Unintended Consequences or a Glimmer of Hope? Comparative Impact Analysis of Cash Transfers and Index Insurance on Pastoralists' Labor Allocation Decisions

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Abstract

Social protection programs that mitigate the risk of economic, climatic, and social shocks to poor livelihoods and simultaneously promote investments in productive activities are increasingly gaining popularity. Often, there is difficulty in choosing among different social protection programs given potential unintended consequences, particularly those surrounding incentives to work. However, little empirical evidence exists on the comparative causal effects of cash transfers and index insurance on beneficiaries' labor allocation. We address this gap by exploiting exogenous variations in program participation and panel data sets from pastoralists in Kenya and Ethiopia to examine the comparative causal effects of index-based livestock insurance (IBLI) and cash transfer (CT) programs, which were implemented concurrently among the same sample in both countries. Both programs alter household labor allocation decisions by inducing changes or expansions in agricultural production toward more diversified livelihood activities both on-farm and off-farm. Subgroup analyses by employment type and place, gender, and age suggest that, although IBLI coverage is more effective in inducing a greater reallocation of labor to on-farm production diversification, CT programs induce a lager increase in household labor participation in nonfarm activities. The two programs show minimal complementarities that can increase the efficiency of labor market outcomes, although some gains are observed from their interactions in terms of improving labor allocations to nonlivestock production.

Key words: Social protection, Cash transfers, Index insurance, Pastoralists, Labor allocation, Livelihood diversification

JEL codes: D13, J01, J22, O13

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Introduction

African pastoralists' exposure to economic and social risks leave them highly vulnerable to falling into poverty traps. One such risk is catastrophic herd loss from droughts (Barrett & Swallow, 2006; McPeak et al., 2012). Social protection programs (SPPs) have often been promoted as a cost-effective method of risk management given the expectation that they positively affect poverty alleviation and strengthening the livelihoods—and do not impede the productivity and investment capacity of the poor, increasing earnings, and making households resilient against negative income shocks (Banerjee et al., 2015; Betcherman et al., 2004; Sakketa and von Braun 2019). Thereby, SPPs promote efficient labor markets and enhance beneficiaries' capacity to manage economic and social risks before additional risks materialize. However, different SPPs bear the risks of unintended consequences on beneficiaries' behaviors and economic outcomes such as work disincentives (Banerjee et al. 2017) or additional expenditures on "temptation goods" (Evans and Popova, 2017).

The positive effects of SPPs on poverty, food and nutrition security, and health have been widely documented (Davies et al. 2012; Haushofer and Shapiro, 2016; Premand and Stoeffler, 2020). However, the scientific literature in the field is ambiguous and often provides contradictory results with regard to the causal effects of index-based insurance and/or cash transfers on labor allocation decisions. Cash Transfers and index insurance can differently or complementarily affect labor allocation decisions. On the one hand, cash transfers enable the smoothening of shocks or reducing risks by, improving resilience to income shocks, protecting jobs, retaining or diversifying workforces in business or economic activities (de Mel et al. 2012; de Hoop et al. 2020; Daidone et al. 2015), or enhancing insurance uptake if households' earnings from transfers are used to purchase insurance (Bageant and Barrett, 2015). Thereby, SPPs promote efficient labor markets and enhance beneficiaries' capacity to manage economic and social risks before additional risks materialize. On the other hand, cash transfers were also found to reduce work incentives, for instance, by making leisure more attractive (Hasan 2010; de Brauw et al. 2015; Bertrand et al. 2003; Asfaw et al. 2014). Yet, other studies found no significant disincentive effects on labor allocation and, at times, a combination of both positive and negative effects (Parker and Todd 2017; Banerjee et al. 2017; Ambler and de Brauw 2017). Given the increasingly urgent call for improving livelihood opportunities for vulnerable communities, evidence on the effectiveness of alternative instruments is vital for informing policy choices on the question.

Against this background, in this paper we compare the effects of two contemporaneous SPPs on labor allocation decisions in participating pastoralist households. Specifically, we examine the impacts of two interventions in predominantly pastoralist communities in southern Ethiopia and northern Kenya: cash transfers (CTs) and Index Based Livestock Insurance (IBLI). The cash transfer programs are known as the Ethiopia's productive safety net program (PSNP) and Kenya's hunger safety net program (HSNP). For sake of brevity, we refer to both PSNP and HSNP as cash transfers. The design of IBLI product and household survey implemented in the two countries were complementary except that IBLI product in Northern Kenya was first rolled out two years earlier (2010). Although both CTs and IBLI were introduced contemporaneously for similar reasons, the two programs adopt different targeting approaches or modes of operation having related or different labor market outcomes. Even if CTs were managed by governments of the respective countries, they were supported by donor funding to provide regular CTs to beneficiary households. IBLI is privately underwritten and operated by the commercial insurance companies of the two countries but also supported by donor funding in order to provide commercial policies for purchase by pastoralists who then receive indemnity payments when catastrophic losses of herd occur due to drought. The following questions are addressed: How might providing CTs and subsidized IBLI alter the allocation of pastoralists' labor to different economic activities and livelihoods in ways that increase household welfare and diversification of livelihoods? Do prospective interactions exist if CTs need to be paired with livestock insurance?

Despite considerable research on the single effects of SPPs interventions (either CTs or index insurance), although mostly in the context of non-pastoralists, little empirical evidence exists of the comparative causal effects of cash transfer (CT) and index insurance on beneficiaries' behavior—primarily household (re-) labor allocation to economic activities. Jensen et al. (2017)—one of a few papers that analyzes the effect of both CTs and IBLI interventions in Kenya—found that CT programs enhance household income and child health but have a weaker effect than index-based insurance. However, their study did little for the mechanisms through which the interventions change household labor allocation decisions in economic activities (i.e., they focus on welfare outcomes as a result of the transfer and/or the adoption of IBLI but not on labor supply decisions). In addition, labor allocation effects induced by CT and IBLI could be presumably different for different groups in society (across age, gender, and economic status such as pastoralist versus agriculturalists) (Anderson & Baland, 2002;

Blattman et al., 2014). Therefore, tailoring SPPs to the local circumstances is essential (Williams et al., 2013).

Transfer programs provide in-kind or cash support without ex-ante in-payment or ex-post return services. In contrast, index insurance schemes, such as IBLI, are used to enable risk transfer (Karlan et al. 2014; Matsuda et al. 2019) and all individuals are covered without a risk check—insurance premiums are linked to an individual's economic capacity and not his or her risk profile (Chetty and Finkelstein, 2013). As such CTs and subsidized index insurance can shape household allocation decisions and lead to different production regimes within pastoralist households. Therefore, theoretically, social transfers and social insurance are designed for similar reasons but adopt different targeting approaches or modes of operation having related or different labor market outcomes. Whether CTs and IBLI can alter labor allocation decisions in ways that improve labor market outcomes; and whether both programs are complementary or not is fundamentally an empirical question.

Unlike other studies that did not satisfactorily address the selection bias associated with the insurance uptake, namely the correlation between a household's labor allocation and the decision to participate in SPPs, we employ a fixed effect instrumental variable identification strategy. Specifically, we use randomized encouragement to participate in index insurance program as an instrument (i.e., randomized distribution of discount coupons and information treatments) to identify the effect of IBLI on labor allocation and the intention to treat by using exogenous eligibility criteria to identify the effect of the CT program. To examine the dynamic effects of both program interventions on household labor allocation and to control for unobserved household characteristics, unique rich panel data in both countries are used.

Overall, the results suggest that both programs alter household labor allocation decisions by inducing changes or expansions in agricultural production toward more diversified livelihood activities both on-farm and off-farm. CTs increase households' incentive to allocate more of their labor to off-farm activities than to on-farm production, whereas IBLI incentivizes both on-farm (such as crop production) and off-farm production diversification, and such changes are welfare-enhancing productive activities. Further analyses by employment type and place, gender, and age suggest that, although index-based livestock insurance coverage is more effective in inducing a greater reallocation of labor to on-farm production diversification (e.g., livestock production and crop production, an emerging pastoral production diversification strategy for pastoralist households), CT programs are more effective at increasing household labor participation in nonfarm activities. The two programs show minimal complementarities that can increase the efficiency of labor market outcomes, although some gains are observed from their interactions in terms of improving labor allocations to non-livestock production.

This study adds to the existing literature in several ways. First, we provide an assessment of two SPPs in Ethiopia and Kenya addressing the potential endogeneity using a sound identification strategy and several robustness checks. Second, our work contributes to the growing literature on the economic impacts of SPPs, specifically cash transfers and index insurance products that has not rigorously considered possible unintended consequences on labor market. Third, we go beyond the most common form of SPPs, CT programs, by studying an innovative index-based insurance product for livestock holders and compare the potential effects of these programs as they relate to work incentives. Specifically, the study informs the policy debate in developing countries as to the comparative impact analysis of index insurance and CT programs as they relate to work incentives. By doing so, we also inform the policy debate as to whether there exists potential complementarities between CT and IBLI designed to enhancing resilience to climate shocks informing development policies aimed at promoting resilience by enhancing pastoralists' ability to prepare and protect themselves against shocks.

The remainder of this paper is structured as follows. First, we present theoretical channels. Next, we introduce background information on the program, describes the data used in the analysis and the research design, including some summary statistics. Then, we discuss the estimation strategy and the preferred identification strategy. Finally, we present the main empirical results and robustness checks for the preferred specification, followed by the conclusion.

Theoretical Channels

Given the interlinkages between all of the decisions made in the agricultural household (Skoufias 1994), SPPs could affect household outcomes through several theoretical channels (Jayachandran 2006; Baird et al. 2018). In this study, we concentrates on the effects on labor allocation.

The first effect is related to the income channel (labor–leisure trade-off), through which resource transfers through SPPs made to beneficiaries affect household income and possibly change labor allocation—both intensity and participation in the labor market—when keeping wage rates constant (Haushofer and Shapiro 2013). Critiques of SPPs often refer to this effect as the “lazy welfare recipient” (Banerjee et al. 2017) phenomenon that postulates that receiving social transfers relaxes the household budget constraint and make leisure more attractive. Conceptually, this phenomenon is caused by an increase in the opportunity cost of leisure when nonlabor income increases (Becker 1965). In low-income settings, when households have a low-income elasticity of leisure (Fiszbein et al. 2009) and social transfers often crowd out other income sources (Daidone et al. 2019), the “lazy welfare recipient” might be legitimately challenged and needs to be empirically tested.

Social insurance (related to agricultural production) has no direct effect on current household income because the safeguarding mechanism for agricultural revenue losses leaves expected income unchanged. Therefore, social insurance does not have an ex-ante effect on the labor–leisure decision unless it affects the household’s risk management. However, in farm household models, the income effect also has an ex-post effect on household labor allocation if it affects agricultural production practices (Hill et al. 2019). Additional income, through CTs, provides liquidity to households, allowing them to make investments in agricultural and nonagricultural businesses that they would otherwise not make. Improved agricultural technologies increase the returns to labor and increase the household’s shadow wage rate, creating a new labor–leisure allocation equilibrium (Gertler et al. 2012) (liquidity channel). In the medium to long-term, more household resources improve household health and, thus, labor productivity. In turn, both the labor supply and the individual wage rate increase, rendering labor more attractive (health-productivity channel). Both the liquidity and health-productivity channels of the income effect could also be relevant for social insurance when ex-post payouts increase liquidity for agricultural investments (Hill et al. 2019).

The second effect, associated with the second moment of farm household income, is referred to as the risk management channel. Given production and price uncertainties, agriculture insurance alters the distribution of possible incomes by guaranteeing a payout if agricultural production or profits fall short, eliminating the shortfall risk from the insurance payout, and reducing the expected income (or leaving it unchanged) as result of the cost of insurance. The new probability distribution of income can spur investments in risky on-farm (input use, area expansion) (Karlan et al. 2014; Hill et al. 2019) and off-farm (self-employment, migration for a better job activities. Investments in agricultural technologies can increase the farm household's shadow wage, rendering farm labor more attractive. Alternatively, less risky agricultural income could induce farm household members to engage in new off-farm work, leading to more hours in self-employment or elsewhere. The net effect on household labor depends on the extent to which new off-farm labor replaces on-farm activities or whether it induces labor that was not previously utilized. A positive side-effect of additional off-farm activities is the diversification of household incomes. Daidone et al. (2019) argued that, generally, transfer programs with regular flows can also play the role of insurance payouts and create similar incentives as insurance products.

The effect of both insurance and transfer programs on household wealth and risk structure could also have the potential to change farmers' risk preferences, which is particularly relevant in the absence of minimum social protection and incomplete financial markets (Daidone et al. 2019). A reduction in absolute risk aversion also includes riskier on-farm and off-farm decisions (Dercon 1996). Because riskier activities tend to increase expected income, risk management effects can spur longer-term income effects.

Finally, general equilibrium effects are the last channel. Because transfers and social insurance affect the market wage rate through labor allocation and affect commodity prices through the production effect, market conditions respond, and new equilibrium wage rates and commodity prices arise also for nonbeneficiaries (Mobarak and Rosenzweig 2013). The labor/leisure trade-off is reinforced with increasing opportunity costs of leisure in consequence of lower wage rates and commodity prices.

From the discussions, the theoretical effect of both transfers and insurance on labor allocation—specifically total household labor supply—is ambiguous. Social insurance positively affects household labor supply efforts as long as the general equilibrium effects do not outweigh the risk management effect. For the social transfer program, the effect is less clear because the income effect can go in both directions—increase or decrease labor supply. Therefore, the literature is also more confident about the positive labor effects of social insurance than social transfers. Yet, importantly, the sign and magnitude of the program's effect depend on the program's design, such as targeting methods, transfer size, and participants' socioeconomic conditions and risk preferences (the level of liquidity constraints/risk aversion).

Setting and Interventions

The study is situated in the Borana zone of the Oromia region in southern Ethiopia and the Mersabet district in northern Kenya. In both countries, the two study areas consist of a vast pastoralist land mass of mainly arid and semiarid agroecological zones with a bimodal rainfall pattern of four seasons: the long rainy (LR) (March, April, May, and June) and long dry (LD) (July, August, and September) seasons and the short rainy (SR) (October and November) and short dry (SD) (December, January, and February) seasons. Because pastoralism is a household livelihood strategy, livestock usually provides a means of sustenance and a large portion of a household's productive capital and wealth. However, the production of livestock in these areas is subjected to various risks, such as those from climate shocks, diseases, and predation. In addition, livestock production systems in the two study countries are characterized by cyclical movements of livestock in search of grazing land and water (Berhanu et al. 2007). For instance, droughts in the 1980s, 1990s, and 2011/12 (the year in which IBLIs were launched in Ethiopia) resulted in significant herd losses in areas affected by droughts (Catley, Lind, and Scoones 2016; Ayana et al. 2016).

Insurance Product

The IBLI product was designed for precisely addressing the study areas' risks: to foster the food and income security of vulnerable pastoralist communities by managing climate-related risks and to protect pastoralists from falling into the poverty trap (Santos and Barrett 2011). IBLI was first successfully piloted in northern Kenya in the Marsabit district beginning in January 2010 (Chantarat et al. 2013) and subsequently in 2012 in Ethiopia in eight woredas of the Borena zone located directly across the border from the Kenyan region.[1] Hence, the survey periods and the year in which the IBLI product became available differ for the two study countries.[2] The provision in northern Kenya was grouped into five insurance divisions also corresponding to the district's administrative boundaries (Figure A1). Even if IBLI contracts were updated many times during their operations, this study focuses on the active contracts during data collection.

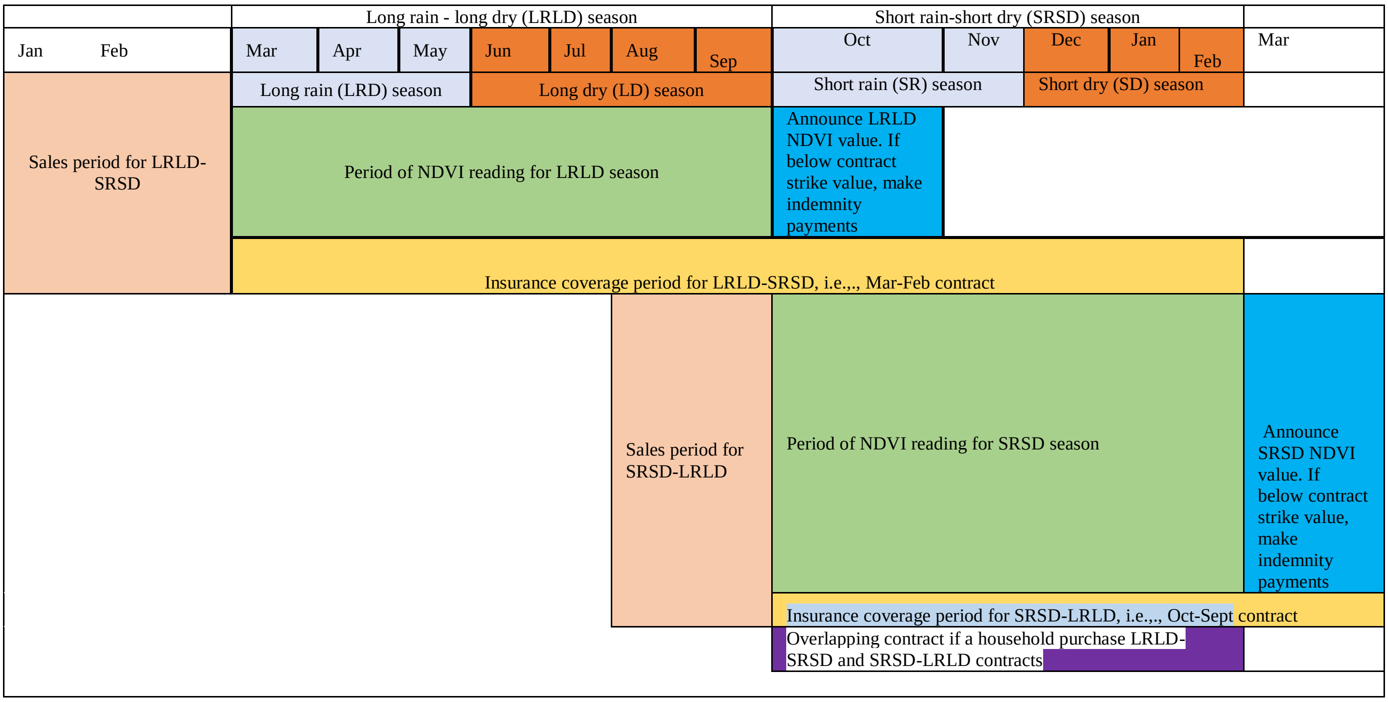
Indemnity payouts are based on the livestock mortality rate predicted from historic, remotely sensed, Normalized Difference Vegetation Index (NDVI) observations (Chantarat et al. 2013). The IBLI index for Kenya is calculated in each insurance division corresponding to its NDVI values, whereas the index for Ethiopia is calculated at the woreda level as a cumulative deviation of periodic NDVI readings for each IBLI sales period. As a result, IBLI premium rates differ across divisions/woredas and livestock species (i.e., whether cattle, camels, or shoat), although polices are purchased and sold in tropical livestock units (TLUs). However, in each respective country, the premium is the same for all buyers. This same premium insures the same livestock species within the insurance boundaries (i.e., within divisions or districts) irrespective of the individual loss experience. Hence, boundary-specific premium rates are applied to the value of a herd that a product buyer chooses to obtain the total amount that must be paid for IBLI coverage.[3] Detailed documentation of the encouragement design for each IBLI sales period as well as discussions of the constriction of IBLI indices in both countries are available at ILRI (2018).

The two-stage stratified random sampling with clustering at the community/*Reera* level was carried out by International Livestock Research Institute and Cornell University in collaboration with local insurance companies. The details are presented in Appendix A and ILRI (2018)

IBLI can be purchased in two forms: a universal reduction in insurers' loaded premium rates and premium discount coupons. Regarding the first form, a 40% premium subsidy was granted. Regarding the second form, various combinations of randomized discount coupons were distributed to households before each sales season began (additionally, information interventions were used in Ethiopia, which are further explained in the next section).

In both study countries, IBLI contracts had two sales windows each year that preceded each of the semiannual rainy seasons: before the start of the short rain seasons (sales period for short rain - short dry season (SRSD)) and long rain seasons (sales period for long rain - long dry season (LRLD)). In Kenya, the first IBLI contracts were sold in 2010. In Ethiopia, the first IBLI contracts were sold from August to September 2012 and repeated from January to February 2013, August to September 2013, January to February 2014, August to September 2014, and January to February 2015. The contract duration is 12 months and starts two months after purchase. Figure 1 illustrates the temporal structure of the IBLI calendar. IBLI policies might overlap or accumulate. Households can buy new contracts in every sales window to augment their coverage. Similar to index insurance products, the imperfect correlation between droughts predicted by NDVI data and household level losses experienced (which are common, as indicated in Takahashi et al. 2020) creates the inherent risk associated with IBLI that livestock loss is not compensated. For instance, IBLI does not cover covariate risks, such as animal diseases, and idiosyncratic risks such as injuries, which are common in both countries.

Figure 1: Timeline of IBLI contract design



Note: Temporal coverage of IBLI: 12 months contract, 2 months sales windows just prior to usual start of seasonal rains. For instance, a contract sold in January 2012 covers March 2013 to February 2013, and a contract sold in August 2012 covers October 2012 to September 2013. Adopted from ILIR-IBLI project document available at https://livestockinsurance.wordpress.com/.

Cash Transfer Program

In both Ethiopia and Kenya, CT programs are common, including Ethiopia's productive safety net program (PSNP) and Kenya's hunger safety net program (HSNP).

HSNP of Kenya

HSNP is one of the four government CT programs launched in the four poorest counties/districts of Kenya—Marsabit, Mandera, Turkana, and Wajir—under the country's national safety nets program. HSNP is managed by the National Drought Management Authority (NDMA).[4] HSNP was implemented in two phases; the first from 2009 to 2012 (HSNP1) and the second from 2013 to 2018 (HSNP2). The main objective of HSNP is to reduce extreme hunger and vulnerability by providing regular bi-monthly unconditional CTs to beneficiary households for the duration of the project.

HSNP was implemented in48 randomly selected sublocations. Out of these, half received transfers during HSNP1 and the other half during the final HSNP2 phase. The following three main targeting mechanisms randomly assigned to each treatment sublocation were used to identify beneficiary households (i.e., to determine who within each sublocation could qualify for CTs): community-based targeting, social pension, and dependency ratio. Regarding community-based targeting, the community is consulted to identify households based on pre-defined eligibility criteria (HSNP 2016). A brief overview of the eligibility criteria for the other two targeting mechanisms as well as the cross-cutting targeting mechanisms considered is provided in Appendix A.

HSNP was rolled out across the Marsabit in April 2009, approximately six months before the first round of the IBLI survey. When the first round of the IBLI survey (i.e., baseline) was carried out, five out of 16 survey communities—approximately 142 households—had received transfers. Subsequent HSNP rolled out added approximately 235 households from four new communities during the next four survey rounds. HSNP households reported receiving the equivalent of between Kenya Shillings (Kshs) 2,150 (approximately US$ 28) and 17,500 (approximately US$ 231) in transfers by the final survey in October/November

2013.[5] Unless a household chose to drop out of the program, died, or migrated out of the area, it was entitled to receive the benefit for the entire duration of the program once selected.

PSNP of Ethiopia

PSNP is the second-largest social security program in Africa next to South Africa. PSNP has two components/programs. The first is the CT component that provides payments to poor and vulnerable households—mainly labor poor households. The second is the public works program (PWP) that targets the poor and provides payments in exchange for their participation in labor-intensive public works projects. The work of PWP occurs during the off-peak season to leave beneficiary households with time for their farming activities. Payments for PSNP-participating households were made in cash or kind. Participating households in labor-intensive PWP did receive approximately six birr per day (approximately US$ 0.5) at the start of the program which increased to eight birr/day and ten birr/day in 2008 and 2010, respectively. PSNP uses a mix of geographic and community-based targeting to identify households in chronically food-insecure woredas. In consequence, PSNP beneficiaries are located only in certain Reeras of the PSNP woredas. Among the selection criteria is a lack of labor power, which includes primary income earners, and the availability of elderly or disabled in the households. Approximately 38% and 14% of the total sampled households were participants in PWPs and CTs programs.

Similar to Kenya, PSNP was rolled out across the Borena zone prior to IBLI baseline survey, although participating woredas and PSNP households in the Borena zone varied significantly across the survey periods (Table A1 and Table C2). At the time of the baseline survey, approximately half of the households had received transfers. The number of beneficiary households under direct support increased during the study period. In contrast to other PSNP sites in the country, pastoral regions, such as the study region, were provided monthly transfers for nine months to meet households' consumption needs. To maintain consistency with Kenya's HSNP setting, the analysis was restricted to PSNP beneficiaries of direct support and included participants of PWPs that contain explicit work requirements only as potential controls. Additional information about the program can be found in Berhane et al. (2014).

Data Collection and Encouragement Design

This study uses five rounds of household panel data from northern Kenya and four rounds from southern Ethiopia. The baseline survey was collected in Kenya during October and November 2009, before the pilot was announced. Six months after HSNP transfers were initiated, the IBLI product became available in January 2010. The pre-experimental baseline survey in Ethiopia was collected in February and March 2012, before the IBLI product became available. Accordingly, after the intervention was introduced, four follow-up rounds of the original households for Kenya and three follow-up rounds for Ethiopia were collected every year. The data collection periods—October and November in Kenya and March and April in Ethiopia—follow the sales period for the SRSD and the LRLD seasons, respectively. Because the contract coverage lasts for only one year, some contracts from sales in different seasons had lapsed in round three and onwards, whereas others remained in force. Table A1.1 in the Appendix summarizes the survey year for each round and the number of households sampled in the two countries.

A total of 923 households from Kenya and 510 households from Ethiopia were surveyed in each round (including the semiannual insurance sales periods in both countries), and attrition was less than 4% between rounds. Details on the replacement procedure, including re-weighting, following Fitzgerald, Gottschalk, and Moffitt (1988), attrition and the descriptions of the variables are provided in Appendix A.

A nontransferable, newly randomized distribution of premium discount coupons was carried out and assigned to a specific respondent in all sales periods. The encouragement design creates exogenous price variations in IBLI uptake and the premiums faced by potential buyers, enabling an analysis of the causal effects of IBLI on outcome variables of interest.[6] The encouragement design (i.e., to encourage the uptake of IBLI products) involves various combinations of premium discount coupons, and additional information interventions using audiotapes or comic books (the additional treatments were only for Ethiopia) that were randomly implemented in each IBLI sales season (Table B1 in the Appendix B). At each study site (communities/Reeras), approximately 60% (in Kenya) and 80% (in Ethiopia) of the randomly selected respondents received a discount coupon ranging from 10–80% at 10% intervals, enabling them to purchase IBLI for up to 15 TLUs at a discount price. The remaining 40% (in Kenya) and 20% (in Ethiopia) of the respondents did not receive discount coupons (premiums).

These additional information interventions (i.e., “learning kits”) specific to Ethiopia were delivered via caricature representations of IBLI in comic books or in audiotapes of a poem about IBLI. These materials were prepared in Afan Oromo, the local language, by the Oromia Insurance Company (OIC) (details on the information interventions are in ILRI (2018). These two information treatments were randomized at the village level for six sites each (12 out of the 17 study sites were selected to receive the information treatment), and assignments did not overlap. Within each treatment site, half of the respondents were randomly selected for the treatment, and these assignments were implemented independently for each sales season. However, information interventions were discontinued after the first two sales seasons. Similar to information treatment interventions, discount coupon treatment was also carried out at the household level.

Program Variables and Estimation Strategy

Given the design of agricultural insurance that cannot be randomly distributed but needs to be purchased and nonrandom social transfers, the identification strategy is fundamental.

The respective labor outcome variable is denoted by L_{it} for household i and season t. The program variables (PV_{it}) are associated with participation in cash transfer (CT) programs (HSNP for Kenya and PSNP for Ethiopia) and the IBLI program.[7] Because the effect of CT programs and/or IBLI coverage on the labor allocation of households and their members is not expected to be immediate, the cumulative effect of past program participation over time (CPV_{it}) is also used to capture dynamic effects that subsequently materialize. The behavioral effects associated with participation might take longer than the IBLI contract period and transfers channeled into households in the form of cash to induce changes in household labor allocation. Previous welfare effect evaluations using the Kenya dataset also suggest that the program participation effects last longer than a single period (Jensen et al. 2017). Moreover, the effects of current program participation might differ from that of past participation that has accumulated over time. For instance, past CTs and/or IBLI status affecting current behavior rather than the future affecting the present; hence, such changes might not immediately reveal themselves. The lagged cumulative IBLI/CT and current participation are used to examine the program's total effect in the final period. Accordingly, four PV are considered to estimate the overall effects: i) current IBLI participation ($IBLI_{it}$), 2) cumulative IBLI participation lagged by one season to avoid double counting in the current season ($i.e.,\ CIBLI_{it} = \sum_{j=1}^{t-1} IBLI_{ij}$), 3) participation in CT programs, and 4) cumulative participation in CT programs lagged by one season ($CCT_{it} = \sum_{j=1}^{t-1} CT_{ij}$). Household and individual level controls (x_{it}) that are believed to affect labor allocation decisions and employment status are also included. These controls vary depending on the model specifications that are estimated given the nature of the outcome variables. Equation (1) presents the model specification for the various estimations, where PV_{it} denotes current program participation in CTs or IBLI and their associated cumulative program variables CPV_{it} ($i.e. CCT_{it}$ and/or $CIBLI_{it}$), as previously described.

(1) $L_{it} = \alpha_0 + \beta_1 \text{PV}_{it} + \beta_2 \text{CPV}_{it} + \beta_3{}' x_{it} + \lambda_t + D_i + \varepsilon_{it}$,

where $CPV_{it} = \{ CCT_{it}, CIBLI_{it}\}$; β_1 and β_2 represent the effect of the program; the $\beta_3{}'$ vector includes the coefficient estimates of the household controls, and D_i and ε_{it} denote the household's or individual's time-invariant fixed effect and mean zero random error, respectively.

Given the nonrandomness of program participation, the standard within estimator of β_1 and β_2 might be inconsistent because of the self-selection of households into the programs. In other words, unobservable respondent characteristics might drive both IBLI/CT participation decisions and outcomes of interest. In such cases, PV (i.e., IBLI uptake and CT participation) and the corresponding CPVs (i.e., cumulative IBLI uptake and cumulative CTP participation) are purely endogenous to both observed and unobserved respondents' characteristics.

The random encouragement design of the IBLI program—the randomized distribution of premium discount coupons and randomly assigned extension (information) treatments in either audiotapes or comic books (the latter only for Ethiopia)—enables us to address the selection biases associated with IBLI uptake choices. Similarly, participation in the CTs was randomized only at the village level but not within the village, a logical finding because the CT targets specific households. Controlling for observable targeting variables and eligibility criteria does not entirely account for the participation; hence, the within estimator is likely to be inconsistent but instrumentation based on the intention to treat (ITT) yields consistent estimates (Wooldridge 2010). Hence, a fixed effect instrumental variables approach is used to examine the local average treatment effect (LATE) of the four program variables on the outcome variables of interest, which makes use of randomly distributed discount coupons to instrument IBLI and exogenous eligibility thresholds to instrument CT treatment.

IBLI Instruments

The treatment-control covariate balancing tests performed using data from the season immediately preceding each coupon distribution showed no systematic difference between coupon recipients and nonrecipients across all coupon distribution periods (except in specific periods, such as herd size in SRSD09, TAE in SRSD10, age in LRLD10, and mobility in LRLD13 in Kenya and age in HH in SRSD11, member of self-help group in SRSD11, and income per AE (Birr) in LRLD12 in Ethiopia) (Table B1, Appendix B) providing no evidence for violation of the exclusion restrictions. Hence, premium discount coupons were confirmed as being random, as the encouragement design intended. The first-stage panel fixed effects of the linear probability model (LPM) estimates of IBLI uptake and lagged cumulative IBLI purchases confirms that discount coupons, information treatments (poet tape and comic book), and cumulative discount have a strong positive and statistically significant effect on current IBLI uptake and the lagged sum of coverage in both countries, respectively (Table B2, Appendix B). The detailed discussions about the instruments are presented in supplementary Appendix B.

HSNP/PSNP Instruments

CTs are designed such that participation is not random, and certain households might have manipulated their reported structures to fit the selection criteria to receive transfers (i.e., noncompliance or inconsistence of adherence to the selection) (see Appendix C for a detailed analysis of adherence to the selection). A CT's ITT—households' exogenous eligibility status—is used as an instrumental variable to address endogeneity. This approach follows that of Jensen (et al. 2017). For the ITT to be a valid instrument, it should be exogenous (i.e., transfers are targeted on the basis of an exogenous threshold in household characteristics) and correctly predict participation in a CT (i.e., the ITT variables should be correlated with program participation). The results presented in Table C3 in Appendix C confirm that the ITT indicator is a relevant instrument. A detailed analysis of the validity of ITT as a relevant IV for participation in HSNP is provided in supplementary Appendix C.

In the second stage of the estimation (Equation 2), four predicted program variables (i.e., two current and two lagged—cumulative IBLI and CT participation) are used to estimate the causal effect of these variables on the various labor supply outcomes.

$$(2)\ L_{it} = \alpha_0 + \check{\beta}_1 \widehat{\mathrm{PV}}_{it} + \check{\beta}_2 \widehat{\mathrm{CPV}}_{it} + \check{\beta}_3 x_{it} + \widetilde{\lambda c}_t + \widetilde{D}_i + \varepsilon_{it},$$

where $\widehat{\mathrm{CPV}}_{it} = \{ \widehat{CCTP}_{it}, \widehat{IBLI}_{it}\}$, and the other variables are as previously defined. Given that treatment exogeneity and compliance monotonicity are satisfied, the predicted IBLI coverage and/or CT participation (measured in discrete terms) included in our second-stage estimates provide a clean causal effect of these program variables on the outcome variables of interest. Let PV denote the current discrete IBLI uptake and/or CT participation. The LATE of the individual program (IBLI or CT) is given by the difference in the predicted probabilities of program participation between the treatment and comparison groups (Angrist and Imbens 1995). In other words, the coefficient estimate for the predicted $(\widehat{\mathrm{PV}}_t)$, $\hat{\check{\beta}}_1$, measures the effect of current program participation on labor supply outcomes. The coefficient estimate for the predicted cumulative past participation in the final season $(\widehat{\mathrm{CPV}_t})$, $\hat{\check{\beta}}_2$, measures the effect of past cumulative IBLI uptake/participation in CTs on labor supply outcomes. The overall average total program effect (ATPE) among participants is the net effect of the two estimated coefficients, that is, $(\hat{\check{\beta}}_1 + \hat{\check{\beta}}_2)$.[8]

Finally, to examine the complementarities in terms of labor supply, if any, the effect of both types of programs are simultaneously examined using the cumulative current predicted IBLI uptake, cumulative current predicted CT participation, and the interaction between the two variables.[9] The interactions of the program instrumental variables previously described are used to instrument program interactions (i.e. IBLI and CTs). The first-stage estimation results for these variables are presented in Appendix C, Table C4.

Summary Statistics

Table 1 provides the summary statistics. Approximately 37% and 22% of households are headed by females in Kenya and Ethiopia, respectively, during the final survey period. On average, approximately 13% of Kenyan household heads attended formal education, has a herd size of 13 TLU, annual income of per adult equivalent (AE) of Kshs 2,083 (approximately US$ 28). In Ethiopia, surveyed households have an average of 0.8 year of formal education, herd size of 20 TLU, an annual income per AE of birr 2671 (approximately US$ 152), and family size of approximately four in AE. The outcome variables, which are related to the labor allocation decision, are categorized into work hours in primary and secondary activities and aggregate work hours (intensive margin); labor employment status in on-farm and off-farm production activities (extensive margin) that indicate the overall working probabilities both on-farm and off-farm; and other livelihood diversification strategies that require the sale of labor time to generate household income, such as migration for employment. Average total work hours per AE per day in Kenya and Ethiopia are 9.7 and 12, respectively. The corresponding figures for secondary activities in Kenya and Ethiopia are 2 and 2.7 work hours per adult equivalent per day, respectively. The number of surveyed households engaged in crop production as a source of income is higher in Ethiopia (approximately 25%) compared with Kenya (approximately 8%). The average number of migrants per household in both countries is approximately two.

Table 1: Summary Statistics for Selected Variables

	Kenya, 2013			
	Mean	Std. Dev.	Min	Max
Household characteristics				
Female headed (1=yes)	0.367	0.482	0	1
Age of household head (in years)	50.507	15.882	22	97
Head is widow (1=yes)	.143	0.35	0	1
TLU class (1=low, 2=medium, 3=high)	1.94	0.817	1	3
Education level (head) (in complete years)	1.036	3.133	0	16
Total adult equivalent (TAE)	5.18	2.028	.7	12.8
Member of self-help group (1=yes)	0.101	0.301	0	1
Annual income per AE (in 2009)	2082.97	5936.48	0	82056.15
Herd size (TLU)	13.09	14.9	0	99.75
Program variables				
Current HSNP participation (1=yes)	0.238	0.426	0	1
Lag cumulative HSNP participation	1.889	2.532	0	8
Current HSNP transfers (KSH)	1114.41	2216.478	0	10500
Lag cumulative HSNP transfers (KSH)	12354.651	16883.689	0	80750
IBLI uptake (1=yes)	0.061	0.239	0	1
TLU insured	0.183	1.06	0	15
Lag cumulative IBLI uptake	.62	.843	0	4
Lag cumulative TLU insured	1.727	3.776	0	34.29
Outcome variables				
Total hours of work per AE per day	9.728	2.421	0	16.471
Total hours of work in primary per AE per day	7.713	1.682	0	12.857
Total hours of work in secondary per AE per day	2.014	1.374	0	7.059
Off- farm employment (1=yes)	0.19	0.392	0	1
Crop production (1=yes)	0.079	0.27	0	1
Number of migrants per household	2.012	1.778	0	10

	Ethiopia, 2015			
	Mean	Std. Dev.	Min	Max
Household characteristics				
Female headed (1=yes)	0.217	0.412	0	1
Age of household head (in years)	52.471	17.938	23	103
Head is widow (1=yes)	0.008	0.088	0	1
TLU class (1=low, 2=medium, 3=high)	2.012	.818	1	3
Education level (head) (in complete years)	0.749	2.071	0	14
Total adult equivalent (TAE)	3.874	1.756	0.7	11.7
Member of self-help group (1=yes)	.65	0.774	0	3
Annual income per AE (in 2012)	2671.58	14049.23	17.06	165243.9
Herd size (TLU)	19.84	30.981	0	458.75
Program variables				
Current PSNP participation (1=yes)	0.139	0.346	0	1
Lag cumulative PSNP participation	0.832	1.457	0	8
Current PSNP transfers (ETB)	91.632	357.684	0	4775
Lag cumulative PSNP transfers (ETB)	600.262	1662.813	0	25200

IBLI uptake (1=yes)	0.163	0.37	0	1
TLU insured	0.325	1.651	0	15.2
Lag cumulative IBLI uptake	0.923	1.13	0	5
Lag cumulative TLU insured	2.101	6.076	0	75
Outcome variables				
Total hours of work per AE per day	12.59	5.456	4.33	19.83
Total hours of work in primary per AE per day	9.8	4.769	2.16	18.11
Total hours of work in secondary per AE per day	2.666	1.462	0	7.02
Off- farm employment (1=yes)	0.194	0.396	0	1
Crop production (1=yes)	0.25	0.433	0	1
Number of migrants per household	1.924	1.754	0	13

Note: See Appendix A2 for a description of each variable and other control variables used in the models. N=923 and N=510 for Kenya and Ethiopia, respectively. TLU is a common measure used to aggregate livestock across different species to a common unit. 1 TLU = 1 cattle = 0.7 camels = 10 goats or sheep ("shoats").

Table 2 presents the IBLI take-up in both Kenya and Ethiopia in each year. Approximately 28% (in LRLD10) and 26% (in SRSD13) of survey households purchased IBLI in Kenya and Ethiopia only during the first sales window, respectively. In follow-up surveys, IBLI purchases were lower for the LRLD than for the SRSD sales periods in Ethiopia and vice versa for Kenya. However, the premium payment structure, number of indemnity payouts, and information treatment, among others, are different between the Ethiopian and Kenyan IBLI products.

Indemnity payments were made in Kenya in four divisions following the 2011 LRLD season and in two divisions following the 2011 SRSD season to combat the drought. The second, third, fourth, fifth, sixth, and seventh indemnity payments were made in some divisions after the 2011, 2012, 2013, and 2014 SRSDs, and the 2014 LRLD.

The first IBLI indemnity payment in Ethiopia was made in all woredas following the 2014 LRLD (in November 2014) (ILRI 2018). Also to be noted is that insurance policies last for one year; therefore, households that purchased coverage during either the LRLD sales period or the SRSD sales windows received SRSD indemnity payments.

Table 2: IBLI Coverage and Demand for IBLI (TLU) Conditional on Purchase, by Country

Year	Sales period	Kenya		Ethiopia	
		Number of purchasing households	Average purchased coverage (standard deviation)	Number of purchasing households	Average purchased coverage (standard deviation
2010	LRLD	254	3.15 (3.12)	-	-
	SRSD	-	-	-	-
2011	LRLD	132	2.94 (2.95)	-	-
	SRSD	127	2.14 (2.25)		
2012	LRLD	-	-	-	-
	SRSD	83	2.28 (2.35)	130	2.42 (3.18)
2013	LRLD	56	3.01 (3.17)	94	2.36 (3.74)
	SRSD	40	3.01(2.93)	148	2.52 (5.04)
2014	LRLD	-	-	62	2.49(4.15)
	SRSD	-	-	103	1.94(3.36)
2015	LRLD	-		64	2.07(4.13)

Note: LRLD (January to February sales period), SRSD (August to September sales period). Five years and six semiannual sales periods are used in northern Kenya, and a data set covering four years and six semiannual IBLI sales periods are used in southern Ethiopia. LRLD is the long rain/long dry season that lasts from March 1 through September 30. SRSD is the short rain/SD season that lasts from October 1 through February 28. For logistical reasons, no sales occurred in Kenya during the sales period for SRSD in 2010 and LRLD in 2012.

Results: Do the Programs Influence Labor Allocation Decisions?

First, we present the effect of IBLI coverage and PSNP/HSNP participation on household labor supply (intensive margin) in both countries, separately. Then, the effect of the two programs on labor allocation by activity (extensive margin) and the effect of joint program exposure are presented.

Impact of IBLI Uptake and CT Participation: Intensive Margin

Current and cumulative IBLI contracts are observed to be not as closely linked, partly because a few of them are purchased in every sales season. For instance, nearly 33% and 30% of households' in Ethiopia and Kenya, respectively, purchase IBLI at least once. In most cases, households participating in the CTs in the two countries continue to participate throughout the program. As a result, the HSNP/PSNP variable is always positive when the lagged cumulative participation is positive.

Panels A and B of Table 3 report the second-stage results of the effects of IBLI coverage and CTs on work hours per day (AE) in primary and secondary activities, respectively. The results in Panel A indicate that IBLI coverage increased work hours per AE per day in both Ethiopia and Kenya irrespective of the type of activities to which household labor hours were allocated. In terms of the magnitude across the countries, IBLI coverage has a stronger effect in Ethiopia than in Kenya, driven by both current and accumulated participation. For instance, current IBLI coverage in Ethiopia increases total work hours per day for participating households by approximately 1.03 (column 1), whereas accumulated past participation in IBLI increased total work hours per day in the contemporaneous period by an additional 1.18 (row 2, column 1). The corresponding figures for Kenya are 0.56 and 0.60, respectively (column 4).[10] Therefore, contemporaneous IBLI coverage has an ATPE on aggregate work hours per day among the IBLI participants of a 2.21 (p-value = 0.001) and

1.1 (p-value = 0.001) increase in Ethiopia and Kenya, respectively (columns 1 and 4). When the effects of IBLI coverage are compared by activities, the influence of current IBLI participation is found to be stronger on secondary activities than on primary activities but is vice versa for the effect of historic participation (i.e., cumulative past participation) (columns 2, 3, 5, and 6).

The independent significance of the coefficients of current and past cumulative participation and their respective magnitudes confirms our previous discussion on program participation having dynamic and longer-term effects on household labor allocation decisions. This indication shows that the effects of past and current program participation affect contemporaneous labor supply decisions through different channels. The income channel exerts long-term labor allocation only after additional income has been generated, whereas the risk management effect is immediate. Given the income channel's ambiguity, current and historical participation might have opposite effects that offset each other. Therefore, the ATPE is the net effect of current participation and lagged cumulative program participation during the final period. The following discussions focus on the ATPE of the two programs.

Table 3: Effect of IBLI Coverage and CTs on Household Work Hours per AE by Country

Panel A: IBLI	Ethiopia			Kenya		
	Total hours of work	Primary activities	Secondary activities	Total hours of work	Primary activities	Secondary activities
	(1)	(2)	(3)	(4)	(5)	(6)
Current IBLI uptake	1.029*	0.648	0.528***	0.563**	0.194	0.369**
	(0.549)	(0.460)	(0.177)	(0.265)	(0.197)	(0.151)
Lagged cumulative uptake	1.181***	0.672**	0.364*	0.595**	0.320*	0.275**
	(0.336)	(0.294)	(0.196)	(0.256)	(0.189)	(0.120)
Aggregate total program effect (ATPE)	2.209	1.319	0.893	1.091	0.524	0.566
p-value	0.001	0.031	0.001	0.001	0.041	0.002
Observations	3778	3776	3522	6732	6732	6732
Households	502	502	502	915	915	915
Model F-stat	9.18	101.19	50.57	24.06	14.66	2.63
K-P F-stat	28.46	29.15	29.78	2186.09	2186.09	2186.09
Household FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: HSNP/PSNP	Total hours of work	Primary activities	Secondary activities	Total hours of work	Primary activities	Secondary activities
	(1)	(2)	(3)	(4)	(5)	(6)
Current participation	-0.317	-0.443*	0.297***	-0.938	-0.866	-0.071
	(0.293)	(0.235)	(0.109)	(1.480)	(1.171)	(0.738)
Lagged cumulative participation	-0.430*	-0.944***	0.094	-0.331**	-0.054	-0.277***
	(0.243)	(0.197)	(0.094)	(0.162)	(0.118)	(0.071)
Average total program effect (ATPE)	-0.747	-1.386	0.391	-1.269	-0.920	-0.348
p-value	0.096	0.000	0.021	0.389	0.432	0.633
Observations	3778	3776	3522	6728	6728	6728
Households	502	502	502	921	921	921
Model F-stat	14.79	16.14	24.89	33.25	16.91	2.69
K-P F-stat	9.64	8.72	9.20	14.70	14.70	14.70
Household FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Standard errors in parentheses and are clustered at the sublocation level for Kenya and at Reera level for Ethiopia. Total work hours are the sum of the work hours per AE per day in primary and secondary activities. Both models include the following covariates: age and age of head squared, household head education level, current seasons' livestock mortality and its square, number of children below 15 years of age, number of male and female youth in the household (15–34 years), number of male and female adults in the household (35–64 years), number of old members (>65 years), net transfer values from governments and non-governmental organizations (NGOs) outside SPP, log of income per AE, a dummy indicating whether or not households have own farmland, number of days unable to engage in normal activities because of illness, a dummy indicating that a household is a member of a self-help group (for Ethiopia, the number of local groups in which the household is registered as a member), the number of donkeys and poultry owned, a dummy indicating whether a household participates in group activities related to water and pasture, the value of productive assets and the wealth index, a dummy for missing values, and village-period dummies. The first stages of IBLI uptake contain a dummy if a household heard about insurance, and CTP participation includes knowledge about the CTP in the village. Note also that most of the work hours reported for the different activities during R1 for Kenya are missing, and R1 is excluded from this analysis. Failure to control for participation in the public works (for Ethiopia) component does not alter the sign and significance of the treatment variable—direct support. * $p<0.10$, ** $p<0.05$, *** $p<0.01$.

Panel B of Table 3 shows that, unlike IBLI coverage, CT participation had a negative effect on aggregate work hours for participating households in both countries, with a stronger negative effect through cumulative past participation. This finding seems to support the lazy welfare recipient argument. However, the effect is not the same across activities and between the two countries. For instance, Ethiopia's PSNP participation was found to increase the work hours spent in secondary activities (Panel B, column 3). For instance, the ATPE on work hours in secondary activities among PSNP participants in Ethiopia during the final period is estimated to be a 0.40-hour increase per day (p-value = 0.021) (approximately two hours per household). The corresponding estimated effect for HSNP participants in Kenya is 0.35 hour per day, suggesting a decrease (p-value = 0.633) (Panel B, columns 3 and 6). However, further analysis of the effect of Kenya's HSNP on labor participation suggests that CT participation increased off-farm labor participation and labor allocation to crop production, including migrating for work. Therefore, the seemingly unintended consequences of CTs at the intensive margin (i.e., on work hours) in Kenya do not necessarily capture the overall effect of CTs on labor allocation—a point further discussed in the next section.

The findings of this study point to four potential mechanisms. First, insurance coverage might encourage participating households to increase their investments in risky activities (i.e.,., activities outside livestock production). In this case, the IBLI product mitigates investment risks and stimulates changes in production toward more diversified and/or income-generating activities, in turn increasing work hours. For instance, individuals who purchased the IBLI product might now attempt to expand their on-farm activities with high potential rewards, such as crop production, start small businesses, and engage in off-farm employment (including investments in migration). In other words, access to subsidized insurance might have enhanced investments in agriculture and nonagriculture activities by easing binding constraints, such as uninsured risk, because insured farmers can find resources to increase their expenditures on their farms (Karlan et al. 2014; Mobarak and Rosenzweig, 2013). Thus, the overall effect is positive. Second, after CTs received during the lean season met immediate consumption, some might have been reinvested in expanding existing or new livelihood activities, as is evident for Ethiopia.[11] In other words, some CTs might have eased liquidity constraints that prevented poor households from undertaking certain livelihood-enhancing investments, such as diversification of current production (e.g., livestock production) or investments in other income-generating activities. Such investments would result in more work hours in self-employment or employment elsewhere. Stoeffler et al. (2020) found similar effects in Niger in which small, regular CTs combined with improved saving mechanisms induced sustained investments in livestock assets. Third, although CTs can be used mainly to meet recipient households' consumption needs (reflected by the negative coefficients on primary activities), their effect on work could be indirect (for instance, enhancing IBLI uptake or funding migration costs). In Kenya, CTs are found to enhance IBLI uptake, and IBLI coverage leads to increased work hours in agricultural and nonagricultural activities. Fourth, CTs can ease the credit constraints faced by households and might enable participants to purchase agricultural equipment, such as small machinery, to substitute for their labor. In that case, a CTP might negatively affect work hours. In addition, both programs prolong migration (particularly that of male members) that would have occurred to fill earning gaps and provide necessary labor for on-farm activities (results in Table E supports this line of thinking). In that case, the effect of CTs on effort is indirect or negative. Recent empirical evidence from Ethiopia suggests that PSNP participation causes participating households to delay migration (marrying out of adolescent female members), thus their sizes increase (Hoddinott and Mekasha, 2020). Such a substitution could decrease working hours.

Does Program Participation Influence Where to Work and What Work To Do?

After examining how program participation influenced the intensive margin, the extensive margin is now analyzed. Such analysis also informs the mechanisms through which program participation has resulted in subsequent increases or decreases in labor hours. Specifically, an attempt is made to examine whether the change in work hours in different activities that resulted from program participation indeed spurred investments by analyzing the effect of each program on the household's labor allocation into different types of activities and place of work (i.e., on-farm vs. off-farm). For this analysis, different labor participation indicators (livelihood diversification) in on-farm and off-farm employment, including migrating for work, are constructed. The program impact on these indicators also suggests the type of investment decisions that households made in response to program participation.

Panels A and B of Table 4 present the effects of IBLI coverage and CT participation, respectively, on different on-farm and off-farm labor participation indicators. The discussion concentrates on off-farm employment, crop production, and input expenditures (in value) in Table 4. Again, by focusing on the ATPE, the results in Panel A reveal that IBLI coverage indeed influences both on-farm agricultural diversification (nonlivestock production, such as crop production) and off-farm employment (such as self-employment in small businesses and off-farm work) in both countries (with a stronger effect on on-farm work). In other words, IBLI coverage enhances households' livelihood diversification in both ways: through on-farm production diversification and off-farm employment, thus incentivizing additional work effort.[12] For instance, IBLI coverage in Ethiopia increased the likelihood of households participating in crop production by 16% and engaging in off-farm employment by 6%. The corresponding numbers in Kenya are 13% and 25%, respectively. These results suggest that the insurance coverage increased a household's propensity—outside of animal production—to try new investment options or expand existing ones with high potential returns (see columns 2–3 and 5–6). Given erratic rainfall and frequent droughts, crop production is considered a risky activity in the study areas (during the final survey period, only approximately 25% (Ethiopia) and 8% (Kenya) of households reported crop production as a source of income).

Increased participation in crop production, despite erratic rainfall among the insured, confirms previous discussions that the introduction of the IBLI insurance induced investments in crop production (e.g., IBLI coverage in Ethiopia increases the likelihood that households would invest in crop production by approximately 25% (column 3) and the cultivation of nonirrigated land by approximately 0.34 ha; Table E1)).[13] Crop production is an emerging pastoralist production diversification strategy that demands more household labor and partial sedentarization than does livestock production. Other studies also documented that the binding constraints to farmers making investments are uninsured risk; thus, providing insurance against primary catastrophic risks enables farmers to find resources vital to increasing expenditures on their farms (Karlan et al. 2014). Similarly, Janzen and Carter (2019) suggested that insured households in rural Kenya are less likely to sell assets, and access to insurance schemes significantly reduced the need for the poor to cut food consumption when faced with adverse shocks. In line with these findings, the results of this study also suggest that consumption smoothing and asset protection effects of insurance schemes in turn significantly increase productive investments in subsequent years because they might stimulate a household's investments and, thus, more work hours. Hence, access to liquidity during lean seasons in the form of payouts has a significant effect on the household's labor allocation, which is in line with other experimental studies (Fink et al. 2020).

Panel B presents the estimated coefficients for the CTs and offers the interesting insight that, in line with IBLI coverage, CTs also increased labor participation in on-farm and off-farm employment, although the effect on the latter is stronger. For instance, by the final survey round, cash recipient households have an 8% and a 14% higher likelihood of participating in off-farm employment in Ethiopia and Kenya, respectively (columns 1 and 4). These results contrast the previous findings that CTs had a negative effect on hours worked.
However, an additional insight is that, relative to IBLI coverage, CTs had a higher effect on the likelihood that a household engages in off-farm livelihood diversification (see columns 1 and 4) relative to on-farm production diversification (columns 3 and 6). In other words, although IBLI coverage encourages more on-farm production diversification or investments, thus increasing on-farm productivity, CTs support off-farm employment. This support partly result from the fact that implicit transfers to IBLI purchasers are smaller than the annual transfers received by safety nets participants and that the average single CT is greater than implicit transfers.[14] Jensen et al. (2017) also found that welfare gains among those who purchase the IBLI product are the result of increased investments in their livestocks' productivity, which is "partly attributed to changes in production strategies in response to insurance coverage, rather than the direct effects of premium or indemnity payments." Moreover, in both countries, the

effects on off-farm labor allocation are seemingly driven more strongly by cumulative CTs than current participation. Cumulative transfers are expected to be more important when engaging in off-farm/nonfarm activities than current CTs, which is expected given the fact that transfers accumulated over time would generate more income, in turn enabling the financing of the cost of migration when searching for jobs and/or starting small businesses, hence increasing employment.

In summary, our findings from the two programs suggest that, unlike the "lazy welfare recipients" claim that transfers induce weaker efforts, no adequate empirical evidence confirms such a claim. Instead, evidence is found that suggests that in addition to their role of consumption smoothing or asset protection—as proven by previous studies (Hidrobo et al. 2018)—both CTs and social insurance induce work efforts pertinent to improving one's livelihoods. The induced efforts are materialized either by enhancing investment and production decisions in primary and secondary activities (such as change of production toward more diversified activities) or by engaging in additional off-farm employment. This livelihood diversification has resulted in subsequent increases in work hours and the high likelihood of employment outside the own farm, particularly in activities that generate additional income for the household. This diversification might also indicate that instead of investing in risky activities (because of droughts), households might prefer to diversify their livelihoods outside of agriculture. To some extent, as observed in both datasets, CTs and IBLI could also induce investments in productivity gains such as intensification (in addition to diversification) (Figure A2 in the Appendix). By doing so, households could earn more income and have sustainable livelihoods from diversification or increased productivity; hence, improving labor market outcomes. A similar effect of CTs was reported in Burkina Faso by Adjognon, von Soest, and Guthogg (2020). Other studies also documented that CTs are more effective in enabling production changes from on-farm to outside the farm, such as to nonagricultural work (Skoufias et al. 2008). This type of shift was also documented in Mexico for the PAL program (Bianchi and Bobba, 2013) and Niger (Premand and Stoeffler 2020).

Table 4: Effects of Program Participation on On-farm and Off-farm Employment (Extensive Margin, Coefficient estimates)

	Ethiopia			Kenya		
	Off-farm participation	Crop production	Expenditure in crop	Off-farm participation [a]	Animal production	Crop production
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: IBLI						
Current IBLI uptake	0.083	0.989***	0.499***	0.146*	-0.359***	0.504**
	(0.159)	(0.173)	(0.190)	(0.091)	(0.091)	(0.233)
Lagged cumulative uptake	0.002	-0.387***	-0.363***	0.001	0.043	0.135
	(0.088)	(0.103)	(0.099)	(0.053)	(0.044)	(0.123)
Total program effect	0.085	0.602	0.136	0.147	-0.136	0.639
Observations	4070	4042	2922	9124	9124	7139
Wald chi2	230.39	630.64	515.41	371.13	685.50	70403.24
Wald test of exogeneity	3.64	42.07	36.49	9.43	1.09	42.71
	Off_farm participation	Crop production	Expenditure in crop	Off-farm participation [b]	Animal production	crop production
Panel B: PSNP/HSNP						
Current PSNP/PSNP participation	0.297***	-0.299	0.041	0.348	0.391	1.016
	(0.089)	(0.262)	(0.154)	(0.544)	(0.434)	(0.880)
Lagged cumulative PSNP/HSNP participation	0.124*	0.960***	0.022	0.017	0.012	-0.413***
	(0.070)	(0.228)	(0.111)	(0.086)	(0.061)	(0.100)
Total program effect	0.421	0.661	0.063	0.365	0.403	0.603
Observations	4070	4042	2600	9090	9090	7111
Wald chi2	315.69	427.09	417.70	582.24	265.46	22063.35
Wald test of exogeneity	30.60	3.69	2.54	0.58	0.23	16.94

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Off-farm participation = 1 if the household participates in off-farm/nonfarm activities and 0 otherwise. Crop production = 1 if the household plants crops in either the LR or SR seasons and 0 otherwise. Animal production = 1 if it is the main source of livelihood. Crop expenditure = 1 if a household spends money on crop production in either the LR or SR season and 0 otherwise. Covariates used in the model include age and age of head squared, household head education level, current season's livestock mortality and its square, number of children below 15 years of age, number of male and female youth in the household (age 15–34), number of male and female adults in the household (age 35–64), number of old members (> 65 years of age), net transfer values from governments and NGOs outside SPP, log of income per AE, a dummy indicating whether or not the household has its own farmland, number of days unable to engage in normal activities, such as because of illness, a dummy indicating that a household is a member of a self-help group (for Ethiopia, the number of local groups in which the household is registered as member), the number of donkeys and poultry owned, a dummy indicating whether a household participates in group activities related to water and pasture, the value of productive assets and the wealth index and village-period dummies. Coefficient estimates reported but marginal effects used for discussions. Table D4 presents the results of additional indicators.

[b]Using TLU insured the coefficients become: current = 0.053*(0.028); cumulative = 0.007(0.008).

How Does Program Interaction affect Labor Allocations?

This study further explores the prospective interaction effects between the two social protection interventions to capture effects not captured by individual program analyses. The effects of instrumented cumulative IBLI coverage, cumulative participation in CTs, and the interaction between the two—instead of current and lagged cumulative participation—are used to examine whether interactions exist between the two programs in a way beneficial to participants' labor supply.[15] As previously shown in Tables 3 and 4, historical participation—in addition to current participation—determines labor supply decisions; hence, using cumulative variables better helps to capture the interactions thereof. In addition, cumulative participation in CTs and IBLI coverage helps to maintain statistical power for adequate program overlap, although a minor overlap in coverage was found (14.4% of IBLI purchasers in Ethiopia were PSNP participants, and 27% of IBLI purchasers in Kenya were also HSNP participants).

Table 5 presents the estimation results for aggregate work hours (Panel A) and labor participation decisions (Panel B). No strong evidence was found to show that complementarities exist between the two programs such that their interaction increases/decreases work intensity, although there is some indication that participation in both programs increases the likelihood of labor participation, particularly in crop production in Ethiopia and off-farm employment in Kenya (columns 3 and 4). This finding is consistent with previous findings that CTs induce IBLI uptake, in turn increasing on-farm production in Ethiopia and off-farm employment in Kenya. An increase in the magnitude of the coefficient estimates also suggests that the interaction between the two programs might increase the effects that each has on labor working hours. Again, the results suggest that CTs enhance IBLI uptake that subsequently resulted in increased work hours by enhancing investments in agricultural production and secondary activities in both countries. Another study on the welfare effects of IBLI and HSNP among pastoralists in northern Kenya also found no positive synergies between the two programs in terms of enhancing household welfare, such as income (Jensen et al. 2017).

Table 5: Effect of Cumulative IBLI Coverage, CTs, and Their Interactions on Work Hours

	Ethiopia			Kenya		
Panel A: on hours of work	Total hours of work	Hours in primary activities	Hours in secondary activities	Hours of work (total)	Primary activitie s	Secondar y activities
	(1)	(2)	(3)	(4)	(5)	(6)
Cumulative IBLI uptake	2.412**	1.041	0.755*	3.312***	0.743	2.569***
	(1.166)	(0.686)	(0.443)	(1.280)	(0.792)	(0.711)
Cumulative participation in CTs	3.028	-1.744	1.296	-3.568	-1.778	-1.790
	(5.844)	(3.631)	(2.131)	(2.600)	(1.701)	(1.535)
Interaction	-3.291	-0.195	-0.992	0.274	0.471	-0.197
	(3.556)	(2.250)	(1.288)	(0.915)	(0.514)	(0.571)
Aggregate program effect (ATPE)	2.149	-0.897	1.058	0.018	-0.564	0.582
Households	512	512	502	889	889	889
Observations	3778	3776	3522	6728	6728	6728
Model F-stat	7.84	32.06	85.80	10.49	20.01	3.27
K-P F-stat	3.25	2.87	2.20	2.04	2.04	2.04
	Participation in:					
Panel B: on labor participation (coefficient estimates)	Off-farm	Animal productio n	Crop productio n	Off-farm	Animal producti on	Crop productio n
	(1)	(2)	(3)	(4)	(5)	(6)
Cumulative IBLI uptake	0.024	-0.0427	-0.347**	-0.544***	0.156	0.116
	(0.172)	0.245	(0.144)	(0.127)	(0.112)	(0.303)
Cumulative participation in CTs	1.276***	-0.629	-0.894**	-0.310***	0.227***	-0.489**
	(0.303)	0.528	(0.368)	(0.071)	(0.061)	(-0.489)
Interaction	-0.536	.5462	1.054***	0.346***	-0.109	0.244
	(0.390)	0.539	(0.307)	(0.113)	(0.098)	(0.301)
Average total program effect (ATPE)	0.740	-0.126	-0.183	-0.508	0.274	-0.129
Households						
Observations	4070	3,898	4042	9090	9090	9090
Wald chi2	479.19	98.0	763.17	902.70	1251.33	243.35
Wald test of exogeneity	21.52	1.23	7.49	10.44	11.14	9.61

Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01. When TLU insured is used instead of IBLI participation and cash transfer value instead of HSNP participation, both IBLI and HSNP remain consistently positive and significant for total and secondary work hours, and the interaction consistently remains negative but significant for total and secondary (with a very low magnitude), at least for Kenya. All models include the following covariates: age and age of head squared, marital status of head, household head education level, current season's livestock mortality and its square, number of children below 15 years of age, number of male and female youth in the household (15–34 years), number of male and female adults in the household (35–

64), number of old members (> 65 years of age), net transfer values from governments and NGOs outside SPP, log of income per AE, a dummy indicating whether or not the household has own farmland, number of days unable to engage in normal activities, such as because of illness, a dummy indicating that a household is a member of a self-help group (number of local groups in which the household is registered as a member for Ethiopia), number of donkeys and poultry owned, a dummy indicating whether a household participates in group activities related to water and pasture, the value of productive assets and the wealth index, a dummy for missing values, and village-period dummies.

Additional Robustness Checks

As robustness checks, a series of analyses were conducted for the main estimates found in Tables 3 and 4 using pooled IV, Propensity Score Matching and Tobit models, and by controlling for a rich set of other covariates, such as migration, public working programs, and number of days that a household was unable to perform productive activities, and experimenting with the definition (proxies) of work hours and labor participation both on-farm and off-farm. Finally, an assessment was made of whether the effect observed for the household is also the case for individual household members by disaggregating the sample households into male adults (15–65), female adults (15–65), and children (0–14). Such an analysis also adds to the debates on targeting in SPPs. Appendix D and E discuss in detail the results from the various regression models. In general, these various estimation techniques confirm the original results except for a change in a few statistical significance levels for some outcome variables. However, the results from the analyses by gender and age suggest that program participations have significant effect on intra-household labor re-allocation. Hence, the aggregate analyses previously presented could mask some interesting heterogeneity within a household.

Conclusions

Different social protection interventions in poor countries are increasingly gaining acceptance as being able to mitigate economic, climatic, and social risks, and simultaneously promote investments in productive activities by improving labor markets, or enhancing their capacity to manage economic risks when exposed—more so in the context of pastoralists.

Despite the importance of SPPs, the choice between their different forms is a dilemma for governments, donors, and development communities because of their unintended consequences on work incentives. In this regard, the causal effects of IBLI and CT programs —implemented concurrently among the same pastoralists in Ethiopia and Kenya—on household labor allocation decisions are compared. Labor time is the major source of income for the poor; hence, this type of analysis also assists in designing policies pertinent for the transformation of pastoralist livelihoods. In addition, the analysis sheds light on how social protection could improve labor markets in developing countries because the two are strongly interrelated.

Both access to publicly subsidized IBLI and CTs are found to significantly influence pastoralist labor allocation (both at the intensive and extensive margins) in both countries. Moreover, these allocations enable households to diversify their livelihood activities (i.e., in response to these incentives and opportunities) or intensify their current agricultural activities to generate long-term welfare gains. For instance, IBLI coverage increases both labor market participation and work intensity by enhancing on-farm production diversification or off-farm employment, more so through the former. On-farm diversification includes crop production, in addition to animal production, as part of pastoralists' agricultural portfolios, and off-farm diversification is achieved by generating incentives to invest in new small business opportunities or petty trade and wage employment, including migrating for work. IBLI uptake also increases labor hours through productivity-increasing investments by decreasing herd size as purchasers invest more in other nonlivestock-related livelihood diversification strategies. In other words, providing insurance enhances investments in agriculture and/or nonagriculture by easing binding credit constraints (such as uninsured risk) and enabling insured farmers to find resources to increase their expenditures on their farms and outside their farms because insured households prefer to invest more in production diversification outside animal production as part of their agricultural portfolios. As a result, labor allocation to livestock production might decrease, and reallocation of labor to nonlivestock production activities such as crop production, off-farm, and wage employment might increase. Interestingly, a decrease in herd size as part of the strategy among the insured does not necessarily reflect a decrease in work hours in livestock production because purchasers invest in livestock to enhance productivity.

Similarly, CTs cause changes in economic activities resulting from the allocation of household labor (both intensity and participation), and such changes created incentives or disincentives to engage in on-farm and/or off-farm work. The effect could vary depending on the socioeconomic conditions of countries, households, and communities in which the program is implemented depending on the nature of the work (primary vs. secondary activities) and geographic location (country)—increasing or decreasing the work done by inactive individuals. HSNP reduces aggregate work hours in Kenya, whereas PSNP increases work hours in secondary activities in Ethiopia. Overall, these findings suggest that, in addition to smoothening out consumption, CTs increase households' incentive to allocate more of their labor to off-farm activities than to on-farm production, whereas IBLI incentivizes both on-farm and off-farm production diversification. The seemingly negative effect of CTs on aggregate work hours (at the intensive margin) in Kenya is offset by the positive effect at the extensive margin, such as off-farm participation, migration, and by enhancing the uptake of IBLI. Regarding the interaction between the two programs, they do not seem to strongly work synergistically, although small gains are observed from their interactions in terms of increasing work intensity in primary activities and off-farm labor participation. The net effect of the interventions depends on the magnitude of the positive effect of IBLI coverage and the negative effect of HSNP. Negative effects on intensity as a result of participation in both programs might be offset as CTs participation increases IBLI uptake/purchases.

This study's analysis of household labor allocation decisions also suggests that households' labor participation in off-farm activities is partly the result of optimal labor allocation rather than being driven by the short-term constraints necessary to meet households' cash or credit needs, which contrasts with the suggestions made by a growing body of literature on off-farm labor allocation in developing countries. In this regard, CTs to the poor would create incentives and opportunities to improve overall labor allocation efficiency, particularly for off-farm activities, which are becoming an increasingly important source of livelihood among small-holders in developing countries.

The findings have important policy implications. Both IBLI and CTs influence household labor allocation in a way that is pertinent to moving out of poverty and/or creating sustainable livelihoods. The programs appear to be promising options for enabling the diversification and transformation of livelihood choices available to households in general and to poor groups in drought risk-prone areas in particular. Hence, such SPPs could be promoted as key intervention approaches to improving welfare gains and moving the poor out of the poverty trap on a more productive basis, thus improving overall labor market outcomes. However, SPPs' sustainable provision and operationalization are subjected to many challenges. Specifically, the uptake of publicly subsidized weather insurance has remained low. In addition, productive safety nets' implementation and financing mechanisms typically focused on their short-term effects, undermining their potential to transform the livelihoods of the poor.

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[1] The terms households and pastoralists are used interchangeably.

[2] Woreda (district) refers to the third lower administrative division in Ethiopia, below region and zone.

[3] Boundary refers to insurance divisions in Kenya and insurance woredas in Ethiopia.

[4] The other three cash transfer programs include cash transfers for orphans and vulnerable children, older persons, and persons with severe disabilities. See https://www.socialprotection.or.ke/.

[5] The data show that HSNP participation and HSNP targeting are slightly inconsistent (see Appendix C). This study uses households' own reported participation even though these reports might not be in line with program targeting criteria (Jensen et al. 2018).

[6] Because of these possible failings in perfect encouragement design implementation and as a general concern over the potential for recall error, we included the household responses to whether they received each treatment.

[7] The models were also estimated using the value of the transfers received or TLUs insured (see the supplementary material).

[8] If the program variables are measured at levels, the aggregate program effect would be the coefficient estimate on $\widehat{\mathrm{PV}}_t$, $\hat{\hat{\beta}}_1$, multiplied by the average current program participation rates in the final season for each analysis, net of the coefficient on CPV, $\hat{\hat{\beta}}_2$, multiplied by the average cumulative past program participation rates in the final season among participants for each analysis, $\widehat{\mathrm{CPV}}_t$, $(\hat{\hat{\beta}}_1 * \widehat{\mathrm{PV}}_t + \hat{\hat{\beta}}_2 * \widehat{\mathrm{CPV}}_t)$. The results from the levels are presented in the Appendix C, Table C5.

[9] One hundred and ninety-two households purchased IBLI coverage in Kenya when receiving HSNP transfers, whereas 87 households in Ethiopia purchased IBLI when receiving PSNP.

[10] To put into perspective: A unit increase in current TLUs insured in Kenya increases the work hours for participating households in secondary activities by approximately 0.5 hour per person per day(2.5 hours per household), whereas a unit increase in cumulative past TLU purchases increases work hours in secondary activities by 0.13 hour per person per day. Thus, the aggregate effect of buying additional TLU coverage on work hours in secondary activities is 0.63 hour. Buying five TLU coverage would increase work hours per day in secondary activities by approximately three hours (see Table C5).

[11] This is also true with IBLI purchases because IBLI purchases directly affect expected income.

[12] Given the pastoralist mode of production, on-farm production diversification refers to livestock and crop production, whereas livelihood diversification refers to both on-farm production and off-farm employment practices by households to improve their livelihoods.

[13] This is further corroborated by the positive effect of IBLI uptake on irrigated and nonirrigated land farmed. For instance, IBLI uptake increases total irrigated and nonirrigated land for participants in Ethiopia by 0.04 ha and 0.34 ha, respectively (Appendix E).

[14] By its design, IBLI is an imperfect insurance product in the sense that coverage rates left much of the herd owned uninsured.

[15] Cumulative IBLI purchases in TLU and cumulative cash transfers and their interactions were also used for experimentation. The interaction terms showed some gains of significance

(but negative) while both IBLI purchases and cumulative cash transfers are positive and statistically significant.