quality of the insurance product led to negative effects which culminated in a withdrawal from the microfinance scheme itself. On a more positive note, Hamid et al. (2011) found that microcredit clients of the Grameen Bank in Bangladesh who had access to health insurance offered by Grameen Bank were more likely to be food sufficient as compared to microcredit clients who did not have access to the insurance product. Based on their study of providing health insurance through the Self-Employed Women's Association (SEWA) in India, Ranson et al. (2006) argue that offering health insurance through community-based associations like SEWA is more effective in terms of reaching out to low-income women as compared to stand-alone schemes. The authors also argue that offering insurance through existing programs offsets the lack of institutional capacity to run such schemes.

A similar enrolment issue that has been observed in developing countries that have attempted to reach Universal Health Coverage (UHC) through social insurance based programs is the so-called missing-middle problem. The formal sector can be obliged to enrol through typical social insurance designs, with compulsory payroll based contributions. However, such mechanisms are not effective for achieving universal coverage in countries with a large informal economy and labour market. The missing-middle problem describes the phenomenon where mandatory enrolment of formal sector workers is combined with subsidized premiums targeted to the poorest, while insurance uptake for the remainder of the informal sector relies to some extent on voluntary enrolment. International experiences suggest that it is extremely difficult to convince informal sector households to enrol voluntarily into health insurance, without providing strong (monetary) incentives to do so (Capuno et al. 2014 and Wagstaff et al. 2014). However, there is no empirical evidence for the effectiveness of policy instruments that leverage insurance uptake for the informal sector by integrating social policies.

In June 2011, the Ethiopian government introduced a voluntary Community Based Health Insurance in thirteen rural districts of the country. Several of these districts are food insecure and are also locations where the Productive Safety Net Program (PSNP), the government's flagship program to deal with covariate risk, also operates. The PSNP program targets food insecure households in chronically food insecure regions. Recognizing the interlinkages between the impoverishing effects of different shocks, an explicit goal is to use the PSNP as a platform to help food insecure households access other social protection programs (MoARD 2010). Such an approach is potentially promising in terms of helping the most vulnerable households deal with multiple shocks and at the same time increasing demand for insurance.

Whether the PSNP does enhance access to other social protection programs for food insecure households and more importantly, the channels through which this takes place are open questions. *A priori* it may be expected that food insecure households will be less likely to afford insurance. However, there are a number of reasons why PSNP beneficiaries may be more likely to join the scheme such as a higher chance of obtaining a premium payment waiver or greater information about the benefits of insurance scheme as compared to non-PSNP members. To shed light on such issues, this paper examines the links between the CBHI scheme and the

PSNP. In particular, we examine whether being a PSNP beneficiary influences initial enrolment in the CBHI scheme and thereafter whether it influences scheme retention. While the effect of various factors on enrolment and drop-out has been explored by Mebratie et al. (2015a) and Mebratie et al. (2015b), the focus of these papers was not on the role played by the PSNP. The paper's main contribution is that we attempt to identify the channels through which the PSNP may influence uptake and renewal. The study relies on several rounds of focus group discussions and key informant interviews, three rounds of panel data and a health facility survey.

The next section of the paper briefly describes certain features of the PSNP and CBHI schemes. Section 3 discusses the data, section 4 lays out the research methods, section 5 contains empirical results and section 6 concludes.

2.2 A brief overview of PSNP and CBHI in Ethiopia

The Productive Safety Net Program (PSNP) has been designed to deal with covariate risk while the recently piloted Community-Based Health Insurance (CBHI) is expected to become the key program to deal with the financial consequences of ill-health.

2.2.1 The Productive Safety Net Program (PSNP)

In 2003, the Ethiopian government initiated discussions with its development partners to replace the existing emergency response of using food aid to fill consumption gaps. These consultations led to the creation of the Productive Safety Net Program which articulated a shift from an emergency relief system to sustainable food security. The scheme was launched in January 2005.

The PSNP has three main objectives. These are to protect food insecure households in food insecure regions by providing resources to smooth consumption during the lean season, protect households by preventing sales of household assets and reduce the probability of borrowing and further impoverishment and finally to promote livelihoods by building community assets with development potential.[2] Program participants are selected through a participatory approach, and households with able-bodied members are expected to undertake public works activities in return for payment either in cash or in kind. The program operates in 319 food insecure districts (40% of the total districts) located 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 food resources to the tune of 274,844 metric tonnes and provided social transfers to about 6 million food insecure individuals either through "public works" activities (4.8 million) or as "direct support" (1.2 million) for labour constrained households (MoA 2013).

A key objective of the current phase of the PSNP is to enhance achievement of the program's objectives by forging links between the PSNP and other food security and development programs. As stated in the Program Implementation Manual, PIM (MoARD 2010: 6):

> "The PSNP is not a project but a key element of local development planning. PSNP plans are integrated into wider development plans at *woreda,* zone, region and federal levels."

2.2.2 Community Based Health Insurance (CBHI)

In June 2011, the Ethiopian CBHI pilot was launched in 13 districts (for a detailed description, see Mebratie et al., 2015a). The scheme is government-driven but with community engagement in insurance design, participation, management and supervision. At the design phase of the scheme, regional governments were involved in determining benefit packages, registration fees, premium payments and co-payments. The role-out phase involved a two-step process, with first the community deciding (based on a general assembly majority vote) whether to participate in the scheme and subsequently households could choose whether to enrol or not. The insurance covers households rather than just individuals, in order to reduce adverse selection.

The scheme covers inpatient and outpatient health care services at public facilities. Care at private facilities is not covered unless drugs or services are not available at public facilities. Transportations costs, medical treatment with largely cosmetic value and treatment outside Ethiopia are not covered. If members adhere to the scheme's referral procedure, they are exempt from co-payments.

Monthly premiums lie in the range of 0.4-0.6 percent of household monthly income. To stimulate enrolment, fee waivers are targeted to the poorest 10 percent of the population. Identification of the poorest households is based on interactions between local government officials and the community. Of particular interest for this paper is that 9 of the 12 districts are classified as food insecure and both the PSNP and the CBHI operate in these districts.

2.3 Data

This empirical analysis is based on household panel data, with survey rounds in 2011, 2012 and 2013. In addition, a health facility survey was conducted in 2011 and qualitative information was gathered through Key Informant Interviews (KII) and Focus Group Discussions (FGD).

Data collection followed a stratified sampling design and covered all 12 of the districts that had been identified by the government for participation in the CBHI pilot. From each district, six villages were randomly selected and from each village we randomly selected 17 households for a combined sample of 1,224 households. The follow-up surveys in 2012 and 2013 revisited 1,203 and 1,186 households respectively. The questionnaire included modules on individual and household socio-economic characteristics and demographics, assets, employment, consumption expenditure, health and health care, access to credit, social networks, and shocks. Crucial for this analysis is that the questionnaire asked whether the household is a member of the PSNP, and the 2012 and 2013 questionnaires included questions on participation in the CBHI pilot scheme. The 2011 health facility survey visited 3 randomly chosen health centres in each district, collecting information on quality of medical care and access to health facilities.

The qualitative information was collected in three rounds. The first round of FGDs and KIIs were conducted in 2012 in four districts (one in each of the regions) where the pilot CBHI had been launched. The second, a more focused data collection effort took place in 2014 in a district where both the CBHI and the PSNP were active (a district in Oromia region). FGDs were conducted in four villages. In each of the villages the FGDs included up to eight household heads or their representatives. While all the FGD participants were PSNP members, all were not members of the CBHI scheme. The discussions focused on the interactions between the PSNP and CBHI schemes. The second round of KII was held with officials responsible for executing the PSNP and the CBHI. This was held at district and village levels.[3] The key informants were also asked to provide inputs on the interaction between the PSNP and the CBHI and whether and how the PSNP was used as a platform to promote and encourage uptake of the CBHI scheme. A final round of six FGDs was conducted in Tigray and in SNNPR regions in June 2015. The discussions focused not

just on the interaction between PSNP and CBHI but also on the functioning of the CBHI in general.

2.4 Analytical Framework

The empirical analysis focuses on identifying the effect of being a PSNP beneficiary on enrolment and conditional on enrolment, on retention. Drawing on the focus group discussions, the key informant interviews and the existing literature, we treat the decision to join the scheme or to renew as a function of two broad sets of variables – these are a range of variables that capture scheme affordability and variables which captures the extent to which a household may be expected to gain from insurance. The latter is further treated as a function of household traits (health status, demographic composition), household understanding and knowledge of insurance and supply side variables which capture accessibility to care and quality of care.

To elabourate, scheme affordability is assumed to depend on a household's socio-economic characteristics (*SEC*). These characteristics include a household's consumption quintile, the household head's educational level, access to credit (*AC*) as indicated by membership in traditional or modern credit associations, savings and whether a household has availed of loans and finally, the key variable of interest, that is, whether households are affiliated to the productive safety net programme (*PSNP*).

Expected gains from the scheme are treated as a function of the chance of using medical care and the specification includes variables that capture illness episodes and self-assessed household health status (*HS*). A set of demographic traits *(DT)* is also included. We capture understanding of health insurance (*UHI*) on the basis of responses to four questions – these are, only the sick purchase insurance, CBHI is a saving scheme, CBHI pays for health care, the CBHI premium will be returned if medical care is not used. To capture scheme knowledge (*SK*) we include a variable which indicates whether household members attended community-level meetings before scheme launch, whether any household member works in a government position or is involved in managing the CBHI scheme. In the case of the renewal decision we include scheme experience (*SE*) which is determined on the basis of responses to five questions which enquire about the functioning of the scheme. To the extent that the expected returns from the scheme depend on supply-side (*SS*) variables, the specification includes time taken to reach the closest health centre and public

hospital and a range of variables that captures the quality of health care. This includes waiting time to see a health care provider, availability of various types of medical equipment, and respondent's perceptions of the quality of health care.

Combining all these factors leads to specification (1), where the probability that household (h) enrols in the scheme or renews enrolment (Y) in time t depends on variables in previous time periods. That is,

$$p(Y_{ht}) = f\begin{pmatrix} \alpha SEC_{ht-1}, \phi PSNP_{ht-1}, \tau AC_{ht-1}, \beta HS_{ht-1}, \theta DT_{ht-1}, \\ \pi UHI_{ht-1}, \nu SK_{ht-1}, \omega SE_{ht-1}, \delta SS_{ht-2}, \mu_{ht} \end{pmatrix} \quad (2.1)$$

Several variants of specification (2.1) are estimated using logit specifications for enrolment and retention while the duration of enrolment is estimated using an ordered logit specification (not enrolled, enrolled for one year, enrolled for two years). Note that we regress enrolment and retention in 2013 as a function of covariates in 2012, except for the quality of medical services variables for which we have data only from 2011. These lagged specifications are unlikely to be affected by endogeneity of some of the independent variables. In addition, we estimate specifications which rely on PSNP status in 2011 as well as linear probability models of current CBHI status on current PSNP status controlling for household fixed effects.[4]

Estimates of (1) are used to provide an assessment of the extent to which participation in the PSNP is associated with insurance uptake/retention. Thereafter, we use both the qualitative information and responses to survey-based questions on the reasons for enroling in (dropping-out from) the scheme to try and pin down the channels through which the PSNP influences uptake.

2.5 Results

2.5.1 PSNP and CBHI uptake

As shown in Table 2.1, in April 2012, scheme enrolment reached 41 percent. About 18 percent of those who had enrolled in 2012 dropped out in 2013 but new entrants more than made up for the dropout, translating into an overall enrolment rate of 48 percent in April 2013.

Table 2.1
Enrolment and dropout: CBHI Ethiopia

Region	April 2012 Enrolment		April 2013 Enrolment		Drop-outs		New enrol-ees	
	%	N	%	N	%	N	%	N
Tigray	33.9	101	50.2	146	26.5	26	38.3	74
Amhara	49.5	148	62.7	188	6.9	10	33.8	52
Oromia	44.2	133	44.5	133	21.2	28	17.4	29
SNNPR	35.3	107	35.4	107	21.5	23	11.8	23
Total	40.7	489	48.2	574	18.0	87	25.1	178

With regard to the PSNP, about 17 to 20 percent of the sample households are PSNP beneficiaries (Table 2.2) and PSNP beneficiaries are far more likely to participate in the CBHI scheme as compared to those who are not beneficiaries. For instance, in 2012 about 60 percent of PSNP beneficiaries enrolled in the scheme as compared to an enrolment rate of 36 percent amongst non-beneficiaries while in 2013 the corresponding figures were 68 and 44 percent.

Table 2.2
CBHI uptake and PSNP membership

Enrolled in the CBHI	April 2012			April 2013		
	PSNP member	Non-members	Total	PSNP Member	Non-member	Total
Enrolled	141	345	486	136	438	574
	(60.3)	(35.9)	(41)	(67.7)	(44.2)	(48)
Total	234	962	1196	201	990	1191

Table 2.3 provides estimates based on a series of specifications where the aim is to identify the effect of participation in the PSNP on enrolment and retention. We start with a very parsimonious regression (only PSNP) and then add sets of covariates to examine the sensitivity of the PSNP effect.[5] The striking aspect of the estimates is that regardless of the specification, PSNP participation in 2012 has a large and statistically significant effect on the probability that a household enrols in the scheme in 2013.

The effect of PSNP on enrolment without including any covariates is about 22 percentage points and after controlling for the full-range of attributes we find that being a member of the PSNP scheme is associated with a 24 percentage point increase in the probability of being enrolled in the CBHI scheme. The stability of the effects suggests that there is a large and positive effect of PSNP on enrolment which is not mediated through any other channels. Ordered logit estimates based on the most complete specification show that the PSNP is associated with a 27 percentage point increase in the probability that a household remains enrolled for two years. As may be inferred from these two sets of enrolment estimates, participation in the PSNP influences enrolment and reduces scheme dropout or vice versa enhances retention. The most complete specification indicates that participation in the PSNP scheme enhances the probability of retention by 10 percentage points.

Table 2.3
Probability of CBHI enrolment and renewal: marginal effects of PSNP after (ordered) logit

VARIABLES	Enrolment 2013	Renewal 2013	Enrolment	
			One year	Both Years
Participation in PSNP	0.223*** (0.066)	0.002 (0.053)	-0.005 (0.015)	0.223*** (0.064)
Participation in PSNP + regional fixed effects	0.300*** (0.054)	0.081** (0.040)	-0.003 (0.002)	0.346*** (0.060)
Participation in PSNP + regional fixed effects, socio-economic status	0.306** (0.053)	0.086** (0.036)	-0.030 (0.024)	0.350*** (0.059)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits	0.317*** (0.054)	0.093** (0.037)	-0.033 (0.026)	0.360*** (0.060)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits, health status	0.313*** (0.056)	0.097*** (0.036)	-0.033 (0.026)	0.357*** (0.061)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits, health status, understanding of health insurance, household member has official position	0.2849*** (0.056)	0.101*** (0.034)	-0.033 (0.027)	0.334*** (0.060)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits, health status, understanding of health insurance, household member has official position, access to credit	0.2880*** (0.056)	0.101*** (0.034)	-0.035 (0.028)	0.341*** (0.061)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits, health status, understanding of health insurance, household member has official position, access to credit, supply-side characteristics	0.242*** (0.058)	0.102*** (0.037)	-0.014 (0.022)	0.266*** (0.061)
Participation in PSNP + regional fixed effects, socio-economic status, demographic traits, health status, understanding of health insurance, household member has official position, access to credit, supply-side characteristics, experience with CBHI	-	0.099*** (0.0340)	-	-
Observations	1,147	455	1147	1147

2.5.2 Why does PSNP membership enhance CBHI uptake?

The PSNP is meant to target food-insecure households in food-insecure districts and it may be expected that such households will find it difficult to buy insurance and hence will be less likely to access the CBHI scheme. However, the estimates display that participation in the PSNP is positively linked to enrolment and retention. This is an intriguing pattern and there could be several channels through which participation in the PSNP may translate into higher CBHI uptake. The following sections pursue various potential explanations.

First, it is possible that PSNP members have certain traits that makes insurance more attractive for them. For instance, the PSNP is meant for food-insecure households and it may be that PSNP members are less healthy and more likely to use health care which in turn increases their desire to acquire insurance. Second, PSNP membership may enable access to fee-waivers which in turn enhances uptake and retention. Third, although we control for scheme understanding and knowledge of insurance, it is possible that PSNP members have greater scheme knowledge and greater understanding of the scheme which in turn translates into greater uptake. Fourth, it is possible that administrators explicitly or implicitly coerce households to join the CBHI scheme and since households with access to the PSNP depend on administrators to provide scheme payments they are more susceptible to pressure. While we have information on whether explicit pressure was applied it is certainly more difficult to discover the manner in which, if at all, implicit pressure is applied. In any case, we explore the veracity of each of these explanations using both the qualitative and the quantitative information at our disposal.

2.5.2.1 Who accesses the PSNP?

To explore differences in socio-economic status and other variables which may have a bearing on scheme uptake we provide descriptive statistics conditional on PSNP membership (Table 2.4) and also estimate a logit model to identify factors associated with the probability of participating in the PSNP (Table 2.5). Consistent with the targeting mechanism of the PSNP the descriptive statistics show that households falling in the poorest consumption quintile are far more likely to be PSNP members – 31% of PSNP members are in the lowest consumption quintile as compared to 18% of non-members. PSNP household heads are also more likely to be uneducated (50 versus 41%) and more likely to have taken out loans (39

versus 29%). In terms of health status, the picture is a little muddled as it shows that PSNP members are more likely to report that they are in good health, while at the same time they are more likely to be experiencing chronic illnesses (29 versus 16%).

Table 2.4
Descriptive statistics by PSNP membership

Variable	PSNP Membership					Total	
	Member		Non-member		Mean diff. P-value		
	Mean	SD	Mean	SD		Mean	SD
Socioeconomic status							
Poorest consumption quintile	0.31	0.47	0.18	0.38	0.0000	0.20	0.40
2nd consumption quintile	0.19	0.39	0.20	0.40	0.6721	0.20	0.40
3rd consumption quintile	0.19	0.40	0.20	0.40	0.7699	0.20	0.40
4th consumption quintile	0.19	0.40	0.20	0.40	0.8453	0.20	0.40
Richest consumption quintile	0.11	0.32	0.22	0.41	0.0007	0.20	0.40
HH head education- No education at all	0.50	0.50	0.41	0.49	0.0234	0.43	0.49
HH head education- Informal	0.09	0.29	0.18	0.38	0.0022	0.16	0.37
HH head education- Primary or above	0.41	0.49	0.41	0.49	0.9602	0.41	0.49
Demographic traits							
Male headed HH	0.78	0.41	0.89	0.32	0.0001	0.87	0.34
Age of HH head	48.2	13.8	47.9	13.9	0.7696	47.9	13.9
Household size	5.67	2.22	5.94	2.24	0.1203	5.89	2.24
Prop. of children aged under 6	0.13	0.15	0.13	0.14	0.8478	0.13	0.14
Prop. of male aged 6 to 15	0.17	0.16	0.15	0.15	0.2738	0.15	0.15
Prop. of female aged 6 to 15	0.15	0.15	0.15	0.14	0.7840	0.15	0.15
Prop. of male aged 16 to 64	0.22	0.16	0.26	0.16	0.0009	0.25	0.16
Prop. of female aged 16 to 64	0.28	0.17	0.26	0.15	0.1275	0.26	0.15
Prop. of elderly aged above 64	0.05	0.15	0.05	0.14	0.6163	0.05	0.14

Variable	PSNP Membership					Total	
	Member		Non-member		Mean diff. P-value		
	Mean	SD	Mean	SD		Mean	SD
Health status							
Prop. of household members with poor self-assessed health	0.11	0.21	0.19	0.32	0.0006	0.18	0.31
Prop. of household members with good self-assessed health	0.88	0.22	0.80	0.33	0.0004	0.81	0.32
Past illness event – total number of days ill in past 2 months	7.36	16.9	6.35	14.2	0.3779	6.52	14.7
Chronic illness – no. of household members with symptoms for more than 30 days	0.29	0.89	0.16	0.65	0.0224	0.18	0.69
Access to credit							
Savings in bank account	0.10	0.30	0.13	0.34	0.2377	0.12	0.33
Outstanding loan	0.39	0.49	0.25	0.43	0.0001	0.28	0.44
Member of Iqqub – informal rotating savings/credit group	0.04	0.20	0.07	0.25	0.1419	0.06	0.24
Member of a formal credit & saving association	0.07	0.26	0.12	0.33	0.0398	0.11	0.31
Observations	234		964			1198	

Notes: The PSNP refers to membership status of the households in the productive safety net program in 2013 and all household characteristics are according to the 2012 household survey and the 2011 health facility survey.

The regression estimates presented in Table 2.5 underline the point that households in the poorest quintile are more likely to be enrolled in the PSNP. After controlling for covariates, there is no link between educational status and PSNP participation. Chronic illness, at least in 2013, and PSNP participation are positively correlated. Similarly, households with outstanding loans are more likely to join the PSNP. While having an outstanding loan indicates that a household has access to credit it may also be interpreted in terms of a marker of poverty and an inability to finance needs without borrowing. Regardless of the interpretation of the correlations between chronic illnesses and PSNP participation and between the presence of outstanding loans and PSNP participation, the estimates in Table 2.3 show that the inclusion of these two variables does not particularly dampen the PSNP effect (see rows 5 and 7). The denouement is that there is no strong evidence to support the claim that PSNP participants have observed traits that make them more susceptible to joining the CBHI scheme.

Table 2.5
Probability of PSNP membership: marginal effects after logit (std. error)

VARIABLES	Participation in PSNP	
	2013	2012
Socioeconomic status		
2nd consumption quintile (ref: poorest consumption quintile)	-0.0647***	-0.0601***
	(0.0185)	(0.0207)
3rd consumption quintile	-0.0586***	-0.0754***
	(0.0194)	(0.0206)
4th consumption quintile	-0.0666***	-0.0575**
	(0.0199)	(0.0232)
Richest consumption quintile	-0.0980***	-0.123***
	(0.0192)	(0.0198)
HH head education- Informal (ref: no education at all)	-0.0320	-0.0287
	(0.0254)	(0.0297)
HH head education- Primary or above	0.0148	0.0137
	(0.0219)	(0.0226)
Health status		
Prop. of household members with good SAH	0.157***	0.0772***
(ref: Prop. of household members with poor SAH)	(0.0417)	(0.0280)
Past illness event	0.000404	-0.000433
	(0.000574)	(0.00071)
Chronic illness	0.0290**	-0.0295*
	(0.0118)	(0.0165)
Access to credit		
Saving in bank account	-0.0232	-0.0520**
	(0.0261)	(0.0236)
Outstanding loan	0.0692***	0.0827***
	(0.0238)	(0.0251)
Member of Iqqub	-0.0252	0.0136
	(0.0351)	(0.0443)
Member of credit and saving association	-0.0310	-0.0129
	(0.0276)	(0.0334)
Observations	1159	1185
Pseudo R-squared	0.2011	0.2796
Log pseudo likelihood	-420.835	-422.148

Notes: Outcome variable is one if a household is affiliated to the PSNP in 2013/2012 and zero otherwise. All explanatory variables are at their 2012/2011 values; clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The specification also includes a set of demographic characteristics and regional fixed effects.

2.5.2.2 Fee waivers, knowledge of insurance ad scheme understanding

According to scheme guidelines, the poorest 10 percent of households are eligible for a fee-waiver. *Prima facie* and on the basis of the information provided in the previous section, it may be expected that PSNP members are more likely to belong to this category of households. Our data show that in both survey rounds only about 3 percent of households join the scheme with a fee waiver. While this is rather low as compared to the target, of greater interest is that despite their poorer socio-economic status there is no evidence that PSNP members are more likely to receive a fee-waiver. As shown in Table 2.6, the proportion of PSNP and non-PSNP members with a fee-waiver is the same.

Our data include a series of questions which test understanding of health insurance in general and scheme-specific knowledge. It is likely that households with a greater understanding of health insurance and more information about the working of the CBHI scheme are more likely to enrol. At the same time it is possible that due to their enrolment in an existing scheme, PSNP members are more willing to attend the awareness-generating activities which preceded the launch of the CBHI. Table 2.6 contains information on differences in understanding of health insurance and scheme knowledge conditional on PSNP membership. We find some evidence that PSNP participants have a slightly better understanding of the concept of health insurance, as we find statistically significant differences for one of the four questions that probe health insurance literacy (i.e. whether or not CBHI is meant only for sick people).

In terms of knowledge and participation in the CBHI scheme, PSNP participants are more likely to have attended meetings before the launch of the CBHI and are also more likely to be involved in CBHI management - about 16 percent of PSNP members participate in CBHI management while it is 7 percent for non-members (Table 2.6). This is consistent with the government's plan to use the PSNP as a platform to create awareness and deliver other development and social protection programs which as a consequence translates into higher participation of PSNP members in the management of community level positions like CBHI management. Given the relationship between PSNP membership and scheme involvement it is possible that a part of the PSNP effect may be attributed to differences in involvement in scheme management. This does seem to be the case when we compare the estimates in rows 5 and 6 of Table 2.3. The inclusion of the knowledge and participation variables leads to a 3 percentage

point reduction in the effect of PSNP. However, the PSNP effect remains large and as shown in rows 8 and 9 of Table 2.3 and in the detailed estimates (not reported here), there are independent and large effects of PSNP affiliation *and* of involvement in CBHI management on uptake and retention.

Table 2.6
CBHI experience and design features by PSNP membership status

Variable	PSNP Membership				Mean diff	Total	
	Member		Non-member		p-value		
	Mean	SD	Mean	SD		Mean	SD
Affordability of scheme							
The timing of premium payment - convenient	0.70	0.46	0.82	0.38	0.0048	0.79	0.41
CBHI registration fee – affordable	0.83	0.38	0.84	0.36	0.7586	0.84	0.37
CBHI premium – affordable	0.76	0.43	0.77	0.42	0.9140	0.76	0.42
Capacity to afford CBHI – Low	0.21	0.41	0.19	0.39	0.5374	0.19	0.39
Capacity to afford CBHI – Medium	0.15	0.36	0.10	0.30	0.1386	0.11	0.32
Capacity to afford CBHI – High	0.64	0.48	0.71	0.45	0.1226	0.70	0.46
Pressure and fee waiver to join CBHI scheme							
Joined the scheme because of pressure – Yes	0.15	0.36	0.08	0.28	0.0322	0.10	0.30
Joined the scheme without contribution – Yes	0.03	0.16	0.03	0.18	0.7821	0.03	0.17
Understanding of health insurance							
Only sick people buy CBHI - Appropriate response	0.77	0.42	0.69	0.46	0.0173	0.70	0.46
CBHI is same as saving scheme - Appropriate response	0.73	0.45	0.72	0.45	0.7124	0.72	0.45
CBHI finances health care - Appropriate response	0.68	0.47	0.68	0.47	0.9424	0.68	0.47
CBHI premium can be returned if health care not Used - Appropriate response	0.67	0.47	0.65	0.48	0.6811	0.65	0.48

Variable	PSNP Membership				Mean diff	Total	
	Member		Non-member		p-value		
	Mean	SD	Mean	SD		Mean	SD
Health insurance understanding – Low (<=2 correct)	0.31	0.46	0.32	0.47	0.6333	0.32	0.47
Health insurance understanding – Medium (3 correct)	0.23	0.42	0.22	0.42	0.7613	0.22	0.42
Health insurance understanding level – High (4 correct)	0.46	0.50	0.45	0.50	0.8467	0.46	0.50
Knowledge of & participation in CBHI scheme							
No of CBHI meetings attended before implementation	2.92	3.00	2.49	1.60	0.0198	2.57	1.94
Involved in CBHI management	0.16	0.36	0.07	0.26	0.0002	0.09	0.28
Official position held	0.10	0.30	0.23	0.42	0.0000	0.21	0.41
Observations	234		964			1198	

Notes: The PSNP refers to membership status of the households in the productive safety net program in 2013 and all household characteristics are according to their value in the 2012 household survey.

2.5.2.3 Pressure to join the scheme

Scheme membership is supposed to be voluntary. However, survey-based responses on the main reason for joining the scheme as well as information gathered from the qualitative work suggests that enrolment may not be entirely voluntary. About 10 percent of those who have joined the scheme indicate that they were pressured to enrol by village level government officials. As shown in Table 2.6, this proportion is substantially higher (15%) among PSNP participants as opposed to non-participants (8%). The susceptibility of PSNP members to pressure was also revealed in some of the focus group discussions where respondents pointed out that the CBHI premiums are at times deducted from their PSNP payments. For instance an uninsured FGD participant in Oromia region said,

> "A *kebele* official reduced my monthly transfer payment from PSNP and informed me that the reduced money was for CBHI membership contribution. I said I did not want to enrol in the scheme and asked him to give me my full PSNP benefit. However, he did not pay me. So, I accused him to a higher *kebele* official and I got my money back" [Discussed on December 23, 2012].

Similarly, an insured FGD participant from Oromia district reported that,

> "In 2012, one woreda cabinet member came and collected the full CBHI premium by deducting it from the PSNP transfer. I went home with reduced transfer payment and I suffered as I didn't plan on it. All the cabinet cares about is fulfilling their quota. Not how valuable the money is to our family" [Discussed on September 8, 2014].

Such views are not restricted to Oromia district and FGDs in other parts of the country also revealed several instances where officials deducted the CBHI premium contribution from the monthly PSNP benefit without obtaining the consent of beneficiaries.

To examine the role of pressure in driving the PSNP effect we estimated specifications excluding households who responded that they had been forced to enrol in the scheme. Dropping such observations did not have a substantial effect on the magnitude of the PSNP effect suggesting that the link between PSNP membership and reported (explicit) pressure is not the main reason behind the PSNP effect.

While explicit pressure may not be the main factor for the large PSNP effect, the responses from the key informant interviews suggests that

strong persuasion may often be used. As implied by the response of the FGD respondent provided above, one of the performance yardsticks of village level government officials is enrolment in the CBHI which is likely to lead to overzealous behaviour. Regardless of whether officials were willing to admit the use of pressure, officials provided two core arguments for their actions. First, they argued that PSNP members are particularly vulnerable, unable to afford health care and find it harder to borrow to finance health care and since the CBHI scheme offers them access to health care at a very affordable price they need to be encouraged to join.[6] For instance an official in Oromia region argued,

> "We have to force PSNP members to join CBHI because we know they will benefit. Getting resources through borrowing is not usually the case for PSNP beneficiaries as they lack collateral which is needed by lenders in most cases" [Interviewed on September 10, 2014].

There is a second and perhaps more insightful reason for the pressure exerted by officials. The same local government officials are responsible for implementing the CBHI and the PSNP. While the performance target for the CBHI is based on uptake the target for the PSNP requires the construction of public works. In order to meet these construction targets the officials need to rely on the labour contribution of PSNP beneficiaries which in turn raises their interest in the health and work capacity of PSNP beneficiaries. For instance during an interview a village level official remarked,

> "We inform PSNP members to join the 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 on October 31, 2014].

Officials clearly have a keen sense of the links between the two schemes and their desire to meet the objectives of both the programs creates an incentive for them to push respondents to join the schemes.

While officials have used pressure and justify their use of pressure, some respondents were also aware of the benefits of both schemes while others highlighted their changing attitudes towards the actions taken by officials. For instance, an FGD participant in Oromia mentioned,

"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 neighbourhood and ask for borrowing which is very difficult" [Discussed on September 9, 2014].

During an FGD, a participant in Tigray region pointed out,

"At the beginning of the scheme, we were not convinced of the benefit of CBHI and we resisted joining the scheme. I remember the first membership was deducted from the payment of PSNP and everybody was opposed to what the leaders did. But now we are the ones nagging them to renew our membership" [Discussed on June 9, 2015].

2.6 Concluding remarks

Inspired by the low uptake of community based health insurance (CBHI) in a number of schemes operating in developing nations and the plans of the Ethiopian government to use its flagship social protection initiative, the productive safety net programme (PSNP) as a platform to help households access other social protection interventions, this paper examined the link between participation in the PSNP and uptake of a recently introduced CBHI scheme. Whether it is possible to use participation in existing social protection programs to leverage uptake of new programs is a question of wider interest and not confined to Ethiopia.

The paper was based on three rounds of panel data, a health facility survey and information gathered from key informant interviews and focus group discussions. We found a strong link between participation in the PSNP and uptake of and retention in the CBHI scheme. Despite controlling for a large number of covariates which may influence both PSNP and CBHI participation we found that participation in the CBHI was associated with a 24 percentage point increase in the probability of taking out insurance and a 10 percentage point increase in the probability of renewing insurance. These large effects are intriguing, especially since the PSNP caters to food insecure households in food insecure districts.

We considered a variety of explanations which may be responsible for the higher participation rates of PSNP beneficiaries. We discovered that a higher proportion of PSNP beneficiaries had chronic illnesses (29 vs. 16 percent), they had attended more CBHI-related awareness meetings and were more likely to be involved in CBHI management (16 vs. 7 percent).

However, controlling for these variables did not substantially alter the magnitude of the PSNP effect suggesting that PSNP participation has a direct effect on CBHI uptake which is not mediated through variables which maybe correlated with PSNP status. Survey-based responses to questions on why households joined the CBHI revealed that about 15 percent of PSNP beneficiaries joined the scheme due to pressure exerted by government officials while the corresponding figure was 8 percent in the case of non-beneficiaries. The FGD and KII confirmed the use of pressure, especially on PSNP beneficiaries. Since there are limited differences in observable traits between PSNP and non-PSNP members it is likely that the PSNP effect is mainly driven by the use of explicit and implicit pressure on PSNP beneficiaries.

There were two main reasons offered by officials for strongly advising PSNP beneficiaries to buy insurance. First, some program officials argued that due to the inability to finance health care and the relatively lower socio-economic status of PSNP beneficiaries, they should take advantage of the affordable insurance as it is to their benefit, even if they are not aware of it. Second, at the village level the same government officials are responsible for implementing both the PSNP and the CBHI and this provides an incentive for officials to push both schemes as CBHI uptake enhances access to health care and might reduce illness-related losses in labour contributions which are needed to build rural infrastructure through the PSNP.

The use of pressure by the administration is contrary to the design of the CBHI scheme. Nevertheless, what we are able to show in this paper is that the approach of using participation in an existing social protection can be successfully used to leverage insurance uptake amongst perhaps the most economically vulnerable groups in rural Ethiopia. Whether this can be sustained and whether it is justified, as argued by officials is debatable. However, if one of the goals is to universalize access to health care in Ethiopia and other countries in the region, then exploring how roll out of health insurance may be integrated with other social protection programs is a policy option that is worth considering.

Notes

[1] A shorter version of this essay has been published in *Social Science and Medicine* Vol. 176, (2017), pages 133-141. A longer version is also available as IZA Discussion Paper No. 9833 (2016). The paper is co-authored with Anagaw D. Mebratie, Robert Sparrow, Zelalem Yilma, Getnet Alemu, and Arjun S. Bedi.

[2] A district is classified as food insecure on the basis of the frequency of requiring food assistance in the ten years preceding 2004. Food insecure households within such districts are households who fail to produce enough to meet their consumption needs even when there is normal rainfall (MoARD, 2010:8).

[3] At the *woreda* level, discussions were held with officials in the *woreda* agricultural office who are directly responsible for executing the PSNP and indirectly involved in CBHI implementation. The officials interviewed at the *kebele* level are responsible for implementing both programs.

[4] The results are not sensitive to these changes and continue to display large effects of PSNP on CBHI status.

[5] Detailed estimates are available on request

[6] The various measures used to determine scheme affordability indicate that the scheme is equally affordable for both PSNP and non-PSNP members and for a majority of households - about 70 percent. However, PSNP beneficiaries are more likely to be in debt they are less likely to have savings accounts and be members of credit and savings associations (see Tables 2.4 and 2.6).

3 Linking Social Protection Schemes: The joint effects of a public works and a health insurance programme in Ethiopia[1]

Abstract

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, labour 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.

3.1 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 interlinkages between different social protection instruments and the joint effect of participating in multiple social interventions on welfare outcomes are scarce.[2] 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 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 labour 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 a related work, Shigute et al. (2017) have examined whether participation in the PSNP may be used to encourage CBHI uptake.[3] Motivated by the findings that PSNP participants are substantially more likely to enrol 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 labour contributions, PSNP participants will have higher off-farm labour 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 labour 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 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.

3.2 PSNP and CBHI: Key features

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 relating to the objectives of the current essay.

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 collabouration 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.[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."

Turning to the 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 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.[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 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.[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), 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).

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.

3.3 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 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 A3.1). 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 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.

3.4 Analytical Framework and empirical approach

3.4.1 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.[9]

The PSNP is expected to enhance food security by providing payments for labour 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 labour as compared to non-participants. Furthermore, these labour contributions are important not only from the perspective of households but also from the perspective of PSNP program managers as labour 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 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 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 labour. 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 labour 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 neighbourhood 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 centre 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 centre when either I or my children get health problems and continue working on the public works. I

now tell my non-CBHI neighbours to enrol 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 labour and through provision of payments in lieu of labour 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 labour, 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.[11]

3.4.2 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 labour, 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,

$$Y_{ijt} = (CBHI * PSNP)_{ijt}\beta + CBHI_{ijt}\gamma + PSNP_{ijt}\delta + X_{ijt}\eta + T_t\theta + (W * T)_{jt}\sigma + \lambda_i + \varepsilon_{ijt} \quad (3.1)$$

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

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.[14] Keeping in mind the potential selection issues, prior to discussing estimates of equation (3.1), we explore differences between CBHI participants and non-participants and also examine what drives scheme uptake.

3.5 Results

3.5.1 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. 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 3.1).

Table 3.1
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

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 3.2).

Table 3.2
CBHI uptake by PSNP participation

Enrolled in the CBHI	2012			2013		
	PSNP members	Non-members	Total	PSNP members	Non-members	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.

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 3.3).

Table 3.3
Participation in CBHI and PSNP: Full sample

Program	2011		2012		2013		Sample total	
	Membership		Membership		Membership		Membership	
	%	N	%	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.

3.5.2 Who enrols in the PSNP and the CBHI?

Table 3.4 provides descriptive statistics for a range of socio-economic, demographic and health status variables conditional on PSNP membership, while Table 3.5 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.

Table 3.4
Descriptive statistics conditional on PSNP membership status in 2011

Variable	PSNP Membership				p-value	Total	
	Member		Non-member				
	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

Variable	PSNP Membership				p-value	Total	
	Member		Non-member				
	Mean	SD	Mean	SD		Mean	SD
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 3.5
Probability of enroling in PSNP in 2011: marginal effects after logit

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.

Turning to the CBHI, Table 3.6 provides descriptive statistics at baseline conditional on insurance status in 2012 while Table 3.7 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 3.2, 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.

Table 3.6
Descriptive statistics conditional on CBHI membership status

Variables	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

Variables	CBHI Enrolment				p-value	Total	
	Enrolled		Not-enrolled				
	Mean	SD	Mean	SD		Mean	SD
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 3.7
Probability of enroling in CBHI: marginal effects after logit

Variables	2013		2012	
Socioeconomic status				
2nd Consumption Quintile	-0.203***	-0.200***	-0.087***	-0.064***
(Ref: Poorest Quintile)	(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	0.072	0.064	0.057***	0.073***
(Ref: No Education)	(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	0.102***	0.087***	0.077***	0.051***
(Ref.: SAH- not good)	(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)
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 financial participation and networks variables and regional fixed effects. The specification for 2013 additionally control for understanding of health insurance and knowledge and involvement in the CBHI.

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 3.8 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 3.9) 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 3.8). 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.

Table 3.8
Descriptive statistics conditional on membership status

Variables	Total Sample (1)	CBHI* PSNP (2)	CBHI (3)	PSNP (4)	No Programme (5)	*p*-value (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	17585.3	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

Variables	Total Sample (1)	CBHI* PSNP (2)	CBHI (3)	PSNP (4)	No Programme (5)	*p*-value (6)
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	0.96
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 3.9
Probability of participating in PSNP and CBHI: Multinomial Logit Marginal Effects

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	-0.048***	0.016	0.014***	0.018***
(Reference not good SAH)	(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)
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. The specification controls for a set of variables indicating financial participation and networks; Standard errors in parentheses; *** p<0.01, ** p<0.05, *p<0.1

3.5.3 The joint effect of CBHI and PSNP

Estimates of the joint and individual effect of the two programs on health care utilization, labour supply are provided in Table 3.10 while those estimates on asset accumulation (captured by livestock and borrowings) are provided in Table 3.11. We begin with a discussion of the effect of the two schemes on health care use.

Table 3.10
Effect of CBHI and PSNP on health care utilization and off-farm labour supply

	Modern health care utilisation (1/0)	Number of visits to modern health facility	Participation in Off-farm Work (1/0)	Number of Hours worked in Off-Farm
CBHI*PSNP	0.046**	0.037	0.067***	10.90***
	(0.019)	(0.039)	(0.024)	(2.80)
CBHI	0.023*	0.07***	0.008	-0.57
	(0.012)	(0.024)	(0.010)	(1.34)
PSNP	-0.017	-0.034	0.130***	6.12***
	(0.013)	(0.025)	(0.019)	(2.20)
Joint effect vs. no programme	0.052***	0.073**	0.205***	16.45***
	(0.019)	(0.037)	(0.025)	(2.82)
Joint effect vs. only PSNP	0.069***	0.108***	0.075***	10.32***
	(0.017)	(0.033)	(0.023)	(2.64)
Joint effect vs. only CBHI	0.029	0.003	0.197***	17.02***
	(0.020)	(0.041)	(0.026)	(2.98)
N	12,820	12,820	12,820	12,820
Adj. R-sq	0.012	0.014	0.031	0.023

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 3.11
Effect of CBHI and PSNP on asset accumulation

	Value of Livestock Assets (Birr)	Loan Uptake (1/0)	Outstanding Loan (Birr)
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)
Joint effect vs. no programme	717.38*	-0.057*	-615.57**
	(432.93)	(0.031)	(281.56)
Joint effect vs. only PSNP	710.22*	-0.046	-660.75***
	(381.75)	(0.029)	(187.42)
Joint effect vs. only CBHI	893.53*	-0.025	-1234.85***
	(465.23)	(0.032)	(291.75)
N	12,820	12,820	3,840
Adj. R-sq	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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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 3.10 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 A3.5). 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 3.2 and 3.7) it also translates into greater use of health care amongst those belonging to both programs.

As discussed in Section 3.4, 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 labour 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 labour supply. As shown in Table 3.10, 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 labour 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. The large, positive and statistically significant effect of joint membership is also evident in terms of hours of off-farm labour 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 labour supply is directed to the PSNP, the increase in health care use and the increase in off-farm labour 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.

As can be seen from Table 3.11, 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. 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).[15] 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 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 30 percent reduction in debt compared to no participation in the two programs.[16]

3.5.4 Robustness checks

As has been shown in Table 3.8, 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 Tables 3.10 and 3.11 based only on those who participate in the PSNP. As maybe seen in Table 3.8, 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.[17] While not as crisp as those reported in Table 3.10 and 3.11, estimates conditioning on PSNP status (see Table A3.6) 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 labour. Their labour contributions in terms of hours of work are 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.

The CBHI scheme is meant to enhance access to health care only from public health centres and hospitals as opposed to publicly provided health posts (which provide free access) and privately run health centres. 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 A3.7 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 centres as opposed to health posts and privately provided care.

3.6 Discussions 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 co-ordination 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 labour 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 4 percent increase in livestock and a 30 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.

Notes

[1] A shorter version of this paper has been published in the *Journal of Development Studies* (2019); DOI: 10.1080/00220388.2018.1563682. A longer version is also available as IZA Discussion Paper No. 10939 (2017). The paper is co-authored with Christoph Strupat, Francesco Burchi, Getnet Alemu, and Arjun Bedi.

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

[4] 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.

[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. The remainder (about 2%) is covered by employer and other private insurance schemes.

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

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

[8] The year-specific number of observations is 4,332 individuals in 2011; 4,337 in 2012; 4,151 in 2013 (see Table 3.3).

[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.

[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 labour 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 labour 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] 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".

[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 A3.1, 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.

[14] 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.

[15] 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.

[16] We also estimated household level regressions of livestock and borrowing (see Table A3.8). 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.

[17] 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.

4 The effect of Ethiopia's community based health insurance on revenues and quality of care

Abstract

Ethiopia's Community Based Health Insurance (CBHI) scheme was established with the objectives of enhancing access to health care, reducing out-of-pocket expenditure, mobilizing financial resources and enhancing the quality of health care. Previous analyses have shown that the scheme has enhanced access to health care and led to reductions in out-of-pocket expenditure. Whether the scheme has also delivered on its other objectives is not known. This paper uses two rounds of health facility survey data and household survey data to examine scheme effects on health facility revenues and on different dimensions of quality of care. We find that CBHI affiliated facilities experience a 111 percent increase in the annual volume of out-patient visits and annual revenues from patient cards and drug sales increase by 184 and 76 percent, respectively. The increased revenues are used to deal with drug shortages. These increases seem to have translated into modest increases in patient satisfaction. The satisfaction of patients who sought outpatient health care from contracted health centres is 11 percentage points higher as compared to those who received the service from non- contracted health centres. Furthermore, despite the increase in patient volume there is no discernible increase in waiting time to see medical professionals.

4.1 Introduction

In part, as a consequence of the negative effects of introducing user fees, international bodies (WHO, 2006, 2010) have advocated health insurance as an approach that may be used to achieve universal access to health-care. In the wake of such advocacy, several developing countries, including

Ethiopia, have introduced, either or both, mandatory social health insurance schemes and voluntary community based health insurance (CBHI) schemes.

In June 2011, following substantial supply-side investments which led to a rapid expansion of the country's health care infrastructure (Mebratie et al., 2015), the Government of Ethiopia introduced a pilot voluntary CBHI scheme in 13 districts located in four main regions (Amhara, Tigray, Oromia and *SNNPR*) of the country. The main objectives of the scheme are to promote use of health care services from modern providers, enhance financial protection and generate (domestic) revenues, which are to be retained by health facilities and expected to be ploughed into improving quality of care (EHIA, 2015). Several reviews of the CBHI literature (Preker et al., 2002; Jakab and Krishnan, 2004; Ekman, 2004; Carrin et al., 2005; Soors et al., 2010; Spaan et al., 2012; Mebratie et al., 2013; Adebayo et al., 2015), show that while such voluntary insurance schemes struggle to expand enrolment and to retain clients they have had some success in enhancing access to health care and providing financial protection.

Based on a systematic review of 46 studies conducted in low- and middle-income countries, Mebratie et al. (2013) report an unweighted average insurance uptake rate of 37% and high dropout rates. For instance, for a scheme in Guinea-Conakry, Criel and Waelkens (2003) report a dropout rate of 25%. In the case of the Nouna district scheme in Burkina Faso, depending on the year, the dropout rate ranged between 31 and 46% (Dong et al. 2009) while in Senegal, scheme dropout rates ranged between 58 and 83% for three schemes set up between 1997 and 2001. While there are several factors that influence renewal rates, in almost all the papers that have examined this issue, the (perceived) quality of care on offer has been offered as a prominent reason for inhibiting continued enrolment. For example, Criel and Waelkens (2003) concluded that while affordability was an issue, the main reason for the declining enrolment rate was the poor quality of care in Guinea-Conakry. Similarly, in Burkina Faso, Dong et al. (2009) identified quality of care as perceived by household heads as an important aspect determining dropout and in Senegal, Mladovsky (2014) reported that a negative perception of quality of care increased the probability of dropping out.

Notwithstanding the low enrolment and high dropout rates, Mebratie et al. (2013) report that in 26 of 35 studies carried out in low and middle-income countries there is a positive and statistically significant impact of

CBHI on healthcare utilization while 9 out of 16 studies find a reduction in OOP healthcare expenditure. In the case of Ethiopia, Mebratie et al. (2019) find that CBHI enrolees are at least 30% more likely to use outpatient care and experience at least a 56% decline in the cost per outpatient visit to public facilities. Relatively speaking, as will be discussed later in the text, the literature on the effects of CBHI schemes on generating revenues and on quality of care is scarce (see Spaan et al. 2012).

This paper is motivated by both, the relatively limited literature on the effects of CBHI on revenue generation and quality of care and the potentially strong link between quality of care and CBHI uptake and retention, which has implications for the sustainability of CBHI schemes. The paper is based on two rounds of health facility survey data collected in 2011 and 2014 from 48 health centres and three rounds of household survey data collected in 2011, 2012 and 2013.[1] The first facility survey round was collected in 2011 just before the launch of the CBHI while the follow-up survey was collected in 2014. Of the 48 health centres included in the survey, 36 have signed contracts to provide services to scheme beneficiaries while the remainder, serve as controls. We first examine the effect of being a CBHI affiliated health centre on the volume of patients accessing health care services which is followed by an assessment of the scheme on resource mobilization and on two types of quality measures - perception based and indicators of structural quality. We complement this with an analysis of the effect of CBHI-affiliated health centres on patient satisfaction.

We find that CBHI affiliated facilities experience a 111 percent increase in the annual volume of out-patient visits and annual revenues from patient cards and drug sales increased by 184 and 76 percent, respectively. It appears that the increased revenues are used to deal with drug shortages and budgetary gaps. The increased revenues seem to have translated into increases in patient satisfaction. Patient satisfaction at CBHI-contracted health centres is 11 percentage points higher as compared to non-CBHI contracted health centres. Despite the increase in patient volume there is no discernible increase in waiting time to see a medical professional and there seems to be an increase in patient satisfaction.

The next section of this paper contains a conceptual discussion of quality of care followed by a review of the existing literature on the effects of CBHI schemes on resource mobilization and quality of care. Section 3 contains a brief overview of the Ethiopian health care system and the

CBHI scheme. Section 4 provides details on the data, while Section 5 presents the results from both the health facility and individual survey data. The final section reflects on the results and provides concluding observations.

4.2 Conceptualizing quality of health care and the effects of CBHI on quality of care

4.2.1 Conceptualizing quality of care

While the main objectives of the paper are straightforward, what is perhaps less clear is the meaning of quality of care and indicators that may be used to measure quality. Consolidating different definitions and concerns, the World Health Organization's (WHO) working definition of quality of health care is "the extent to which health care services provided to individuals and patient populations improve desired health outcomes." (WHO, 2017). This definition calls for a focus on health outcomes which is certainly the end goal of a health care system but it is perhaps not very useful with regard to measuring the effects of insurance-related interventions.

In one of the earliest papers to conceptualize quality of care and suggest ways of measuring it, Donabedian (1966, 1988) proposed a systems-based framework of structure, process and outcome to capture the various dimensions of health care quality. Structure refers to the availability of physical facilities, equipment, drugs, human resources such as the number and qualification of personnel, and working hours. In essence, geographic proximity and availability of care are the main components of structural quality. Process refers to the manner in which these facilities and human resources are deployed in clinical terms, (for instance, whether appropriate medical procedures are being followed, appropriate tests are being conducted), as well as inter-personal handling of patients (explanations, demeanour of providers). While the final dimension refers to the translation of structure and process into outcomes such as morbidity, mortality and restoration and function as well as, at least in current debates, in terms of patient well-being and satisfaction.

In a more recent contribution, Donabedian (1990) argues that quality, especially process, consists of two parts – technical and interpersonal. The technical component concerns the application of science and technology by health professionals and interpersonal is the social and psychological

interactions that prevail during the care process between client and practitioner. Various versions of Donabedian's systems-based approach have been used as a basis for defining quality (Steffen, 1988; Tarlov et al. 1989; Baker, 1995; Campbell et al. 2000; Mainz, 2003).

Rather than focusing on the system, Campbell et al. (2000) argue in favour of a focus on the individual user of health care services and suggested two dimensions of quality. These include, access to services, do users get the care they need, and effectiveness - is the care effective when they get it? Effectiveness is further divided into clinical effectiveness and the effectiveness of inter-personal care. While arguing in favour of placing the individual at the centre of quality considerations, Campbell et al. (2000) echo and further articulate that to measure quality of care one may rely on the three inter-connected domains of structure, process and outcome.

In a departure from a focus on the three domains of structure, process and outcomes to measure quality of care, Chow et al. (2009) along with a series of other authors (Choudhry et al., 2005; Copnell et al., 2009; Gill and White, 2009; Turkson, 2009; Sharma and Narang, 2011; Ayimbillah Atinga, 2012) argue in favour of a predominantly patient-centred approach to measuring quality of care. The argument is that from a patient's perspective, patient satisfaction is the ultimate end point of what a health care system is trying to achieve and a direct assessment, albeit subjective, of such satisfaction should be an essential part of quality assessment.

Drawing on the conceptual literature on quality of care, the current study examines the effect of the CBHI on structural measures of quality (for e.g., availability of drugs, equipment), process (essentially waiting time) and patient satisfaction.

4.2.2 The effect of CBHI on revenue generation and quality of care

While there is a large literature (see reviews by Ekman 2004; Spaan et al. 2012; Mebratie et al. 2013) which has examined the effect of community based health insurance schemes on utilization and financial protection, the literature on the effects of such schemes on revenues and especially on enhancing quality of care, regardless of how it is measured are relatively scarce. In his review which includes 36 studies, Ekman identifies seven studies that examine the effect of CBHI schemes on cost-recovery ratios, usually defined as the share of recurrent expenditures incurred by a pro-

vider that are met through insurance pay-outs, and one study that examines effects on quality of care. The study concludes that such schemes have moderate effects on cost-recovery (cost recovery ratio of about 25 percent) and no evidence that they have an effect on quality of care. In a similar study of CBHI schemes, Carrin et al., (2005) showed a modest effect of such schemes on revenue collection, resource pooling and purchase of care service. In the latter study, enrolment and quality of care were identified among the main factors determining the revenue collection potential of community health insurance schemes in developing countries.

A more recent and far more comprehensive review which is not restricted to community based schemes is provided by Spaan et al. (2012).[2] In their review of 159 studies that have analysed the effect of insurance schemes in Asia (91 schemes) and in Africa (68 schemes), the authors identified 19 studies that deal with the effects of CBHI schemes on resource mobilization and 8 studies that deal with CBHI effects on quality of care. In marked contrast to the conclusion reached by Ekman (2004), Spaan et al. (2012) find that 13 of the 19 studies have a strong positive effect on resource mobilization. Methodologically, the papers compare revenues raised through CBHI versus revenues raised through user fees (for example, Moens, 1990; Jackson, 2005; Renaudin et al. 2007) or provide an assessment of changes in revenues raised or changes in cost-recovery ratios over time (Criel and Kegels, 1997; Atim et al. 1999; Desmet et al. 1999; McCord, 2001; Soors et al. 2010). Based on the evidence, Spaan et al. (2012) conclude that the evidence is credible enough to recommend CBHI schemes as an alternative to user-fees in health-care financing and a promising means to achieve universal health care coverage. Similarly, based on a review of the literature, Ejughemre (2014) also recommends scaling up of CBHI schemes in the Sub-Saharan Africa as a potentially important source of resource mobilization.

In contrast to the strong effects on resource mobilization, Spaan et al. (2012) find that CBHI schemes have, if at all, weak positive effects (4 out of 8 studies) on structural and perceived quality of care indicators.[3] The papers are based on cross-section data or only on qualitative information. Three of the papers which find positive effects are on Rwanda's CBHI while the additional paper focuses on Tanzania. These papers show that pre-payments schemes are associated with greater drug availability in both Rwanda and in Tanzania.

This paper adds to the scanty literature on the effect of CBHI schemes on revenue generation and on quality of care. The paper relies on panel data at the health facility level, as opposed to cross-section data and on three rounds of household survey data. In addition to a stronger empirical data base, the paper contributes by examining the effect of such schemes on both structural indicators of quality and on patient satisfaction. That is, we examine the effect of the CBHI on quality from the perspective of both providers and patients.

4.3 Health care financing in Ethiopia and the CBHI: A brief overview

In 1998, the government of Ethiopia developed a health care financing strategy (HCFS), (USAID 2012: 2). This strategy, the first of its kind, had four interrelated objectives. These included, identification of additional resources for the health sector, both domestic and international, mobilization and deployment of these resources to the health sector, enhancing resource efficiency and the ploughing back of additional resources to enhance the quality of care (Zelelew, 2012). Emanating from the HCFS framework, a number of reforms have been implemented in the country (Zelelew, 2012; MOH, 2014; Alebachew et al., 2015). These include, but are not limited to, increases in user fees, fee retention and utilization of generated resources by care providers, and the introduction of health insurance schemes.

Since the implementation of the HCFS there have been changes in the volume of resources dedicated to the health sector and changes in the sources of health care financing. In 1995/96, health care spending amounted to 3.5 percent of GDP with per capita health spending of USD 4.5. The bulk of the resources came from households (53 percent) and federal and regional governments contributed 40 percent (Tassew et al., 1995/96). In contrast in 2013/14, health care spending amounted to 4.7 percent of GDP and per capita health spending rose to USD 28.7. At the same time the share of OOP expenditure fell from 53 to 33 percent, the share of the government was about 30 percent and the rest from international sources (see Table 4.1).[4]

Table 4.1
Health care financing in Ethiopia

	1995/96	1999/2000	2004/05	2007/08	2010/11	2013/14
Share of health care spending to GDP (%)	3.5	4.4	5.2	4.5	5.2	4.7
Per capita health expenditure (USD)	4.5	5.6	7.1	16.1	20.8	28.7
Source of financing (%)						
Government including parastatals	40	33	31	22	16	30
Households (mainly OOP)	53	36	31	37	34	33
Rest of the world	1	22	37	39	50	36
Others	7	9	2	1	1	1

Source: National Health Accounts

In its continuing attempts to enhance the sustainability of health care financing and to increase reliance on domestic sources as opposed to international, the government mooted the introduction of a voluntary Community Based Health Insurance (CBHI) for rural areas and informal sector workers in urban areas and a compulsory Social Health Insurance (SHI) for urban formal sector workers. While the SHI is yet to be launched, the CBHI was introduced on a pilot basis in June 2011 in 13 districts located in four main regions (Amhara, Tigray, Oromia and *SNNPR*) of the country and since September 2017, the scheme has been operating in 280 districts and offers coverage to about 16 percent of the population (Mebratie et al. 2019).

The pilot CBHI was offered to about 301,000 households in the 13 districts at a premium, depending on the region, of between Birr 126 to 180 per year for core household members.[5] The premiums amount to between 0.5 to 1 percent of household monthly income. Households pay premiums and a one-time registration fee to a village (kebele) office which then transfers the funds to the Woreda (District) Health Insurance Agency (WHIA).[6] Scheme enrolees may access both outpatient and inpatient health care services in public facilities (health centres and hospitals) which have signed a contract with the WHIA.[7] The use of services is free at point-of-use.[8]

As of June 2014, according to administrative data (Mebratie 2015) more than 50 percent of households in the pilot districts had joined the scheme

(157,553 of 300,799). Our analysis of household survey data shows a similar picture with enrolment rising from 41 percent in 2012 to 48 in 2013 and to 58 percent in 2015 (see Table 4.2). While households do drop-out from the scheme (18 percent in 2013 and 19 percent in 2015), this is more than compensated by the induction of new enrolee (25 percent in 2013 and 28 percent in 2015).

Administrative data also shows that between scheme launch and June 2014, WHIA had received about Birr 30 million as membership contributions. Additionally, according to Mebratie et al. (2019), utilization of health care rose by at least 30 percent and the frequency of visits by at least 45 percent. Whether the high rate of enrolment, the pre-payment contributions and increases in utilization translate into greater revenues for CBHI-affiliated health centres and subsequently enhance the quality of care is explored in the succeeding sections.

Table 4.2

Enrolment and drop-out across pilot regions- CBHI Ethiopia (%)

Region	2012		2013						2015							
	Enrolment		Enrolment		Drop-outs		New enrolees		Enrolment		Drop-outs (2013 members)		New enrolees (2012 & 2013 non-members)		Re-enrolment (2013 dropouts)	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Tigray	33.9	101	50.2	146	26.5	26	38.3	74	48.1	136	31.5	46	21.9	25	53.9	14
Amhara	49.5	148	62.7	188	6.9	10	33.8	52	68.4	201	9.0	17	30.4	31	54.6	6
Oromia	44.2	133	44.5	133	21.2	28	17.4	29	55.6	164	18.0	24	31.2	43	57.1	16
SNNPR	35.3	107	35.4	107	21.5	23	11.8	23	58.6	116	17.8	19	30.1	22	47.8	11
Total	40.7	489	48.2	574	18.0	87	25.1	178	57.7	617	19.1	106	28.3	121	53.4	47

4.4 Data and empirical framework

4.4.1 Data

Health facility surveys

The data for this study comes from two rounds of a health facility survey and three rounds of household survey data. The first health facility survey, a baseline round was conducted in 2011 and the second survey was conducted in 2014. In both years, the surveys gathered information on 48 health centres, 3 in each of 16 districts – 12 where the CBHI was offered and four in districts where it was not offered. On average, in 2010-11, there were about 3.3 health centres per district (MOH, 2015).[9] Essentially, the data that we work with covers the population of health centres in these districts.

The health facility surveys gathered data on patient volume, facility revenues – sources and amounts and detailed information corresponding mainly to the structural and to some extent the process domains of health care quality.

The respondent was typically the head of the health centre and based on conversations with the head as well as from various administrative records, the surveys gathered monthly data on outpatient and inpatient visits for a period of 12 months preceding the survey; annual revenues, for the year preceding the survey, from the government, patient cards, diagnostic services, sales of drugs and other sources. With regard to structural measures of quality we obtained (i) information on the number of staff and their education levels, this is available for both medical and technical staff[10] (ii) information on the availability of 18 essential drugs and (iii) availability of 21 types of equipment and facilities including labouratory services[11], an outpatient care team, delivery care, maternal and child health service (MCH), emergency care, and inpatient medical service team (iv) access to basic infrastructure such as water and electricity. In addition to these structural availability indicators, respondents were asked to identify and list the main weaknesses in their ability to deliver services. These perception based indicators included options such as shortage or poor supply of drugs, lack of medical equipment, shortage of financial resources and inadequate water supply. Finally, the survey instrument gathered information, through exit interviews of five patients on the time taken to obtain a patient card and the time taken between to see a health professional after

having (mainly nurse, doctor or health officer). The responses on waiting time are used as process indicator outcomes.

Household survey data

Three rounds of household data were collected, the first round 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. The surveys were fielded in the same sixteen districts in which the health facility surveys were conducted. Within each district, six villages were randomly selected and within each village 17 households were randomly surveyed, yielding a sample of 1,632 households. The follow-up surveys revisited 1,599 and 1,583 households in 2012 and 2013, respectively. The surveys contained various modules covering individual and household socioeconomic characteristics, demographic traits, health status and health care utilization. Of particular interest for this paper, conditional on using health care, the survey included a question on patient's satisfaction with the health care received on a five-point Likert scale ranging from very unsatisfied to very satisfy. We focus on patient satisfaction regarding the use of outpatient care from health centres in the two months preceding the survey. This yields 1,156 individual observations over three years.

4.4.2 Empirical framework

Health facility based outcomes

Our primary aim is to detect the effect of the CBHI on revenues and quality of care. Prior to examining the effect on these two outcomes we examine the effect of being affiliated to the CBHI on use of health care as captured by the monthly volume of patients (averaged over twelve months) visiting health care facilities for outpatient care, followed by the effect of CBHI affiliation on various revenue sources (patient card, diagnosis, drug sales and government budget)..[12] This is followed by an examination of the effect of CBHI-affiliation on a range of health care quality indicators. These indicators include structural quality measures, that is, availability of drugs, medical equipment/facilities, and access to water and electricity, perception-based quality indicators (drug shortages, budget shortfalls, self-assessed overall quality of service) and finally waiting time to obtain a patient card to meet a medical professional.

We assess the effect of being affiliated to the CBHI on these outcomes using a difference-in-differences (DID) approach. That is, we exploit the longitudinal nature of the data and estimate a health facility fixed-effect model,

$$y_{it} = \alpha + CBHI_{it}\beta + X_{it}\delta + T_t\pi + \theta_i + \varepsilon_{it} \quad (4.1)$$

Where y_{it} indicates the outcomes of interest for facility *i* at time *t,* X_{it} is a set of time-varying controls. *T* indicates the time period of the observation (2011 or 2014), $CBHI_{it}$ indicates whether facility *i* is affiliated to the CBHI in year *t*, β is the main effect of interest, θ_i is a health-facility fixed effect and ε_{it} is a time-variant error term.

Household survey outcomes

With regard to the household survey data, we treat patient satisfaction (satisfied or not satisfied) as a function of a vector (X_{ijt}) of observed covariates (socioeconomic characteristics, demographic factors, health status, travel time to the nearest health centre, financial participation and networks and location dummies), time fixed-effects (T_t), and whether the health centre closest to their residential location has a CBHI-affiliation ($CBHI_{ij}$).[13] Thus, we estimate satisfaction of patient *i* with health services offered in health-facility *j* at time *t*, that is, (PS_{ijt}), as follows:

$$PS_{ijt} = \alpha + CBHI_{ij}\beta + X_{ijt}\delta + \gamma T_t + \theta CBHI_{ij} * T_t + \varepsilon_{ijt} \quad (4.2)$$

We estimate several variants of (2) using a linear probability model. The coefficient on the interaction term is the main effect of interest.
A description of the variables used in our health centre analysis is presented in Appendix Table A4.1 while Appendix Table A4.2 describes the variables used in the individual analysis.

4.5 Results

Health facility outcomes

4.5.1 Descriptive statistics

Of the 48 health centres located in the 16 districts, 36 have signed contracts with the CBHI scheme to provide services to the insured. 33 of these are located in CBHI pilot districts while three additional centres are

located in areas where the scheme is not on offer to households. Descriptive statistics of the variables of interest in both years (2011 and 2014) are provided in Table 4.3.

Prior to the introduction of the CBHI, contracted health centres recorded 590 patient visits per month in the 12 months preceding the survey while for non-contracted centres the corresponding number was a little higher at 637 visits per month. In 2014, three years after the introduction of the scheme, patient visits to contracted centres almost double to 1,073 visits per month while for non-contracted centres there is almost no change (616 visits per month). Consistent with the increase in patient visits to contracted health centres, over time, there is a sharp jump in revenues from patient cards, diagnoses and drug sales between the two groups of health centres. With regard to government revenues, even at baseline, the contracted health centres had substantially higher revenues. This is perhaps not surprising as facilities located in CBHI pilot areas were provided additional financial resources by federal, regional and district health offices in preparation for the launch of the CBHI scheme.

With regard to structural indicators of quality, in 2011, in both contracted and non-contracted health centres, 15 of 18 types of drugs were readily available. In 2014, there was a slight increase and in both groups 16 of 18 types of drugs were available. A similar picture emerges for availability of medical equipment. Across both years and both groups, health centres have 15 to 16 of the 21 types of equipment that they are expected to be equipped with. Despite limited and similar increases in the availability of drugs (as measured by a binary question, whether they are available or not), the perceptions of health care workers with regard to the availability of drugs is markedly different across the two groups of health centres. In 2011, in 19 percent of the contracted health centres, workers perceived drug shortages while this dropped to zero in 2014. Similarly, with regard to budget shortfalls, health care worker perceptions of shortfalls drops from 17 to 3 percent in contracted facilities while it rises from zero to 8 percent in non-contracted facilities. In general, reflecting overall increases in access to health care, there is an increase in staff in both groups of health centres over time. The total staff in health centres increases from 25 to 31 workers while the number of technical staff increases from 17 to 20.

Table 4.3a
Descriptive statistics based on health centre contract signing status: 2011 Comparisons

Variables	Contracted		Non-contracted		Total Sample		P-value
	Mean	SD	Mean	SD	Mean	SD	
Monthly volume of outpatients	590	652	637	576	600	627	0.88
Revenue (in '000 Birr)							
Patient card revenue	24.3	40.2	31	36.7	26.6	38.1	0.73
Diagnosis revenue	4.3	6.8	18	18.2	9.3	13.5	0.03
Drug revenue	143.3	172.4	62.6	45.6	123.7	154.9	0.18
Government budget revenue	348.1	294.2	68.8	45.7	308.2	289.6	0.07
Availability							
Availability of drugs (18 in total)	14.8	1.80	15.3	2.5	14.9	2.0	0.51
Availability of equipment (21 in total)	15.8	2.4	16.7	1.6	16.0	2.3	0.25
Infrastructure							
Water supply	0.53		0.58		0.54		0.74
Electricity access	0.81		0.75		0.79		0.69
Self-reported problems							
Shortage/poor supply of drugs	0.19		0.00		0.15		0.10
Shortage of budget	0.17		0.00		0.13		0.14
Average waiting time (in min)							
To get medical card	11.7	10.6	15.8	7.9	12.7	10.1	0.25
To see medical doctor	32.1	27.9	31.3	11.7	31.9	24.7	0.92
Head's characteristics							
Head's age	29.8	7.8	28.4	6.7	29.5	7.5	0.58
Training in health service (1=yes)	0.72		0.67		0.71		0.72
Experience working as head (1=yes)	0.28		0.42		0.31		0.37
Human resources in the centre							
Medical Staff	17	8	15	8	17	8	0.56
Total Staff	25	13	26	10	25	12	0.90

P-values are for mean difference comparisons between contracted and non-contracted health centre.

Table 4.3b

Descriptive statistics based on health centre contract signing status: 2014 Comparisons

Variables	Contracted		Non-contracted		Total Sample		P-value
	Mean	SD	Mean	SD	Mean	SD	
Monthly volume of outpatients	1073	760	616	495	977	731	0.12
Revenue (in '000 Birr)							
Patient card revenue	48.2	48.1	15.5	9.4	37.3	42.3	0.03
Diagnosis revenue	21.3	27.1	23.6	39.7	22.2	31.8	0.86
Drug revenue	220.1	157.9	77.5	37.9	185.2	151.2	0.005
Government budget revenue	218.1	341.2	37.2	25.3	180.1	311.4	0.15
Availability							
Availability of drugs (18 in total)	15.8	1.6	15.8	1.7	15.8	1.6	0.96
Availability of equipment (21 in total)	16.7	1.8	15.7	1.6	16.5	1.8	0.23
Infrastructure							
Water supply	0.81		0.83		0.81		0.84
Electricity access	0.94		0.83		0.92		0.24
Self-reported problems							
Shortage/poor supply of drugs	0.00		0.08		0.02		0.08
Shortage of budget	0.03		0.08		0.04		0.42
Average waiting time (in min)							
To get medical card	12.4	11.1	27.3	30.2	16.2	18.6	0.01
To see medical doctor	21.5	23.2	19.7	17.3	21.0	21.7	0.81
Head's characteristics							
Head's age	30.8	7.9	28.3	4.9	30.2	7.3	0.31
Training in health service (1=yes)	0.44		0.33		0.42		0.51
Experience working as head (1=yes)	0.50		0.50		0.50		1.00
Human resources in the centre							
Medical Staff	19	7	23	10	20	8	0.20
Total Staff	30	11	35	13	31	11	0.29

P-values are for mean difference comparisons between contracted and non-contracted health centre.

Revenue indicators in 2014 are adjusted for inflation.

4.5.2 Effect of CBHI on patient volume and revenues

Estimates of the effect of CBHI affiliation on outpatient visits and revenues from four sources are presented in Table 4.4. Consistent with the descriptive statistics, the estimates show that after controlling for health centre fixed effects, CBHI affiliated health facilities experience a sharp increase in the volume of outpatient visits. The increase amounts to 653 more outpatient visits per month or an increase of 111 percent as compared to outpatient visits these health centres had in 2011. As may be expected, given the sharp increase in patient visits to CBHI-contracted centres, there is an increase in resource flows to contracted health centres mainly from patient cards and drug sales. As compared to baseline, signing a contract is associated with a 144 percent increase in revenues from patient cards and a 173 percent increase in revenues from drug sales as compared to not signing a contract. Although not shown in the table, the estimates are robust to the inclusion of covariates such as the number of staff and characteristics of the head of the health facility.

Table 4.4
Effect of CBHI affiliation on outpatient volume and revenues

Variables	Monthly volume of outpatients	Revenue from patient card ('000 Birr)	Revenue from diagnosis ('000 Birr)	Revenue from drug sales ('000 Birr)	Revenue from government budget ('000 Birr)
CBHI	653***	44.7***	-11.6	108.6***	-125.5
	(190)	(15.5)	(25.3)	(27.6)	(80)
Time period- 2014	-95	-12.8	21.2	498.1	-21.9
	(144)	(11.8)	(24.6)	(14)	(14.8)
Observations	64	54	43	82	66
Adj-Rsq	0.484	0.407	0.149	0.436	0.118

Notes: Robust clustered standard errors in parentheses. All specifications control for health centre fixed effects. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

4.5.3 Effect of CBHI affiliation on quality of care

Where are these additional resources spent? Table 4.5 provides information on the manner in which resources generated through the CBHI are spent. The most common use of funds is to purchase drugs and disposable medical equipment such as syringes, gloves, and other related items. About 90 percent of the facilities report using the resources for these two purposes. This is followed by efforts made to purchase durable medical equipment, cover utility and enhance water and electricity related

infrastructure. Although, the retained fees are not meant to be used for salaries and payments, about one-fifth of the facilities do use the additional resources to reward staff.

Table 4.5
Utilization of CBHI generated resources in 2014

Description of money use	(%)	N
Drugs	94.4	34
Disposable medical facilities (syringes, bandages, medical gloves, detergent)	88.9	32
Durable medical equipment	77.8	28
Utility payments (electricity, telephone, water)	52.8	19
Improve infrastructure (water, electricity)	47.2	17
Upgrade or expand construction	41.7	15
Salaries and incentives to employees	22.2	8
Transferred to government finance office	11.1	4

Notes: The figures show the proportion and number of health centres that spend CBHI-generated resources on a particular line of expenditure. 36 health centres are affiliated to the CBHI scheme.

Despite reporting that the additional resources were used to buy drugs and (durable) medical equipment there is no association between CBHI-affiliation and drug and equipment availability, at least as measured by the binary question of whether a particular set of drugs or a particular equipment is available or not (Table 4.6). This is perhaps not surprising as availability of drugs and equipment in both contracted and non-contracted health centres was already high in 2011 and does not show much change in 2014. Furthermore, such outcome variables do not capture whether drugs/equipment is always available and/or the volume of availability.

Table 4.6
Effects of signing CBHI contract on availability of drugs, medical equipment/facilities and basic infrastructure

Variables	Drug availability	Medical equipment/ facilities availability	Water supply	Electricity Access
CBHI	0.023	0.035	0.028	0.056
	(0.060)	(0.032)	(0.154)	(0.157)
Time period - 2014	0.032	0.020	0.250*	0.083
	(0.057)	(0.036)	(0.128)	(0.145)
Observations	96	96	96	96
Adj-Rsq	0.113	0.147	0.219	0.078

Notes: Robust clustered standard errors in parentheses. All specifications control for health centre fixed effects. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

In marked contrast to the response on these objective variables, the perception of whether there is still a problem of drug shortages declines by 28 percentage points in the case of CBHI-affiliated facilities. Similarly, the perception that there is a general shortage of financial resources also declines by about 22 percentage points (Table 4.7).

Table 4.7
Effects of signing CBHI contract on perceived quality of care

Variables	Problems of drug shortage	Problems of budget shortage	Waiting time for patient card	Waiting time for seeing a doctor/ nurse
CBHI	-0.278**	-0.222**	-12.86	0.95
	(0.106)	(0.108)	(9.67)	(7.51)
Time period - 2014	0.083	0.083	13.56	11.6**
	(0.082)	(0.082)	(9.30)	(4.38)
Observations	96	96	95	96
Adj-Rsq	0.163	0.078	0.078	0.085

Notes: Robust clustered standard errors in parentheses. All specifications control for health centre fixed effects. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Despite the large increase in outpatient visits at CBHI-contracted facilities there is no statistically discernible effect in waiting times to obtain a patient cared or see a medical professional. This may seem surprising but despite the increase in the number of outpatient visits, utilization of health care remains low in Ethiopia (see Mebratie et al. 2019) and at the same

time there has been an increase in the medical and non-medical human resource endowment across all health centres.

4.5.4 Household survey outcomes

Descriptive statistics of patient satisfaction are provided in Table 4.8 while estimates of the impact of CBHI affiliation on patient satisfaction are in Table 4.9.

Table 4.8
Satisfaction with treatment received at contracted and non-contracted health centres

	Health care service								
	2011			2012			2013		
	CBHI	Non-CBHI	P-Value	CBHI	Non-CBHI	P-value	CBHI	Non-CBHI	P-value
Unsatisfied	0.07	0.01	0.02	0.11	0.09	0.64	0.073	0.03	0.15
Neutral	0.06	0.06	0.85	0.10	0.08	0.70	0.043	0.14	0.00
Satisfied	0.87	0.93	0.11	0.79	0.83	0.52	0.884	0.83	0.26
N	309	101		286	59		328	73	

Notes: CBHI- Service providing health centre is CBHI affiliated and Non-CBHI indicates that the service providing health centre is not affiliated to CBHI.

Table 4.9
Effect of CBHI contract on satisfaction with health care received

Variables	1	2	3	4
CBHI contracted health centre	-0.061*	-0.025	-0.046	-0.015
	(0.033)	(0.035)	(0.039)	(0.040)
CBHI contracted health centre*2012	0.035	0.031	0.047	0.061
	(0.065)	(0.066)	(0.071)	(0.072)
CBHI contracted health centre*2013	0.109*	0.128**	0.161**	0.179***
	(0.057)	(0.058)	(0.063)	(0.063)
2012	-0.101*	-0.101*	-0.133**	-0.127**
	(0.056)	(0.057)	(0.061)	(0.062)
2013	-0.093*	-0.105**	-0.158***	-0.159***
	(0.051)	(0.052)	(0.056)	(0.055)
Observations	1134	1124	961	960
Adj-Rsq	0.008	0.028	0.079	0.108

Notes: Additional controls in column 2 are socio-economic status and demographic characteristics of the individuals; estimates in column 3 include the regressors in column 2 and adds individual health status; estimates in column 4 include the regressors in column 3 and adds participation in networks and participation in financial institutions and regional fixed effects. Robust standard errors in parentheses; Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

Column 1 of Table 4.9 provides estimates without the inclusion of individual controls while the remaining columns control for a range of individual attributes including socio-economic status, demographic traits and self-reported health status. Regardless of the specification used there is a positive link between CBHI-affiliation and patient satisfaction in 2013. Between 2011 and 2012 there is no change. However, in 2013, patients in CBHI-affiliated health centres are almost 11 percentage points more likely to report that they are satisfied. Controlling for individual traits increases this to almost 18 percentage points. While it is hard to directly pinpoint the reasons for this increase in satisfaction, the increase in the flow of resources to the CBHI-affiliated health centres combined with the spending patterns of the centres and the perception that drug shortages and budget shortages have declined suggests that the proximate reason for the increase in patient satisfaction maybe the higher quality of care on offer. Thus, it seems that both, from the perspective of the medical professional as well as the patient there is an increase in the quality of care which may be attributed to the CBHI scheme.

4.6 Concluding remarks

This paper examined the effect of health facility affiliation to a CBHI scheme in Ethiopia on the volume of outpatient visits, resource mobilization and quality of health care. The paper was based on a two round panel of health facilities and three rounds of household data. Consistent with a recent paper (Mebratie et al. 2019) on the effects of the CBHI on health care utilization, the paper found a sharp increase (111 percent) in the number of outpatient visits to CBHI-affiliated health centres. This increase in patient flows was accompanied by increases in health centre revenues from patient cards (184 percent) and sales of drugs (76 percent). As part of a virtuous cycle, the increased revenue flow was predominantly used by health centres to purchase drugs and disposable and durable medical equipment. This enhancement of structural indicators of quality also seems to have translated into greater patient satisfaction. Patients treated at CBHI-affiliated health centres appeared to be at least 11 percentage points more satisfied than those treated elsewhere. These results combined with the relatively high levels of CBHI enrolment, retention and re-enrolment of those who had dropped out (Table 4.2) suggests that the Ethiopian CBHI has been able to successfully negotiate the main stumbling block, that is, poor quality of care, which has plagued similar CBHI

schemes in Sub-Saharan Africa (for example, Dong et al. 2009; Mladovsky 2014). The combination of supply-side investments prior to launching the CBHI and the freedom to use retained resources to finance health facility expenditure are likely to have been contributory factors.

While these results are promising and suggest that such schemes are able to generate resources for the health sector and enhance quality of care, at least in their current configuration their contribution to the overall health care budget is likely to remain limited. For instance, in the Ethiopian case, on an annual basis about 10 million Birr has been raised by the pilot scheme from about 50,000 eligible households. Even if the scheme were to be expanded to the entire country and had an enrolment rate of 50 percent of all households (about 8 million households) it implies that the scheme would be able to generate resources to cover about 25 percent of the countries health care budget of 6.3 billion Birr for 2015/16. While this is not trivial it also provides a sense of the potential of such voluntary insurance schemes.

Notwithstanding the remarks and the calculations in the preceding paragraph the results of this paper along with the existing body of work on the Ethiopian CBHI suggest that, as in the case of Rwanda and Ghana, the Ethiopian CBHI is likely to play an important role in enhancing access to health care to wide swathes of its population.

Notes

[1] The analysis focuses on health centres, that is, the middle-rung of the health care system since these are the first port of call for accessing curative care and such centres also regulate entry to higher levels of the health care system. Health posts provide care for free and services from private run clinics are not covered by the scheme.

[2] Spaan et al. (2012) analyse the effects of community based health insurance, social health insurance and private health insurance schemes.

[3] For CBHI schemes in Africa the structural quality of care outcome indicators included drug availability, number of technical staff, staff time per visit, range of services offered, waiting time and consultation by nurse instead of doctor and patient perceptions of drug availability, the quality of the prescribed medicine and staff attitude.

[4] In terms of the contribution of the CBHI, the 2013/2014 NHA document states that, "the current HA estimation looks at 2013/14, too soon for the Ethiopian Health Insurance Agency to show a significant contribution in managing health resources. At that time, community based health insurance (CBHI) had been piloted in only 13 woredas, in the four largest regions, and preparation of the social health insurance (SHI) program was just starting." (MoH 2017)

[5] Core household members include parents and their children below the age of 18.

[6] The WHIA carries out four main responsibilities: i) identifying and signing contracts with health facilities to provide care to scheme beneficiaries ii) reimbursing providers for the health care utilized by beneficiaries iii) financial administration and iv) database management including membership, premium payment and utilization of health care by members.

[7] In preparation for service provision, resources were provided in kind and in cash to contracted health facilities by the federal government. This support amounted to Birr 40,000 and was meant to ensure an acceptable level of quality of health care, that is, support the purchase of drugs, medical supplies and/or medical equipment. Woreda and regional government also contributed to enhancing the capacities of

contracted facilities in terms of human resource and basic infrastructure, including water, electricity/generator (EHIA, 2015: 84).

[8] Additional details on the scheme are available in Mebratie et al. (2015).

[9] This number is calculated by dividing the total number of health centres (2,660) by the total number of districts (800) in the country in 2010-11 (MOH 2015).

[10] We also have information on the location, year of establishment, individual characteristics of the head of the health centre (age, sex, education, training and experience). These variables as used as controls in the statistical work that follows.

[11] Blood, urine, stool and rapid HIV tests.

[12] The revenue data are in real 2011 prices.

[13] It is possible but improbable, given the transportation and road infrastructure in rural Ethiopia, that households seek care at other than their most proximate health centre.

5 Community participation and the quality of rural infrastructure in Ethiopia

Abstract

Ethiopia's Productive Safety Net Program (PSNP) is one of the world's largest food security programs. The program supports chronically food insecure rural households and at the same time promotes long-term food security through the creation of rural infrastructure. While studies on the PSNP have examined various features of the program, there is limited knowledge on the quality and durability of infrastructure built through the program. Ensuring and maintaining the quality of local public goods built through the PSNP and similar social protection programs is a costly and recurring issue. Motivated by the long-term objective of the program, this paper analyses the role played by a key design feature of the PSNP, that is, its Community Based Participatory Watershed Development approach in influencing a project's physical condition and its operational status. The paper is based on survey data and technical assessments provided by soil and water conservation engineers covering a sample of 249 Soil and Water Conservation (SWC) projects located in fifty three watershed communities. The survey is complemented by qualitative information gathered through interviews and discussions. The location of multiple projects, with differing levels of participation in the same watershed communities permits estimation of the effects of community participation after controlling for community fixed effects. We find that projects in which beneficiaries play a larger role in project monitoring and evaluation are substantially less likely to be damaged and be in better operational condition. These results support the idea that community participation translates into more durable infrastructure.

5.1 Introduction

Since the mass famine in 1983-84, Ethiopia has tried different measures to tackle deep-rooted poverty. These range from regular annual food aid to emergency food assistance. The latter has been delivered either as payments for public works or direct support. Though these measures have been successful in averting mass starvation, they have not yet banished the threat of further food insecurity. Keeping this in mind, recent efforts have focused on the promotion of rural livelihoods by building local infrastructure assets through different food security programs (MoARD, 2010).

In 2003, the government initiated a consultation with development partners for an alternative to the existing emergency response of channelling food aid to fill consumption gaps. This alternative was aimed at supporting the needs of chronically food insecure households while at the same time developing long-term solutions to tackle the root causes of food insecurity. The process ended by proposing a Food Security Program (FSP) which encompassed a shift from an emergency relief system to sustainable food security. This program was formally launched in January 2005 with the name Productive Safety Net Program or PSNP (Gilligan et al., 2009). The PSNP has three inter-connected objectives. First, to protect beneficiaries against hunger by providing cash and/or food during periods of food shortage, second, to prevent further impoverishment by protecting the sale of household assets and third, to promote sustainable livelihoods by building local infrastructure assets. While the first two objectives may be classified as short-term, the third objective is related to the long-term solution of addressing the problems of food insecurity (Devereux et al., 2006).

Unlike preceding interventions, the PSNP program has several distinguishing features. First, there is a distinction between direct support (DS) and public work (PW) beneficiaries. The former includes vulnerable but labour constrained households who receive support from the program but are not expected to provide any labour contribution, while the latter are expected to provide time and help build community assets. Second, according to MoARD (2005), natural resource degradation in general, and soil erosion and drying up of water sources in particular, are the root causes behind declining agricultural production which eventually leads to poverty and food insecurity. Consistent with this analysis, natural resource management using soil conservation and flood control structures, together

with water harvesting and water conservation projects are the most important components of the public works projects implemented under PSNP. Finally, in order to achieve its long-term objectives of creating and maintaining quality local rural infrastructure assets the programme has adopted a so-called Community Based Participatory Watershed Development (CBPWD) approach which requires active participation of the community in the overall program cycle. As is by now quite widely known, the aim of such community based development initiatives is to reverse the traditional top-down approach and allow beneficiaries (the community) to participate in all aspects of watershed development by involving them in the selection, implementation, management and maintenance of projects.

Since its inception, the PSNP has attracted a large body of empirical work. A number of these studies have evaluated the targeting efficacy of the PSNP (Nigussa and Mbrengwa, 2009); its impact on assets, food security and consumption, diversification (for example, Knippenerg and Hoddinott, 2017; Mohamed, 2017; Béné et al., 2012; Hoddinott et al., 2012; Berhane et al., 2011; Andersson et al., 2011; Gilligan et al., 2009) and its unintended but positive impact on emission of greenhouse gases (Woolf et al., 2018; Woolf et al., 2015).[1] While the results vary across studies, depending on the district and the region under scrutiny, the literature tends to suggest that the PSNP has had a positive effect on a range of outcomes, including enhancing household resilience to covariate shocks and asset accumulation.[2] The construction of durable and quality rural infrastructure underpins the realization of the long-term objectives of the PSNP and although, there are a wide range of studies on the program, the effect of the program and in particular its participatory approach on rural infrastructure is still awaited.

Motivated by the long-term objective of the program and its participatory approach, the current study aims at analysing the effectiveness of community participation in determining the quality and durability, as measured by project damage and project operational status, of local public goods built through the PSNP. In particular the study provides: (i) an assessment of the extent of community participation in various project-related decisions (ii) an assessment of the condition of community assets in terms of project damage and operational status and (iii) an examination of the effect of community participation in determining the condition of assets built through the PSNP.

The paper draws on primary data collected from 249 rural projects constructed between 2005 and 2013 which are located in 53 watershed communities in four food insecure districts located in Ethiopia's Oromia region - a region where the PSNP is particularly active. Due to the focus of the PSNP, attention is restricted to soil and water conservation structures. Data were collected through a field survey which included beneficiary self-assessment as well as on-site observations and assessments by soil and water conservation engineers. The surveys were augmented with qualitative data gathered using Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs).

To preview our results, we find a high degree of participation ranging from 72 to 83 percent across 12 participation decisions with substantial variations in participation rates across the four districts. The variation in participation across districts parallels variations in project outcomes with project damage ranging from 25 percent in districts with high participation to 50 percent in districts in with low levels of participation. The empirical approach which exploits the availability of multiple projects located in the same watershed community to identify the effect of community participation shows that community participation in project monitoring and evaluation plays a substantial role in enhancing the physical and operational state of projects. For instance, some of the estimates suggest that 50 percent of the gap in project damage across districts may be attributed to differences in participation in monitoring and evaluation.

The remainder of the paper is organized as follows. Section 2 provides a review of the theory and empirical evidence on the role of community participation in development interventions. Section 3 provides details on the PSNP and its Public Works component. Section 4 outlines the data and methodology. Section 5 discusses the findings while the final section concludes.

5.2 Community participation: theory and evidence

In the last two decades, driven by disenchantment with centralized modes of governance, waves of decentralization have occurred in countries covering half the world's population (Bardhan and Mookherjee, 2006) and large sums of money (Mansuri and Rao, 2013) have been ploughed into poverty-alleviation projects which directly involve project beneficiaries (the community) in some or all aspects of project design, implementation and management. This trend has been motivated by the perception that a

centralized government breeds corruption and rent-seeking and is unaccountable. Decentralization of control over resources and divestment of authority to local governments coupled with community participation has been offered as an approach to enhance beneficiary targeting, foster the adoption of projects that are more closely aligned to local preferences, improve service delivery and reduce corruption.[3] Notwithstanding these expectations, theoretically, there is no guarantee that such outcomes will occur (Waller et al. 2002).

Arguments in favour of decentralization and community participation centre around the role of local information in leading to more informed decisions and through the provision of agency, voice and control to project beneficiaries, a stronger link between allocation of funds and local preferences. Such control and preference matching may be expected, among other outcomes, to lead to more durable and better-maintained community assets (Finsterbusch and Van Wicklin, 1987; Mansuri and Rao, 2013:182; Nkwake et al., 2013). However, it is also possible that due to "local capture", development outcomes will continue to mirror or perhaps worsen as compared to a more centralised system as bureaucratic and political power moves downward (Platteau and Gaspart, 2003; Dasgupta and Beard, 2007).

The theoretical debates on the relative merits of decentralization and community participation have fostered a large empirical literature which has been comprehensively reviewed by Mansuri and Rao (2013). Their report focuses on three issues, namely, evidence of local elite capture, the role of participation in strengthening civil society and most pertinently for the current paper, the impact of participation on development outcomes including the quality of local infrastructure. Compared to the range of studies on various dimensions of participation, the literature on the role of participation in determining the quality of local infrastructure is quite thin. Only a handful of studies have explored the link between participation and the quality of public works infrastructure. These include, Narayan (1995), Prokopy (2005), a pair of studies by Khwaja (2004, 2009) and Mansuri (2012).

Based on a global study of evaluation reports covering 121 rural water supply projects in 49 developing countries, Narayan (1995) concluded that overall beneficiary participation throughout the project cycle (design to maintenance) was a significant factor in ensuring overall project effectiveness and success.[4] Overall project effectiveness and success was generated

by using factor analysis of twenty performance indicators. The analysis was based on cross-section data and relied on multivariate regression analysis using a score of participation (one indicating zero participation and seven indicating high participation in decision making as well as control of resources) as the main explanatory variable. The quantitative analysis was combined with systematic qualitative analysis of some selected cases. Although the study is innovative in terms of attempting to examine the effect of participation on project outcomes, the paper's use of factor analysis and an overall measure of participation makes it impossible to identify the effect of a specific participation decisions on a specific project outcome.

Building on Narayan (1995), Prokopy (2005) explored the relationship between five project outcomes and two measures of participation - beneficiary contribution to the capital cost of projects and household involvement in decision making.[5] Based on cross-section data collected from World Bank assisted water supply and sanitation projects in 45 villages in two Indian states, the author showed that both measures of participation significantly enhance three out of the five outcomes (village level satisfaction, equal access to water and time savings) based on which the author recommends encouraging both measures of participation. The author admits the existence of reverse causality between participation and project outcomes and attempts to address this concern by using pre-project participation measures. However, four of the five outcomes remain susceptible to reverse causation. Furthermore, the outcomes used in the paper are mainly subjective.

Based on cross-section data analysis of 132 infrastructure projects in 99 rural communities located in Northern Pakistan, Khwaja (2004, 2009)[6] finds that projects constructed by the government, which implies lower levels of participation, have a maintenance score which is 23.6 percentage points lower (implying maintenance is less likely to have been carried out) than NGO-initiated projects. Highlighting the importance of community capacity, the paper finds that communities are better able to maintain projects that are less complex and which are being refurbished as compared to new projects. An interesting twist is the finding that community participation in non-technical decisions is associated with a 55 percentage point increase in maintenance score while greater community participation in technical decisions is associated with a 39 percentage point reduction in

the maintenance score. The author also finds that there is a U-shaped relationship between greater inequality in project returns and maintenance. That is, as inequality increases there is a decline in the extent to which project maintenance needs are met but increases beyond a certain threshold as high levels of inequality indicate that the project has effectively been privatized.

Mansuri (2012) extends Khwaja's work by examining the link between community participation and project outcome quality using cross-section data on 230 infrastructure projects located in 80 villages in three of Pakistan's largest provinces. Half the projects in the sample were constructed through Pakistan's National Rural Support Program (NRSP), which adopts a participatory approach, while the remainder were constructed by the concerned government departments. Design and construction, and current condition and maintenance are the main outcomes assessed in the study. Mansuri (2012) finds that participatory projects are better designed and constructed as compared to projects constructed without substantial community participation. Similar to Khwaja (2009), the study finds that such projects are also better maintained. The paper argues that this may be due to NRSP's approach to project maintenance where such costs are included as part of project costs at the proposal stage although the community is responsible for project maintenance. On a negative note, Mansuri (2012) finds that the distribution of project benefits is not sensitive to project type and regardless of whether a project has been constructed through the NRSP or government line departments, the share of marginalized groups in accessing project benefits is far less than their share in the population.

A recent narrative synthesis of the effect of community-driven development (CDD) projects on various outcomes including the quantity and quality of infrastructure is provided by White et al. (2018).[7] A unique element is that the report draws on the grey literature and compiles evidence from program documents, process evaluations and qualitative research papers. The authors conclude that CDD projects have led to substantial increases in the quantity of small-scale infrastructure although in terms of their (technical) quality, the evidence is mixed and varies across countries. Similarly, effects on most welfare outcomes (health, education) are insignificant except in the case of the effect of improved water supply on time savings.

While the studies discussed above look directly at the effect of community participation on project outcomes, a point emerging from these studies is a community's capacity in maintaining project quality. A related strand of the literature examines this aspect directly and concludes that the inability of communities to maintain projects is not an indictment of the participatory approach but a failure to provide adequate post-construction financial and technical support. For instance, based on their global review of water projects, Katz and Sara (1997) argue that inadequate technical support is one of the main reasons for project failure. Isham and Kähkönen (2002) reach a similar conclusion on the basis of their analysis of water projects in India, Indonesia and Sri Lanka. Echoing this conclusion, in their impact evaluation of the Bolivian social find, Newman et al. (2002) find that water projects were associated with increases in water quality only if communities also received training. An interesting study which examines the long-term sustainability of participatory rural water pipeline schemes in Malawi is provided by Kleemeier (2000). Based on an examination of 12 schemes which were constructed 3 to 26 years prior to the time she conducted her analysis, Kleemeier finds that about half the schemes are not functioning well. She goes on to conclude that participatory community organizations are capable of managing relatively small schemes, but do not have the technical and management capacity to handle larger schemes. Although not explicit, in their review, White et al. (2018) do not indict the CDD approach but suggest that the poor quality of infrastructure projects may be attributed to poor supervision, poorly qualified contractors and engineers and insufficient capacity of implementing agencies.

As far as the PSNP program is concerned, soon after its commencement the Government of Ethiopia (2006) conducted a review of the public works program. While the report pointed out variations in project quality perhaps linked to differences in implementation capacity, the main conclusion was that most projects implemented through the PSNP, especially roads, irrigation and water supply projects, have failed to meet minimum technical standards. While there have been no attempts to examine the impact of these projects on economic outcomes, in their review of social protection programs in Ethiopia, Devereux and Guenther (2009) expect that the economic impact of such PSNP constructed assets is likely to be negligible. It is likely that the limited attention paid to the quality of public works in the initial years of the programme may have been driven by an

immediate focus on other program objectives. In any case, a necessary condition for project returns is adequate project quality and maintenance which in turn calls for an investigation of whether the community-based approach used in the PSNP program has any bearing on such outcomes.

5.3 The Productive Safety Net Program: An overview

As described in the previous essays, the PSNP program, which operates in food insecure districts of the country, has been operating since January 2005 and is currently in its fourth phase (2015/16 – 2019/20).[8] This phase builds on the efforts made in the previous phases and stresses the achievement of the program's objectives by forging links between the PSNP and other food security programs (MoARD, 2010). Currently, the programme covers 319 food insecure districts or about 40 percent of the country's districts (MoA, 2014; Woolf et al., 2018, UNICEF, 2016). The main objectives of the program remain unchanged and the focus is on shifting the trend from meeting short term food needs through emergency relief, to addressing the underlying causes of food insecurity. As discussed by Devereux and Guenther (2009), the three main objectives are to protect households by providing resources to smooth consumption during the dry season, protect households by preventing sales of household assets and reduce the probability of borrowing and finally promote livelihoods by building community assets with development potential. In 2013/14, the year before the data for this study was collected, the program had a cash budget of about $205 million and access to food resources to the tune of 274,844 metric tonnes and provided social transfers to about 6 million food insecure individuals either through "public works" activities (4.8 million) or as "direct support" (1.2 million) for labour constrained households (MoA 2013).

Beneficiaries of the public work component are expected to undertake public works activities in six major areas – these are, soil and water conservation/water harvesting, construction of rural feeder roads, bridges and fords, water supply for animal and human use, creation of social infrastructure (schools, health and animal posts), small scale irrigation activities, and agricultural activities related to composting and farmers training. Among these categories, soil and water conservation/water harvesting is the dominant activity and accounts for more than 70 percent of the total

public works projects in most districts (MoARD, 2010). Project beneficiaries are expected to be involved in all elements of the public works project cycle.

The overall approach is called Community Based Participatory Watershed Development (CBPWD) and the overarching objective of the participatory model is: "…to generate greater cohesion within the society and enable its poorest members to benefit from the various assets created and eventually to overcome their food insecurity". The project implementation manual contains a detailed guide on the steps that need to be followed to ensure community involvement from project inception, to implementation and maintenance. Based on the CBPWD guidelines each watershed needs to form a Community Watershed Development Committee (CWSDC) and watershed residents need to participate in various activities. Based on the manual, four major categories of participation may be identified. These four participation categories are participation in planning and implementation; project usage and benefit distribution; maintenance; project monitoring and evaluation. Within each of these broad categories there are several sub-categories and beneficiaries are expected to play a role in determining each of these outcomes. As is discussed in the next section, the data collection efforts were guided by the CBPWD and attempted to measure community participation in each of the four broad categories as well as various sub-categories.

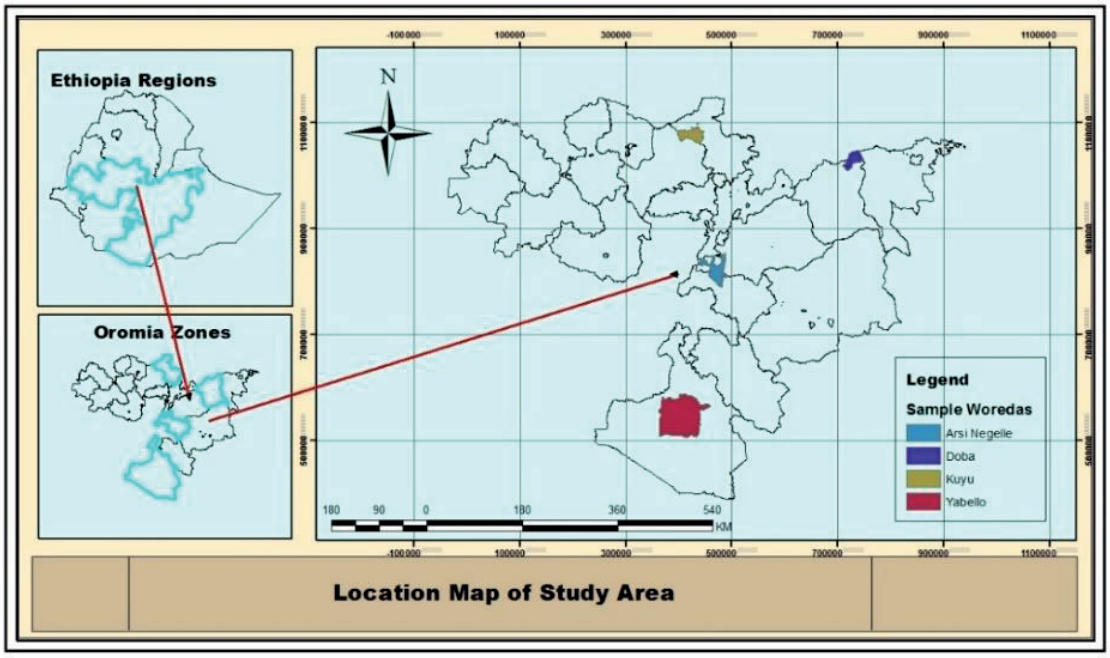
5.4 Data and empirical approach

5.4.1 Data

The study relies on data collected between August 2014 and January 2015 from four food insecure districts (Yabello, Kuyu, Arsi Negelle and Doba) located in Ethiopia's Oromia region.[9] Of the 319 districts where the PSNP operates, 25 percent are located in this region.[10] These 79 PSNP districts may be divided into three agro ecological climatic zones, that is, low altitude *(kola*), mid altitude (*woynadega*) and high altitude (*dega*). Some districts have features of all three agro-climatic zones. The three climatic zones (low, mid, high) account for about 30, 34 and seven districts, respectively, of the total PSNP districts in the region while the remaining eight consists of districts with mixed features. In order to ensure representation of each agro-ecology in the sample, one district was randomly selected from each of the three climatic zones.[11] In addition a fourth district which has mixed features was also selected. Map 1 indicates the location of the four sample

districts. Given the predominance of natural resource - soil and water conservation/harvesting projects in the PSNP's portfolio, data collection was restricted to these two project categories.[12]

Map 5.1
Location of study districts



Subsequently, due to financial and logistical reasons, we decided to collect data from 20 percent or 17 of the 84 PSNP villages located in the four randomly chosen districts. Based on the share of each district in the total number of PSNP villages we selected 4, 3, 4 and 6 villages to be surveyed from Yabello, Arsi Negelle, Kuyu, and Doba districts, respectively. Within each village, based on the share of person days allocated for soil and water projects, we planned to gather information on about 15 (in the case of Kuyu and Yabello) and 20 (in the case of Arsi Negelle and Doba) soil and water conservation projects per village with an overall plan of covering 295 structures in the four districts. Due to logistical challenges the target could not be reached and the study is based on surveying 249 projects located in 17 villages spread over 53 watershed communities. The number of households residing in a watershed ranges between a minimum of 15 to a maximum of 300.

Given the nature of the public works, two types of questionnaires were administered. The first, a collective questionnaire, was administered to a so-called Structure Response Group (SRG) which consisted of four to six beneficiaries. A total of 1,238 individuals participated in the 249 SRG.[13] To be part of the SRG, an individual had to be a resident of the watershed community and a participant in the public works program. Individuals were randomly selected from a list of public works beneficiaries available at the watershed community level and randomly assigned to a structure response group. The SRG questionnaire gathered information on watershed community traits (number of households in the watershed, access to public facilities) project characteristics (type, age, new or refurbished), formation of the CWSDC and information on current operational and physical status of the project. Immediately after the collective survey, an individual-level survey was administered to each of the SRG participants. This survey was used to gather information on the main explanatory variable, community participation – defined as whether the household or its members have participated in twelve project decisions. Consistent with the guidelines in the CBPWD these decisions were categorized into four major types of participation – planning and implementation, project usage and benefit distribution, maintenance, and monitoring and evaluation. In addition, the individual survey gathered information on individual and household characteristics, perceptions of PSNP and CBPWD and existing social interactions between and within watershed communities.

The responses of the SRG on the operational and physical status of individual projects were supplemented by a technical survey conducted by soil and water conservation engineers. These six engineers, each with more than six years of experience with the technical guidelines prescribed in the CBPWD manuals and the author visited each of the projects and measured their condition in terms of their physical damage and operational status.

The qualitative data collection included eight Key Informant Interviews (KII) – two in each district and one focus group discussion (FGD) in each of the 17 villages (kebeles) where the SRG and individual surveys were administered.[14] The discussions and interviews revolved around the implementation of the public works component of the PSNP, views on the relationship between the administrative officials and beneficiaries, reasons for participation or non-participation in public works project decisions.

5.4.2 Empirical approach

A necessary condition for the PSNP to be part of a solution to the country's food security concerns is that infrastructure projects built through the program should be of adequate quality. Construction of durable assets is vital for the realization of the long term objective of the PSNP. Consistent with this line of argument, the main outcome variable used in this paper is the extent of a project's physical damage as determined by on-site visits conducted by engineers. While it is subjective, we also use information provided by the engineers on the functional status of a project.

Physical condition was rated on a 5 point scale ranging from undamaged to severely damaged as well as in terms of the percentage of a project that was damaged.[15] Engineers provided estimates in terms of the percentage of a project that was damaged and a response based on the 5 point scale while the SRG provided an estimated based only on a 5 point scale. Operational status was defined in terms of a 3 point scale (fully operational, partially operational, non-operational) and is a measure of the extent to which a project meets the purpose for which it is intended. Accordingly, we treat the two outcome variables (Y) for project i located in watershed community j as a function of, project characteristics (P) and community participation in project decisions ($Part$), ε_{ij} is an unobserved error term. That is,

$$Y_{ij} = \lambda + P_{ij}\eta + Part_{ij}\mu + \varepsilon_{ij} \qquad (5.1)$$

P_{ij} includes project specific characteristics such as project type (soil conservation/water harvesting), age, mode of construction, that is, completely new or extension of an existing project). $Part_{ij}$ in (1) includes four measures of participation – that is, participation in planning and implementation, project usage and benefit distribution, maintenance, and monitoring and evaluation. Each of these four measures indicates the share of households in a structure response group that participated in each of the participation decisions.[16] Although not shown in (5.1), the specification also contains a set of four district dummies.

Several concerns may arise while using (5.1) to estimate the effect of participation on outcomes. First, it is possible that communities with certain unobserved traits, for instance, greater social cohesion may be more

likely to participate. At the same time social cohesion may also influence project outcomes, that is $Cov\ (Part_{ij},\varepsilon_{ij}) \neq 0$, and hence OLS estimates of (5.11) are likely to be biased. Second, (1) treats project outcomes as a function of participation. However, the reverse, that is, participation itself maybe a function of project outcomes cannot be ruled out. For example, if a project is well constructed and yields clear benefits this in turn may lead to greater community participation in deciding how project benefits should be distributed and/or how a project should be maintained.

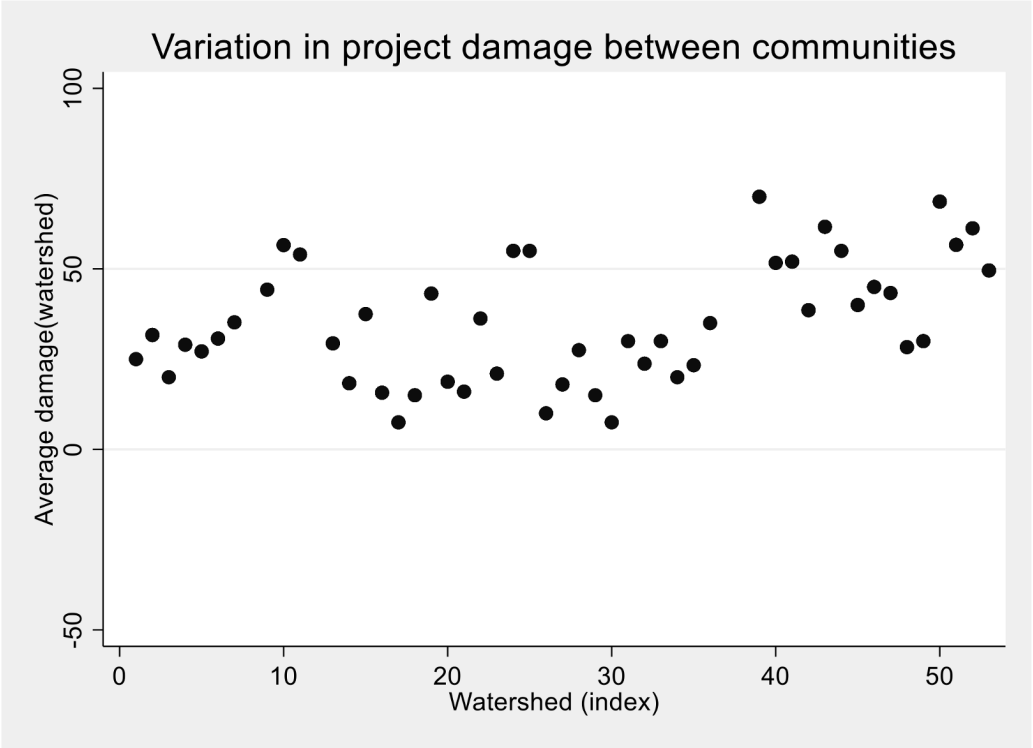
In order to deal with the first issue, in addition to estimating (5.1) which includes various community traits to absorb differences across communities, we estimate a model which includes watershed community-fixed effects and explore variation in participation within a watershed community to identify effects. This is possible as in most of the watershed communities in the survey there are multiple projects (49 of 53 communities) and this enables us to use variation in participation within the same watershed community to isolate the effect of participation on outcomes (see Figures 5.1 and 5.2). That is, we estimate,

$$Y_{ij} = \lambda + P_{ij}\eta + Part_{ij}\mu + \theta_j + \varepsilon_{ij} \qquad (5.2)$$

where θ_j is a watershed community fixed effect.

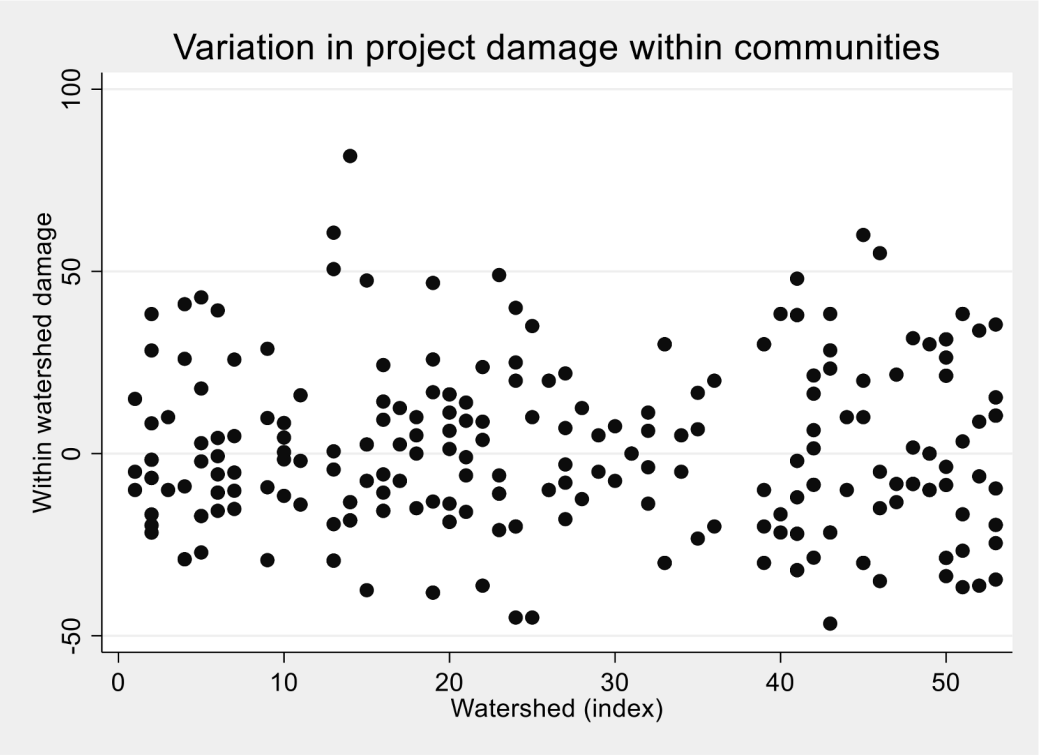
To deal with the second issue we divide the measures of participation into those elements of participation that occur before project benefits start to flow, that is, participation in project planning and implementation and those that occur after the flow of project benefits. While the latter measures of participation are more likely to be influenced by reverse causality, for the former, this is unlikely. We estimate several variants of (5.1) and (5.2).

Figure 5.1
Project damage: variation between community watersheds



Note: The figure plots average project damage score (in percent) across the 49 watershed communities based on engineers' measurements with differences across points representing differences in project damage between watershed communities.

Figure 5.2
Project damage: variation within community watersheds



Note: The figure displays variation in project damage score within the 49 watershed communities. That is, each point is obtained by subtracting the community mean damage from the damage score of each project within each community.

5.5 Results

5.5.1 Descriptive statistics – project outcomes and participation

Tables 5.1 to 5.5 provide summary statistics of the variables used in the analysis. As displayed in Table 5.1, according to the engineers, the average project damage is 37% and about 55% of the projects are fully operational and generate the expected benefits. The average project is about 4.9 years old and 63 percent of the projects are meant for soil conservation. About half the projects are extensions to existing projects while the remainder are completely new.

Table 5.1
Description of variables: SRG level

Variable	Definition	Mean (std. dev.)
Project outcomes		
Project Damage (%)	Share of project that is damaged	37.12 (28.14)
Project operational state	Fully operational = 1	0.55
Project characteristics		
Project make	Project is new or an extension, new =1	0.50
Project type	Soil conservation projects=1	0.63
Project age (years)	Number of years since project constructed	4.88 (2.15)
District		
Yabello	The district where the project is located	0.22
Kuyu		0.18
Arsi Negelle		0.18
Doba		0.42

Notes: N = 249

Table 5.2 examines the link between a project's physical status and its functional state. The bulk of the highly damaged projects are not functioning (72 of 77). However, there is more variation in the other categories. Of the 76 projects that show very low levels of damage, 21 are not functioning. While this is surprising, the explanation provided by the engineers was that these projects are not badly damaged but they have operated long enough and are no longer yielding the expected benefits.

Table 5.2
Project operational and damage state: engineer provided

	Damage state			
Operational state	Highly damaged (>50 %)	Slight damage (25-50 %)	Very little/ undamaged (0-25%)	**Total**
Functioning	5	75	55	135
Not functioning	72	20	21	113
Total	77	95	76	248

Community participation in different decisions and sub-decisions is quite high. As shown in Table 5.3, across the 12 decisions, participation

ranges from 72 to 83 percent. Of a total of 1,238 households, 71 percent have participated in all four decisions at the planning stage. The corresponding figures are 73, 71 and 78 percent for decisions relating to project usage and benefit distribution, project maintenance, and project monitoring and evaluation respectively (Table 5.4).

Table 5.3
Description of variables and means (Std. Dev): Individual level

Participation in planning	Response takes a value of 1, if a household or its members have participated in decision making in each of these 12 individual participation questions	**0.79**
Project type selection		0.77
Project site selection		0.81
Project scale (length, capacity)		0.77
Project timing		0.83
Project usage and benefit distribution		**0.77**
Project usage rules		0.78
Nature of sanctions on misuse		0.77
Benefits distribution		0.75
Maintenance		**0.77**
Maintenance system, rules and policy		0.76
Maintenance labour contribution		0.83
Sanctions for failure to contribute		0.72
Monitoring and evaluation		**0.80**
Project monitoring activities		0.79
Evaluation of the program		0.81
Respondent's traits		
Female	Respondent is female	0.52
Age	Respondent's age in complete years	42.5 (12.9)
Religion	Respondent's religion, 1=Non-Muslim	0.43
Education level	Education level of the respondent	
No education		0.75
Primary education		0.23
Secondary education		0.02
Household size	Number of family members	6.2 (2.1)
Female headed household	Head of the household is female, Yes = 1	0.26
Duration of membership	Number of years in the PSNP	2.9 (2.1)
Perception of PSNP & CBPWD		
PSNP addresses food insecurity	Do your trust that PSNP addresses your food security problems, Yes = 1	0.95
PSNP well targeted	Do your think that PSNP is properly targeted (no problem in inclusion/exclusion), Yes = 1	0.88
Aware of CBPWD	Are you aware of the CBPWD approach of the PSNP program, Yes = 1	0.24
Social Interactions		
Trust PSNP members	Do you trust PSNP beneficiaries more than non-beneficiaries? 1=Yes	0.18
Conflict between watershed communities	Have you ever experienced conflict/disagreement with regard to people living in different watershed? Yes = 1	0.01
Conflict within watershed communities	Have you ever experienced conflict/disagreement with people living in the same watershed, Yes =1	0.03

Notes: N=1,238

Table 5.4
Community participation in project decisions

Number of Decisions	Project Planning	Project Usage & Benefit Distribution	Project Maintenance	Project Monitoring & Evaluation
0	159 (12.9)	234 (18.9)	178 (14.7)	219 (17.7)
1	57 (4.6)	63 (5.1)	104 (8.6)	53 (4.3)
2	70 (5.7)	33 (2.7)	68 (5.6)	962 (78)
3	75 (6.1)	907 (73.3)	862 (71.1)	-
4	872 (70.7)	-	-	-

N (%)

Breaking down the participation decisions into those that take place after and before project execution (Table 5.5) shows that 68 percent of the respondents participated in all eight post-project execution decisions while the figure is 71 percent for participation before project execution. The lack of substantial differences in participation rates before and after project execution suggests that participation is not driven by actual receipt of benefits. If this were the case then one would expect to find differences in participation rates before and after the project.

Table 5.5
Community participation: before and after project execution

Number of Decisions	Before	After
0	159	102
	(12.9)	(8.4)
1	57	95
	(4.6)	(7.9)
2	70	36
	(5.7)	(3.0)
3	75	26
	(6.1)	(2.2)
4	872	16
	(70.7)	(1.3)
5	-	21
		(1.7)
6	-	28
		(2.3)
7	-	65
		(5.4)
8	-	820
		(67.8)

N (%)

Table 5.6 delves deeper and examines district-specific patterns in project damage, project functional status, participation in project decisions and formation of the CWSDC. Project damage is substantially higher, a little above 50 percent, in two of the districts (Kuyu and Arsi Negelle) as compared to the lower rates of damage in Doba (25.4%) and Yabello (37%). In terms of the operational status, 60% of the projects in Yabello are in good functional state as compared to a little below 50 percent in Kuyu. A little more than half the projects (54%) in Arsi Negelle and Doba have good functionality. There is marked variation in participation across districts. Almost all households participate in decision making across the 12 project decisions in Doba. Participation rates in Yabello are also high and range from a low of 75% to a high of 96%. In contrast, rates of participation in the other two districts are substantially lower and lie between 12% and 60% in Kuyu and between 51% and 75% in Arsi Negelle.[17] Despite this marked differences in project decision making committee watershed committees have been formed in almost all locations. These patterns indicate that the presence of a committee does not automatically translate into participation.

Table 5.6
Project outcomes and participation in project decisions by district

Description	District								Overall	
	Yabello		Kuyu		Arsi Negelle		Doba			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Project outcomes										
Project damage	36.8	82.2	50.8	27.1	50.5	29.2	25.4	25.8	37.1	28.1
Project functional status (1=functional)	0.61		0.49		0.54		0.54		0.55	
Participation in project decision								**10.96**		
Before project implementation (*planning*) decisions (%)	**84.95**	**24.70**	**8.53**	**25.05**	**2.93**	**35.89**	**96.55**		**79.14**	**29.64**
Project type selection decision	75.18	33.36	44.89	29.89	61.74	38.83	97.88	7.84	76.70	33.31
Project site selection decision	87.54	26.48	49.67	31.12	65.22	36.86	97.69	8.95	80.81	30.85
Project scale selection decision	87.68	24.99	39.11	33.02	60.27	38.09	94.42	18.37	76.64	34.57
Project time frame selection decision	89.39	24.21	60.44	36.30	64.56	36.62	96.22	12.00	82.42	29.99
After project implementation decisions	**89.21**	**20.58**	**39.54**	**31.53**	**57.44**	**37.93**	**97.66**	**7.63**	**77.89**	**32.99**
Use & Benefit Distribution decisions	**89.66**	**22.12**	**31.11**	**37.69**	**57.21**	**38.72**	**98.74**	**5.61**	**76.88**	**36.46**
Project usage decision	91.88	18.91	37.33	39.68	56.30	41.81	98.85	6.39	78.28	36.03
Nature of sanctions for project misuse decision	88.01	25.32	29.33	37.32	62.61	36.90	98.72	5.45	77.24	36.34
Distribution of project benefit decision	89.10	24.88	26.67	40.68	52.72	42.58	98.85	6.64	75.11	39.60
Maintenance of project decisions	**86.08**	**25.68**	**30.18**	**24.87**	**63.37**	**36.24**	**98.76**	**6.21**	**77.08**	**33.97**
Maintenance system, policy and rules	85.97	25.56	28.89	40.13	57.83	42.00	98.72	6.64	75.78	38.28
Labour contribution for maintenance decision	88.32	23.66	49.33	41.69	75.33	35.12	98.72	6.64	83.21	31.57
Nature of sanctions for failure to contribute in project maintenance	83.97	30.03	12.33	24.37	56.96	42.58	98.85	6.12	72.25	40.79
Project monitoring and evaluation	**91.88**	**16.91**	**57.33**	**42.34**	**51.74**	**43.27**	**95.48**	**4.54**	**79.72**	**34.34**
Time-to-time project monitoring	88.17	24.79	54.89	43.52	52.61	43.69	95.10	15.64	78.48	35.73
Evaluation of project effectiveness	95.58	12.18	59.78	44.13	50.87	43.35	95.86	14.05	80.97	34.49
Community Watershed Committee Formed (1=Yes)	**0.83**		**0.80**		**0.93**		**0.92**		**0.88**	
Observations	54		45		46		104		249	

Notes: The participation variables indicate the share of group members who have participated in a particular decision.

Qualitative information obtained from Focus Group Discussants underlines these district-specific differences. A female FGD participant from Doba narrated:

> "I am a PSNP public works beneficiary from the start. Initially we just did what we were told to do by the officials but in the last few years things have changed. We received different trainings including technical trainings and we take the lead. We first gather and discuss what to do for the year and we prioritize based on the allocated person days we get every year. We work closely with the development agents and even with those working at the woreda agricultural office." (Discussed in December 2014).

The reflection from a discussant in one of the villages in Kuyu echoes the opposite:

> "…our participation in the public works is limited to doing what we are told to do by village officials. They tell us what activities we have to do, where and when to do it. Although we get transfers for six months in the year, we are called for different activities at any time of the year even outside the PWs implementation timing. We just follow their order since we do not want to risk [being] taken out of the program." (Discussed in September 2014).

Information obtained from district level key informants also substantiates the differences found in the survey data. For instance, while discussing project participation, a district level key informant in Doba remarked:

> "…the follow-up of beneficiaries on the PW projects is incredible. They do beyond what is expected as a PW beneficiary. They do see the benefit of their work and their work is acknowledged at different levels and it keeps them motivated" (Interviewed on December 2014).

The perception by a key informant in Kuyu is quite different. While commenting on project participation the informant noted:

> "…the public works participants in this village are not enthusiastic about their activities. They work just to fulfil their paid person days and not very caring about the quality of the infrastructure. There were times they left off uncompleted [SWC] structures just because they completed their person days." [Interviewed September 2014]

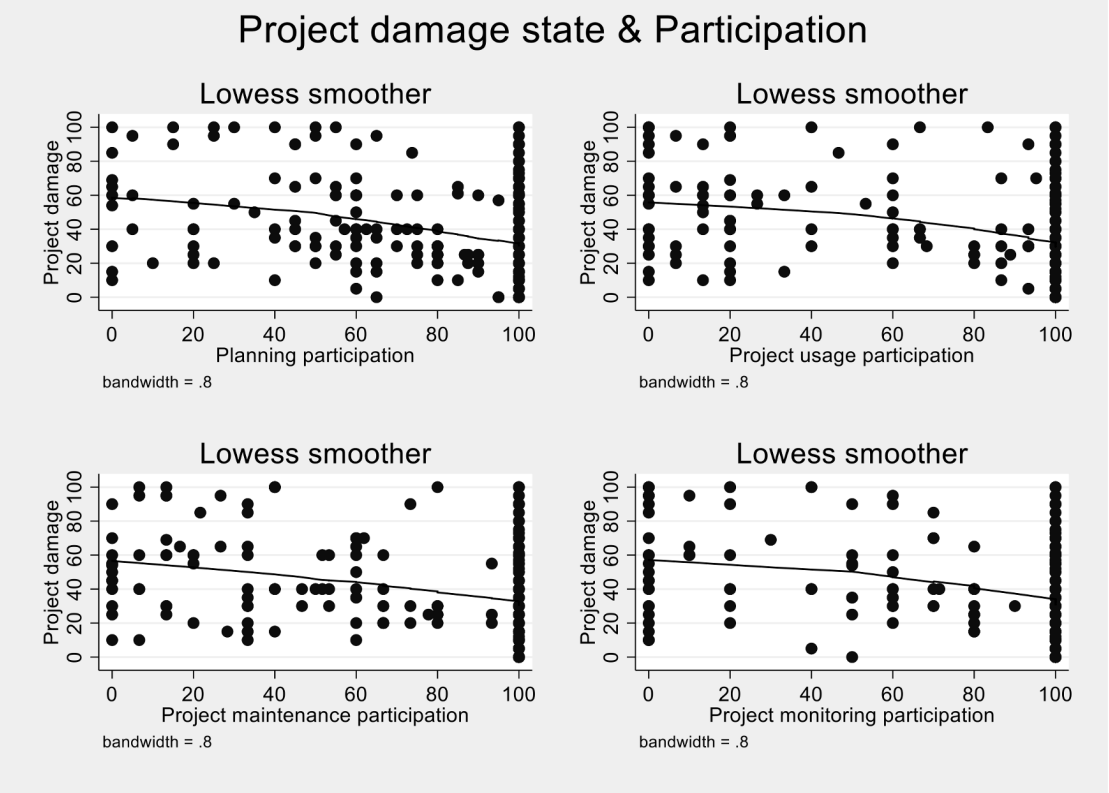
Overall, there are clear differences in community participation across districts and *prima facie* it seems that project participation and project damage are correlated. The next section provides a more formal exploration of this link.

5.5.2 Participation and project outcomes

5.5.2.1 Project damage and participation

A graphical exploration of the relationship based on locally weighted regressions between each of the participation measures and project damage is displayed in Figure 5.3. Across all the four decisions, increasing participation is clearly associated with a decline in project damage.

Figure 5.3
Project damage and participation



The figure displays the distribution and locally weighted bivariate regression of the outcome on project damage with each measures of participation.

Table 5.7 presents a series of estimates of equation 1 with each of the four participation measures included sequentially, followed by a specification which includes all the measures. Individually, each of the participation measures is negatively associated with project damage but not statistically significant. Focusing on the most complete specification, two out of the four participation measures are negatively associated with project damage

and the effect of participation in project monitoring and evaluation is statistically significant at the 5 percent level. The lack of precision in project usage and benefit distribution is not unexpected as participation in the various project decisions is highly correlated (see Table A5.2). Nevertheless, what is clear is that a 10 percentage point increase in community participation in project monitoring and evaluation is associated with about a 2 percentage point reduction in project damage. There are clear differences across districts with projects in Doba about 19 percentage points less likely to be damaged as compared to projects in other districts. The positive effect of participation in project monitoring and evaluation on project damage after controlling for district effects indicates that overall variations in project damage and project participation are not driven only by differences across districts but also by variation within districts.

Table 5.7
Project damage and participation: district fixed effects

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Planning	-0.12				0.12
	(0.06)				(0.18)
Project use & benefit distribution		-0.15			-0.22
		(0.14)			(0.21)
Project maintenance			-0.12		0.21
			(0.16)		(0.25)
Monitoring and evaluation				-0.15	-0.20**
				(0.08)	(0.06)
Kuyu	5.10**	0.37	2.50	4.41***	5.56
	(1.06)	(5.95)	(6.66)	(0.37)	(7.89)
Arsi Negelle	10.11***	7.87	10.08**	6.64*	4.76
	(1.12)	(3.76)	(3.04)	(2.64)	(2.76)
Doba	-15.31**	-15.60*	-15.45*	-16.32**	-18.55**
	(4.50)	(4.96)	(5.77)	(4.21)	(5.21)
Constant	58.51***	62.06***	58.74**	62.56***	60.03***
	(7.50)	(9.78)	(11.07)	(8.42)	(12.45)
Observations	243	243	243	243	243
Adj-Rsq	0.175	0.183	0.174	0.189	0.188

Notes: District clustered robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; All specifications control for project specific characteristics (age, make and type).

Table 5.8 provides estimates of equation 5.2. This specification controls for watershed community effects and exploits variation within the 49 watershed communities, where there are multiple projects, to identify the effect of participation on project damage. The advantage of such a speci-

fication is that the effect of participation on project damage is not contaminated by differences in characteristics across watershed (or district) communities in characteristics such as community leadership or community capacity.

Table 5.8
Project damage and participation: watershed fixed effects

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Planning	-0.110				-0.019
	(0.097)				(0.143)
Project use & benefit distribution		-0.061			0.100
		(0.089)			(0.156)
Project maintenance			-0.052		0.108
			(0.081)		(0.154)
Monitoring and evaluation				-0.186**	-0.306**
				(0.084)	(0.151)
Constant	50.60***	47.40***	46.69***	55.65***	50.32***
	(9.67)	(9.88)	(9.85)	(8.28)	(9.75)
Observations	240	240	240	240	240
Adj-Rsq	0.183	0.178	0.177	0.197	0.192

Notes: Watershed clustered robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; All specifications control for watershed fixed effects and project specific characteristics (age, make and type).

Similar to the results in Table 5.7, each of the individual measures of participation is negatively related to project damage although only participation in project monitoring and evaluation is statistically significant again at the 5 percent level. Based on the specification that includes the participation measures simultaneously shows that participation in monitoring and evaluation decisions is associated with a reduction in project damage. In terms of magnitude, a 10 percentage point increase in participation is associated with a 3.1 percentage point reduction in project damage. These estimates indicate that if a watershed found in a district with low participation were to enhance participation in monitoring and evaluation to a high level – say from 57 percent in Kuyu to the level of participation in Doba (95%) – then project damage would decline by 12 percent or about 50 percent of the gap in project damage between the two districts may be attributed to differences in participation in monitoring and evaluation. These are large effects.

Elaborating on the record of high participation and better project outcome, an FGD participant from (Lega Lencha village) in Doba district narrates his case:

"We [The beneficiaries] were not really in to the projects the way we are now. We didn't follow the structures and just come only for the sake of attendance. Thanks to a former district level agriculture office head who changed the district's picture completely. What he did was he selected some PW beneficiaries (including myself) from different villages in the district and sent us on an experience sharing visit to a village called Abraha Wa Atsbha in Tigray region which at the time had an outstanding performance on SWC. It was like 'Heaven in the middle of Hell!' Everything was green, fresh wind blowing and plantation on the revived land throughout. PW beneficiaries of the village shared their experience and trained us on building and maintaining SWC structures. We came back to our village with a different attitude towards the SWC structures. We took our turn of sharing what we saw and training other beneficiaries who did not get the chance of going there. Although the performance is not similar across the villages in Doba, we are proud that we are among the top performing districts in the region as well as the country. We now go to different PSNP districts all over the country to train others and others also come to our district to share our experience and get 'peer-to-peer' training." [Discussed in December 2014]

Another participant of FGD in Dherito village in Yabello district discusses:

"We learnt our lesson the hard way. In the previous regimes, our zone [Borena] was known for its huge livestock production. At the time we did not care much about the environment (soil and water degradation with its consequence on our small farming and animal fodder). We woke up very late but we are now trying our best to benefit as much as we can from the SWC structures. It is different when you learn it the hard way. You become result focused and concerned about the activities."[Discussed in November, 2014]

5.5.2.2 Project operational state and participation

Table 5.9 provides estimates of the effect of participation but this time with a project's operational status as the outcome variable. This variable is constructed as a binary variable which indicates whether the project is functioning well or not (includes partially and no-operational). As shown in Column 5 of the Table, once again, increase in community participation in project use and benefit distribution, and project monitoring and evaluation decisions increase the probability that a project is functioning well.

Table 5.9
Project functional state and participation: district fixed effects

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Planning	0.0006				-0.0038
	(0.0005)				(0.0029)
Project use & benefit distribution		0.0018			0.0056
		(0.0021)			(0.0030)
Project maintenance			0.0007		-0.0054
			(0.0019)		(0.0027)
Monitoring and evaluation				0.0017	0.0035
				(0.0014)	(0.0017)
Kuyu	0.0061	0.0899	0.0268	0.0368	-0.0117
	(0.0432)	(0.0960)	(0.0815)	(0.0335)	(0.0502)
Arsi Negelle	-0.0429**	0.0020	-0.0398	0.0952	0.0601
	(0.0118)	(0.0544)	(0.0278)	(0.0397)	(0.0382)
Doba	0.0948	0.0857	0.0936	0.0952	0.1631*
	(0.0778)	(0.0873)	(0.0929)	(0.0757)	(0.0618)
Observations	243	243	243	243	243
Adj-Rsq	0.015	0.022	0.015	0.023	0.033

Notes: District clustered robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; All specifications control for project specific characteristics.

The estimates from a linear probability model controlling for community watershed fixed effects in Table 5.10 yield a similar positive effect of participation in project monitoring and evaluation on a project's functional state.

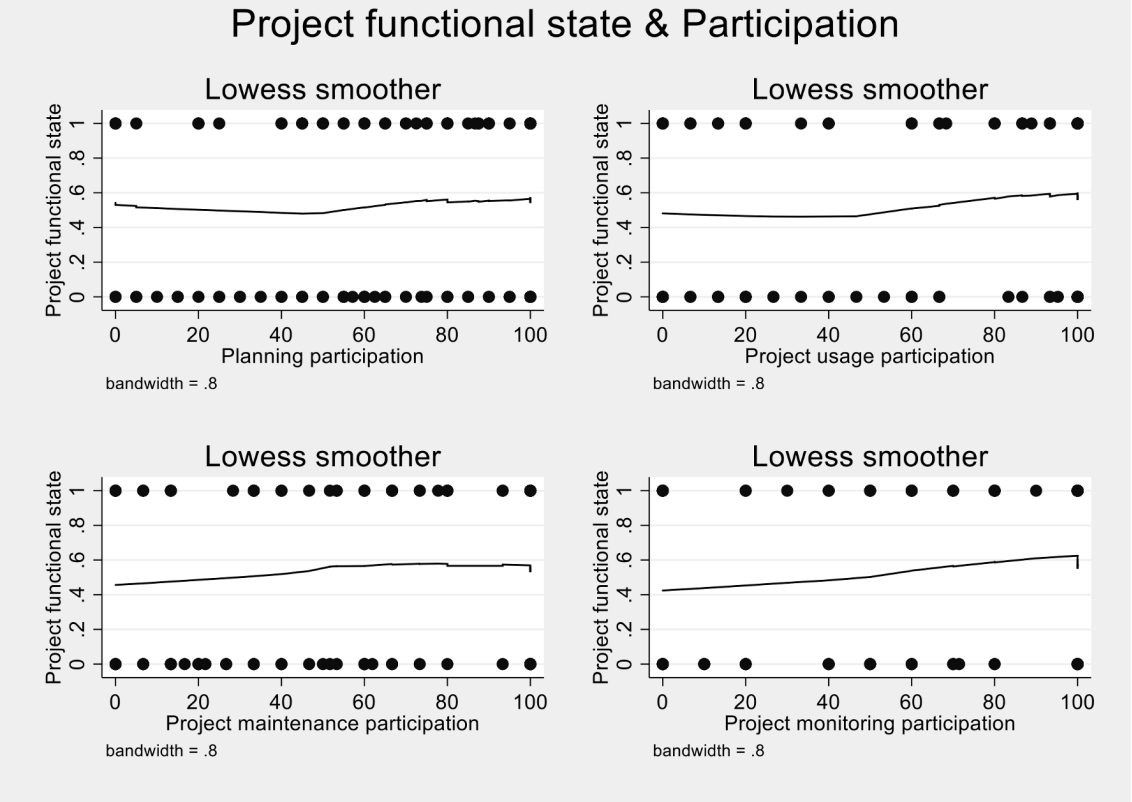
Table 5.10
Project functional state and participation: watershed fixed effects

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Planning	-0.0001				-0.002
	(0.002)				(0.003)
Project use & benefit distribution		0.0002			0.003
		(0.002)			(0.004)
Project maintenance			-0.001		-0.005
			(0.002)		(0.003)
Monitoring and evaluation				0.002	0.005**
				(0.002)	(0.002)
Observations	240	240	240	240	240
Adj-Rsq	0.030	0.030	0.031	0.034	0.034

Notes: Watershed clustered robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; All specifications control for watershed fixed effects and project specific characteristics (age, make and type).

The positive, and relatively sharp, effect of participation in project monitoring and evaluation is also captured in Figure 5.4 which explores the bivariate relationship between project functional state and participation based on a locally weighted regression.

Figure 5.4
Project functional state and participation



Note: The figure displays the relationship between project functional state and four measures of participation.

5.6 Discussion and concluding remarks

This study was motivated by the limited evidence on the quality of rural infrastructure built through public works based social safety nets. While such programs have been rolled out in a number of countries, the contribution of such programs to the creation of rural infrastructure which is expected to serve as basis for rural development and food security has not attracted much systematic scrutiny. Indeed, maintaining the quality and durability of such rural infrastructure is a costly problem for developing countries.

This study, which was based on Ethiopia's Productive Safety Net Program, examined the effect of the program's community-based approach in determining the quality of rural assets. The study was based on a sample of 249 Soil and Water Conservation (SWC) projects located in 53 watershed communities in four food insecure districts in Oromia region and dealt with three aspects. First, the paper analysed the degree of community

participation in project decision making. Second, the paper used soil and water conservation engineers to provide a technical assessment of the projects in terms of their project damage and whether they were fully operational. Third, the paper examined the role of community participation in influencing project outcomes.

We found a high degree of participation ranging from 72 to 83 percent across 12 participation decisions. Despite the overall high rate of participation, there were substantial variations in participation rates across the four districts. Paralleling the variation in participation, project damage was about 50 percent in districts with relatively low levels of participation and about half that in areas with almost complete participation. We were able to exploit the availability of multiple projects located in the same watershed community to identify the effect of variations in community participation on variations in project outcomes within the same community. This yields a more credible estimate of the effect of participation on outcomes as compared to approaches which rely on variations across communities to identify the effect of participation. We found that community participation in project monitoring and evaluation played a substantial role in enhancing the physical and operational state of projects. The estimates indicated that increasing community involvement in areas which have relatively low participation rates (57%) to the rate observed in areas with high participation (95%) maybe expected to reduce project damage by 50%. This is a large effect and shows that good design features, in this case, participation plays a strong role in ensuring the durability of PSNP-built infrastructure.

Notwithstanding these effects and the use of variations within a watershed to achieve identification, it is possible that it is the flow of project benefits, say a well-functioning project that enhances participation and not only that participation leads to better project outcomes. Nevertheless, the results in this paper support the argument that greater community participation in project decisions is associated with more durable rural infrastructure and that at least in the Ethiopian case this particular design feature of the PSNP is worth implementing.

Notes

[1] Based on data collected from 24 PSNP districts located in six PSNP regions (Afar, Amhara, Oromia, Somali, SNNPR and Tigray), Woolf et al. (2018) estimate the emission of greenhouse gases in districts covered and not covered by the PSNP. Using summary statistics and two-sided t-tests, they find that sites covered by the PSNP emit far less greenhouse gases as compared to those without. They argue that the reduction in GHG in PSNP areas may be attributed to the soil and water conservation activities of the PSNP which have resulted in better land management and reduced land degradation.

[2] Knippenberg and Hoddinott (2017) examine the effect of the PSNP on mitigating the effects of drought. Using survey data from multiple years they find that PSNP payments lead to a reduction in the initial impact of drought on food security by 57 percent and an elimination of the adverse drought impact within two years. Based on an analysis of cross section data from 160 households located in a food insecure district, Mohammed (2017) finds that the PSNP has a positive and significant effect on food consumption but no effect on income. Béné et al. (2012) use panel data from 2006 and 2008 and conclude that the effect of the PSNP is limited and not strong enough to completely protect beneficiaries against the impacts of severe shocks. Using Ethiopian Food Security Surveys (EFSSs) collected in 2006, 2008 and 2010, Hoddinott et al. (2012) conclude that household access to the PSNP and Other Food Security Programmes (OFSP) and the Household Asset Building Programme (HABP) has led to increased use of fertilizer as well as enhanced investments in agriculture. Berhane et al. (2011) compare the effect of longer term (five years) versus and short term (one year) participation in the public works programs on livestock holdings and report that longer participation raises livestock holdings by 0.38 tropical livestock units (TLU). Andersson et al. (2011) use three rounds of panel data (2002, 2005, 2007) from one of the country's regions to examine the impact of the PSNP on household holdings of livestock and trees. They find that while the PSNP has a positive impact on tree holdings there is no impact on livestock holdings. Gilligan et al. (2009) use cross-section data collected 18 months after the launch of the PSNP to examine the impact of the PSNP and other safety net programs (OSNP) on a range of household economic outcomes. They find that the PSNP on its own is not very effective but in combination with the OSNP there is a positive impact on food security, enhanced use of improved agricultural technologies, and greater probability of operating nonfarm business activities. However, there is no evidence of increased asset accumulation.

[3] While there are several flavours of community participation with different monikers and different levels of community involvement, two broad approaches are discernible. These are, Community Based Development (CBD) which refers to development projects that actively involve beneficiary communities in decisions related to design and management and Community Driven Development (CDD) which goes beyond CBD and involves communities in the allocation and management of funds (Mansuri and Rao, 2004: 1-2).

[4] The projects were established by eighteen different agencies located in Asia, Africa and Latin America. The evaluation reports for the study report were based on impact assessments carried out by experienced evaluators.

[5] The five outcome variables are the percentage of households (i) reporting satisfaction with the new project (ii) that have paid tariffs (iii) stated that access to water is more equal (iv) reporting time savings (v) who think that the village can sustain the system for 10 years. The participation variables are the percentage of households that have contributed to the capital cost of the project and household involvement in decision making who are aware of project prior to its construction, attended planning meeting, participated in more than one decision, supervised construction work, attended post construction meeting and the percentage of households that have contributed to the project cost.

[6] The 2009 study includes only 64 of the projects located in 33 communities in Baltistan North Pakistan.

[7] The study is based on 25 impact evaluations of 23 programmes implemented in 21 low and middle income countries.

[8] A district is classified as food insecure on the basis of the frequency of requiring food assistance in the ten years preceding 2004. Food insecure households within such districts are households who fail to produce enough to meet their consumption needs even when there is normal rainfall (MoARD, 2010: 8).

[9] The PSNP is very active in the region. The region accounts for close to 21 percent of all PSNP project beneficiaries.

[10] The figures are based on the 2013/14 program data.

[11] Yabello was randomly selected from a group of thirty predominantly low altitude districts, Arsi Negelle from a group of thirty four predominantly mid-altitude districts while Kuyu was picked from a group of seven predominantly high altitude districts. Doba belongs to the group of eight districts with mixed features.

[12] Across the four districts, on average, soil and water conservation projects account for 73 percent of the annual person days spent on public works activities. In the four sample districts, the figure ranges from with a minimum of 65 percent in the case of Kuyu to a maximum of 79 percent in the case of Doba.

[13] Of these 1,238 individuals, 52% were female. Except for 21 groups (8%), all the SRGs have at least one female member. With regard to age, 67% of the respondents were between the ages of 30 and 50 followed by 20% with above 50 years of age and 13% were between the ages of 16 and above but less than 30 years.

[14] The key informants were usually heads of the agriculture office and village administrators or their representatives.

[15] The damage percentage variable is based on the extent of project damage. For instance, if there is a five meter long stone bund and about 1 meter is damaged then the damage percentage is recorded as 20 percent. Operational status provides an idea of the project's capacity to generate the expected benefits. The role of a stone bund is to provide protection against soil erosion and operational state is defined in relation to how well the project is performing in terms of preventing soil erosion.

[16] For instance, if there are five members in a structure response group and three indicated that they participated in a planning decision, then participation in that decision is 60%. In the first instance, participation in each of twelve project decisions was computed in the manner just described and then aggregated into four participation decisions.

[17] Marginal effects based on ordered probit estimates of participation in different stages of the project cycle while controlling for other factors yields the same message, that is, there is substantial variation in participation across the four districts (see Table A5.14 on participation in planning decisions).

6 Summary and remarks

This thesis was motivated by and dealt with two main issues in the context of social protection programs in Ethiopia. First, recognizing the interplay between different shocks, a recent trend in the country's social protection landscape has been to "bundle" or develop greater interlinkages between various schemes and second there has been an attempt to go beyond the "protection" motive of such schemes and to sustainably enhance household resilience to shocks.

Emblematic of these two motives are the country's flagship programs - the Productive Safety Net Program (PSNP) launched in 2005, and a pilot voluntary Community Based Health Insurance (CBHI) which was launched in 2011, and has since been scaled up. The PSNP is a participatory program which provides payments to food insecure households in exchange for labour which is used to build soil- and water-conserving rural infrastructure assets while the CBHI attempts to enhance access to health care and provide financial protection against health shocks.

While the first two essays dealt with "bundling", essays three and four examined the issue of "beyond social protection". Specifically, this thesis, examined (i) whether the PSNP could be used to leverage uptake of the voluntary CBHI scheme (ii) whether participation in both programs enhances social protection (iii) the effect of the CBHI on generating resources and enhancing the quality of health care and (iv) the extent of participation in the PSNP and whether the participatory feature of the PSNP program translates into better quality rural infrastructure. The thesis was based on three rounds of a household panel data set, two rounds of a health facility panel and several rounds of qualitative data collection which involved focus group discussions and key informant interviews.

The analysis showed that, participating in the PSNP increases the probability of CBHI uptake by 24 percentage points and enhances scheme retention by 10 percentage points. The bulk of the effect may be attributed

to pressure applied by government officials on PSNP beneficiaries. The merits of such an approach to enhance "voluntary" uptake are debatable, albeit, reluctant beneficiaries did subsequently appreciate the positive effects of access to insurance. While this approach has worked in Ethiopia it also supports the general idea that membership in existing social protection programs may be used to address low insurance uptake - a common problem faced by developing countries when they implement voluntary health insurance schemes.

Complementing the result of the leveraging ability of the PSNP, the second essay showed that individuals who participated in both social protection programmes, 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 small (4 per cent) increase in livestock and a 28 per cent decline in debt. In short, bundling of interventions enhanced protection against multiple risks and linking social protection schemes yielded more than the sum of their individual effects. While this outcome may seem obvious, the literature, as reviewed in essay two, does not provide unequivocal results. Whether this result also generalizes to other scheme types within Ethiopia or in the case of other developing countries remains a topic for future research.

As opposed to the bulk of the literature which focuses on the effects of health insurance schemes on health care utilization and financial protection, the third essay of this thesis examined the effect of the CBHI on resource generation and on the quality of health care. Health care quality was measured in terms of structural quality indicators such as availability of drugs, equipment and the like as well as in terms of patient satisfaction. The analysis showed that CBHI affiliated facilities experience a large increase in patient flows (111 percent), and increases in annual revenues from patient cards and drug sales were 184 and 76 percent, respectively. As part of the country's health financing strategy, health facilities are allowed to retain earnings and have discretionary power over allocation of retained resources. The analysis showed that the facilities used these resources mainly to purchase drugs and disposable medical supplies. Potentially, as a consequence of such expenditures, there was a notable decline in perceived drug shortages and an 11 percentage point increase in patient satisfaction. One of the main reasons for low retention in voluntary insurance schemes is the low quality of care. The results of this essay showed

that if retained earnings are reinvested in the health care system it may be possible to generate a virtuous cycle which translates into higher uptake and retention rates. Whether such patterns may be replicated in other developing countries is a question for additional research. However, at least in Ethiopia the CBHI is likely to play an important role in enhancing access to health care and generate additional resources for the health sector. The analysis showed that, based on the current CBHI design and with 50 percent uptake, the scheme has the potential to generate revenues that are equivalent to about 25 percent of the country's health care budget for 2015/16. Based on these results and the existing literature it would seem that Ethiopia may occupy a place alongside Rwanda and Ghana as examples of Sub-Saharan African countries that have successfully deployed community-based health insurance schemes.

Finally, as opposed to the effects of the PSNP on consumption or household assets, the fourth essay dealt with the quality of public infrastructure built through the PSNP. The essay was based on a cross-section survey of 249 soil and water conservation projects located in four districts and included technical assessments of structures carried out by engineers as well as qualitative information gathered through interviews and discussions. The analysis showed that there were high, albeit variable rates of community participation in 12 PSNP related decisions. The key result was that projects in which beneficiaries played a larger role in project monitoring and evaluation were substantially less likely to be damaged. Thus, at least in the case of the PSNP its participatory approach is delivering dividends. The essay remained relatively silent in terms of what drives differences in participation across communities. The qualitative work suggested that it was the interaction between the PSNP administration and specific community members. However, this aspect of the work – that is, what explains differences in participation rates across communities still requires additional research.

Whether the results of this thesis may be generalized or are peculiar to Ethiopia is an open question. At the very least, the results presented here suggest that it is worthwhile to consider "bundling" of interventions and that it is possible to use such schemes to deliver more than immediate benefits.

Appendices

Table A3.1
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 Aheferom Tahitay Adiabo
PSNP=1 CBHI=0	Qallu	Kersa	Awasa Zuriya	Saesay Tseadamba
PSNP=0 CBHI=1	Fogera South Achefer	Gimbichu		

Table A3.2
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 (1^{st}) quintile), 2nd quintile, 3rd 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.
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 A3.3
Effect of CBHI and PSNP on health care utilization and off-farm labour supply

Variables	Modern healthcare utilisation (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 1-4 of Table 3.10. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.4
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 1-3 of Table 3.11. Standard errors in parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.5
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 utilisation (1/0)	Number of visits to modern health facility	Modern health care utilisation (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 A3.6
Effect of CBHI and PSNP 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 A3.7
Effect of CBHI and PSNP on health care utilization by source

	Modern health care utilization (1/0)	Modern health care utilization from Health Centres (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 parentheses are clustered at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A3.8
Effect of CBHI and PSNP on assets: livestock and 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4.1
Description of variables: health centre analysis

Variables	Description
Monthly volume of outpatients	Number of patients utilizing outpatient service in a month
Patient card revenue	Health facility's annual revenue from fees paid for patient card
Diagnosis revenue	Health facility's annual revenue from fees paid for diagnosis and tests
Drug revenue	Health facility's annual revenue from sale of drugs
Government budget revenue	Health facility's annual revenue from government budget allocation
Availability of essential drugs	Availability of eighteen essential drugs (ranges from 9 to 18)
Availability of medical facility/ equipment	Availability of twenty one types of medical equipment/facilities (ranges from 9 to 21)
Water supply	Health facility has adequate water supply (1=yes)
Electricity access	Health facility has electricity access (1=yes)
Waiting time to obtain medical card	Average waiting time (in minutes) before getting patient card (based on the response of exit interviews of five patients per facility)
Waiting time to see a medical professional	Average waiting time (in minutes) before seeing a medical professional, doctor/nurse (based on the response of exit interviews of five patients per facility)
Shortage/poor supply of drugs	The facility has shortage/poor supply of drugs problem (1= yes it has the problem)
Shortage of budget	The facility has inadequate allocation of budget problem (1= yes it has the problem)
Overall self-assessed quality of health care provided	Self-assessment of the respondent (typically the head of the facility) about the overall quality of health care services provided by the facility (1 = yes, the facility provides quality services)
CBHI	Health centre is affiliated to CBHI scheme
Head's education level	The maximum level of education the head of the facility has attended (1=degree and above)
Head's age	Age in years of the head of the health facility
Head's training	Head has received training in health service management (1=yes)
Head's experience	Head has previously worked as head in another health facility (1=yes)
Total number of staff	Number of medical and support staff in the health centre

Table A4.2
Description of variables: household data

Variable	Description
Outcome variable	
Satisfaction with care	Satisfaction with the health care sought (1=unsatisfied, 2=neutral, 3=satisfied)
Explanatory Variables	
CBHI	Health centre is affiliated to CBHI scheme
Socioeconomic status	
Consumption quintiles	Classification of individuals based on monthly consumption expenditure (in Birr) excluding health care spending (poorest (1^{st}) quintile), 2nd quintile, 3rd 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.
Demographic traits	
Age	Age in complete years
Male	Male
Household size	Number of household members
Religion	Religion identifier (1=Orthodox Christian, 2= Protestant, 3=Muslim, 4=Other than 1, 2, 3)
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.
Region	Region where the respondent is located

Table A5.1
Distribution of soil and water conservation structures surveyed per district (planned vs actual)

District	Number of soil and water conservation structures				Actual/planned (%)
	Planned		Actual		
	Number of villages	Total per district	Number of villages	Total per district	
Yabello	5	75	4	54	72
Kuyu	4	60	4	45	75
Arsi Negelle	2	40	3	46	115
Doba	6	120	6	104	87
Total	17	295	17	249	84

Table A5.2
Pairwise correlation between different decision categories

Variables	Project planning	Project use rule & benefit distribution	Project maintenance	Project monitoring & evaluation
Project planning	1.00			
Project use rule & benefit distribution	0.830***	1.00		
Project maintenance	0.812***	0.941***	1.00	
Project monitoring & evaluation	0.734***	0.785***	0.780***	1.00

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

Table A5.3
Project physical condition/damage: Structure Response Group versus Engineer's Evaluation

SRG	Engineer			Total
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/undamaged (0-25 percent damage)	
Highly damaged (>50 percent damage)	**15**	8	3	26
Slightly damaged (25-50 percent damage)	26	**21**	3	50
Very little damage /undamaged	36	66	**70**	**172**
Total	77	95	76	248

Table A5.4
Project functional status: Structure Response Group versus Engineer's Evaluation

SRG	Engineer		Total
	Functioning	Not functioning	
Functioning	**131**	92	223
Not functioning	5	**21**	26
Total	136	113	249

Table A5.5
Project's operational state and damage state - SRG provided

SRG	SRG			Total
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/ un-damaged (0-25 percent damage)	
Functioning	21	37	165	223
Not functioning	5	13	8	26
Total	26	50	173	249

Table A5.6
Project physical condition/damage: Structure Response Group versus Engineer's Evaluation - Yabello district

SRG	Engineer			**Total**
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/ undamaged (0-25 percent damage)	
Highly damaged (>50 percent damage)	-	1	-	1
Slightly damaged (25-50 percent damage)	6	**4**	-	10
Very little damage /undamaged	12	17	**13**	**42**
Total	18	22	13	53

Table A5.7
Project functional status: Structure Response Group versus Engineer's Evaluation - Yabello district

SRG	Engineer		Total
	Functioning	Not functioning	
Functioning	**30**	19	49
Not functioning	3	**2**	5
Total	33	21	54

Table A5.8
Project physical condition/damage: Structure Response Group versus Engineer's Evaluation - Kuyu district

SRG	Engineer			Total
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/ undamaged (0-25 percent damage)	
Highly damaged (>50 percent damage)	**4**	1	-	5
Slightly damaged (25-50 percent damage)	11	**4**	-	15
Very little damage /undamaged	6	16	**3**	**25**
Total	21	21	3	45

Table A5.9
Project functional status: Structure Response Group versus Engineer's Evaluation - Kuyu district

SRG	Engineer		Total
	Functioning	Not functioning	
Functioning	**21**	12	33
Not functioning	1	**11**	12
Total	22	23	45

Table A5.10
Project physical condition/damage: Structure Response Group versus Engineer's Evaluation – Arsi Negelle district

SRG	Engineer			Total
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/ undamaged (0-25 percent damage)	
Highly damaged (>50 percent damage)	**3**	-	-	3
Slightly damaged (25-50 percent damage)	6	**2**	-	8
Very little damage/ undamaged	12	14	**9**	**35**
Total	21	16	9	46

Table A5.11
Project functional status: Structure Response Group versus Engineer's Evaluation – Arsi Negelle district

SRG	Engineer		Total
	Functioning	Not functioning	
Functioning	**24**	16	40
Not functioning	1	**5**	6
Total	25	21	46

Table A5.12
Project physical condition/damage: Structure Response Group versus Engineer's Evaluation – Doba district

SRG	Engineer			Total
	Highly damaged (>50 percent damage)	Slight damage (25-50 percent damage)	Very little damage/ undamaged (0-25 percent damage)	
Highly damaged (>50 percent damage)	**8**	6	3	17
Slightly damaged (25-50 percent damage)	3	**11**	3	17
Very little damage/ undamaged	6	19	**45**	70
Total	17	36	51	104

Table A5.13
Project functional status: Structure Response Group versus Engineer's Evaluation – Doba district

SRG	Engineer		Total
	Functioning	Not functioning	
Functioning	**56**	45	101
Not functioning	-	**3**	3
Total	56	113	104

Table A5.14
Determinants of community participation in planning decisions: Marginal effects after ordered probit

	No partici-pation	One decision	Two decisions	Three decisions	Four decisions
Respondent's characteristics					
Female	0.005	0.003	0.003	0.003	-0.014
	(0.013)	(0.006)	(0.008)	(0.008)	(0.034)
Age	0.0005	0.0002	0.0003	0.0003	-0.001
	(0.0004)	(0.0002)	(0.0003)	(0.0002)	(0.001)
Religion: Non-Muslim	0.012	0.006	0.007	0.007	-0.032
	(0.016)	(0.008)	(0.010)	(0.010)	(0.044)
Primary education	-0.023**	-0.012**	-0.015**	-0.015**	0.065**
	(0.011)	(0.006)	(0.007)	(0.008)	(0.030)
Secondary & above education	-0.036**	-0.021*	-0.029*	-0.032	0.119*
	(0.017)	(0.011)	(0.017)	(0.021)	(0.065)
Household size	-0.002	-0.0009	-0.001	-0.001	0.005
	(0.003)	(0.001)	(0.002)	(0.002)	(0.007)
Female headed household	0.008	0.004	0.005	0.005	-0.022
	(0.014)	(0.007)	(0.008)	(0.008)	(0.037)
Duration of membership	0.007***	0.003***	0.004***	0.004***	-0.018***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.006)
Perception of PSNP & CBPWD					
PSNP addresses food insecurity	-0.020	-0.009	-0.012	-0.011	0.052
	(0.018)	(0.008)	(0.009)	(0.008)	(0.042)
PSNP well targeted	-0.002	-0.001	-0.001	-0.001	0.006
	(0.012)	(0.006)	(0.007)	(0.007)	(0.032)
Aware of CBPWD	-0.059***	-0.031***	-0.043***	-0.046***	0.179***
	(0.009)	(0.005)	(0.006)	(0.008)	(0.021)
Social Interactions					
Trust PSNP members	-0.012	-0.006	-0.008	-0.008	0.035
	(0.010)	(0.005)	(0.007)	(0.007)	(0.028)
Conflict between watershed streams	0.006	0.003	0.004	0.004	-0.016
	(0.058)	(0.027)	(0.034)	(0.032)	(0.151)
Conflict within watershed stream	0.064*	0.026**	0.030***	0.026***	-0.145**
	(0.033)	(0.011)	(0.011)	(0.009)	(0.062)
District					
Kuyu	0.294***	0.078***	0.076***	0.052***	-0.499***
	(0.043)	(0.012)	(0.010)	(0.008)	(0.047)
Arsi Negelle	0.170***	0.057***	0.062***	0.049***	-0.338***
	(0.045)	(0.013)	(0.012)	(0.008)	(0.068)
Doba	-0.086***	-0.041***	-0.053***	-0.053***	0.234***
	(0.018)	(0.009)	(0.011)	(0.011)	(0.042)
N	1,202	1,202	1,202	1,202	1,202
Pseudo R-sq	0.199	0.199	0.199	0.199	0.199

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

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