Long-run Effects of Temporary Catastrophic Drought Insurance Coverage*

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November 2026

Abstract

We study the long-run effects of temporary catastrophic drought insurance coverage for pastoralists in Kenya and Ethiopia, instrumenting purchase with randomized premium discounts and resurveying households a decade later. As predicted by multiple equilibrium poverty-trap models, effects diverge by baseline herd size. Among smaller-herd households, insurance reduced holdings of goats and sheep, a precautionary reserve, and sharply raised children's education, consistent with reduced demand for child herding labor. Among larger-herd households, insurance increased holdings of higher-return large animals, with no comparable effect on schooling. These effects persisted or grew, suggesting temporary risk reduction can durably change household investment.

Keywords: Ethiopia, human capital, index insurance, Kenya, livestock, pastoralists

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1 Introduction

Catastrophic aggregate shocks, such as droughts and other natural disasters, have negative long-run impacts on household welfare, shaping educational attainment, health, asset accumulation, and labor market outcomes (Maccini and Yang 2009; Dinkelman 2017; Shah and Steinberg 2017; Carrillo 2020). In the absence of well-functioning financial markets, liquidity constraints may force households to adopt costly coping strategies, including the distress sale of productive assets and reductions in human capital investment that are particularly detrimental when experienced early in life (Jensen 2000; Alderman, Hoddinott, and Kinsey 2006). Beyond the direct consequences of suffering catastrophic shocks, uninsured risk exposure may induce *ex ante* risk averting behaviors, discouraging investment in higher-risk, higher-return strategies that promote long-term growth (Boucher et al. 2024; Karlan, Osei, Osei-Akoto, and Udry 2014; Emerick, de Janvry, Sadoulet, and Dar 2016). In the presence of multiple equilibrium poverty traps, uninsured households might not recover if a disaster pushes them into a low-level, poor equilibrium (Lybbert, Barrett, Desta, and Coppock 2004; Kraay and McKenzie 2014; Barrett, Carter, and Chavas 2019). Market failures in insurance provision are widely recognized as a key driver of these adverse effects (Lybbert, Barrett, Desta, and Coppock 2004; Karlan, Osei, Osei-Akoto, and Udry 2014; Barrett, Carter, and Chavas 2019). While the literature documents positive short-run effects of catastrophic insurance coverage (Karlan, Osei, Osei-Akoto, and Udry 2014; Cai 2016; Jensen, Barrett, and Mude 2017; Hill et al. 2019; Stoeffler, Carter, Guirkinger, and Gelade 2022; Janzen and Carter 2019; Castaing and Gazeaud 2025; Boucher et al. 2024), evidence on long-run impacts remains lacking.

We analyze the immediate and long-run (10-year) effects of catastrophic drought insurance coverage on income, asset holdings, production strategies, and human capital accumulation among

SIS AMA CRSP), the Australian Department of Foreign Affairs and Trade through the Australia Development Research Awards Scheme award "The human and environmental impacts of migratory pastoralism in arid and semi-arid East Africa", JSPS Grant-in-Aid for Scientific Research (B)-26301021, the UK Department for International Development(DfID) through FSD Trust Grant SWD/Weather/43/2009, the Agriculture and Rural Development Sector of the European Union through Grant agreement No: 202619-101, USAID Grant No: EDH-A-00-06-0003-00, the World Bank's Trust Fund for Environmentally and Socially Sustainable Development (Grant No: 7156906), the CGIAR Research Programs on Climate Change, Agriculture and Food Security and Dryland Systems, the CGIAR Standing Panel on Impact Assessment, the CGIAR Research Program on Livestock, and the Foreign, Commonwealth & Development Office Project "Extreme Poverty - Building Evidence for Effective Action" through Oxford Policy Management Limited (Award Number: POR008864). This research was approved by Institutional Review Boards at Cornell University (Protocol ID No 0907000655, 1203002881, 2008009760) ILRI (IRB approval number: ILRI-IREC2015, ILRI-IREC2020-53), and NACOSTI(NACOSTI/P/20/7050). We thank Michael Carter, Johannes Haushofer, Travis Lybbert, John McPeak, Dean Yang, editor Rema Hanna, three anonymous reviewers, and seminar audiences at CEAR-MRIC, Colgate, Cornell, European University Institute, Centre for the Study of African Economies 2024, International Conference of Agricultural Economists 2024, Japanese Association of Development Economics, Kindai, Kyoto, KVS, Oxford Policy Management, Sophia, UC Davis, UNU-WIDER 2025, Utrecht, Wageningen, and Yonsei for helpful comments. This randomized controlled trial was registered in the American Economic Association's registry for randomized controlled trials under ID AEARCTR-0011184 (Barrett, Gabrehiwot, Jensen, and Morsink 2023).

pastoralist households in northern Kenya and southern Ethiopia. We find that even temporary insurance coverage induced a shift in production strategies that began during the experiment and persisted in the long run. Those effects depended on a household's baseline herd size. Among households with smaller herds, insurance reduced holdings of small, liquid livestock like goats, typically held as precautionary savings against catastrophic loss. In these households, children's educational attainment rose sharply in the long run, consistent with reduced demand for children's herding labor, similar to Shah and Steinberg (2017) and Bau, Rotemberg, Shah, and Steinberg (2025). Among households with large baseline herds, insurance instead facilitated accumulation of larger, higher-return animals like cattle, with no comparable effect on schooling. Both patterns persisted or strengthened through the ten-year follow-up, well after insurance coverage itself became unavailable to sample households. These findings show that a temporary intervention capable of reducing uninsured risk exposure can generate lasting gains in human capital and productive capacity long after the intervention itself has ended. Even imperfect, short-lived insurance products can generate durable gains among the poor.

The heterogeneity we observe, based on households' initial herd size, is a well-established feature of poverty-trap dynamics. Where a non-convexity in either subsistence consumption or production technology exists, wealth dynamics can bifurcate around an unstable threshold. Households below the threshold are drawn to a low-level equilibrium while households above are drawn to a high-level one (Skiba 1978; Dasgupta and Ray 1986; Dasgupta and Ray 1987; Galor and Zeira 1993; Dasgupta 1997). This bifurcation has been documented empirically in a range of settings, many involving extensive livestock production (Lybbert, Barrett, Desta, and Coppock 2004; Barrett et al. 2006; Santos and Barrett 2011; Bandiera et al. 2017; Balboni et al. 2022). We use this general logic to develop a conceptual framework to interpret our findings (Section 3). The framework implies that below the unstable herd-size threshold, insurance should substitute for smallstock's precautionary role and free resources towards alternative productive investments such as human capital investment or crop production. Above the herd-size threshold, insurance should instead reduce portfolio risk and facilitate accumulation of higher-return large animals. Critically, this reallocation need not reverse once coverage lapses. Human capital and herding skill accumulate on different margins, and any alternative production and the income it generates may further reduce the value of goats as a buffer.

To identify the long-run effects we use the initial roll-out of Index-Based Livestock Insurance (IBLI) in northern Kenya and southern Ethiopia. IBLI is a satellite-based index insurance product against catastrophic drought-related livestock losses that, unlike most agricultural insurance in low-income settings, achieved durable, expanding scale. Commercial sales have reached over 560,000 households across three countries (Ethiopia, Kenya, and Zambia), and the World Bank-supported

DRIVE project has since scaled IBLI to 3.2 million pastoralists across Djibouti, Ethiopia, Kenya, and Somalia (Endo, Calcutt, and Morsink 2025). We leverage household-level randomized distribution of insurance premium subsidies when IBLI launched — immediately after the baseline surveys — to 1,439 pastoralists across 33 locations. Before the baseline surveys, herd sizes were recorded for the households on each community's roster, and households were assigned to the terciles of their own community's herd-size distribution at the time the roster was compiled, roughly corresponding to below 10, 10 to 20, and above 20 TLU. Because the sample was drawn in equal thirds from those terciles within every one of the 33 study communities, the terciles appear in the same proportions in every location, and are therefore orthogonal to community by construction. Prior to each of six sales seasons, a random sample of households in each location was assigned to receive a premium discount coupon. Coupon receipt was re-randomized each season, implying that a different subset of households received a coupon each round, so that households moved in and out of treatment over time. We use the number of coupons a household received during the first three seasons to estimate the Local Average Treatment Effect (LATE) of purchasing insurance. We re-interviewed 82 percent of the original households a decade later — in 2020 in Kenya and 2022 in Ethiopia — well after commercial insurers had stopped serving the study communities (Jensen et al. 2024a).

We approximate the unstable herd-size threshold by 20 tropical livestock units (1 TLU = 0.7 camel = 1 cattle = 10 sheep/goats), which roughly corresponds to the boundary between the top and middle herd size terciles. This falls within the range of household-level thresholds estimated for this and neighboring pastoralist populations (Table 1). Consistent with our conceptual framework, we observe different effects on either side of this threshold. Below the threshold, 10 years after the initial introduction of IBLI, insured households hold, on average, the equivalent of 36 fewer goats or sheep at Kenyan conversion rates, or 22 fewer at Ethiopian rates, than control households and enjoy a significant increase in total crop income. Among these insured below-threshold households, the maximum years of education among school-aged household members rises by 5.3 years (77 percent), the total years of education by 14.2 years (124 percent), and the average years of education by 4.4 years (86 percent) after 10 years. In the Ethiopian sample, where child time use was measured, the share of children working falls, while the share studying full-time rises. Above the unstable herd size threshold, insured households hold additional large animals equivalent in market value to roughly 18 cattle relative to control households. They also experience an increase in total crop income similar in size to that of households below the threshold, with no corresponding effect on education. These results are robust to a standard battery of checks: alternative inference procedures, alternative control sets, alternative instrument definitions, correction for multiple hypothesis testing and for potential interpersonal spillovers across households.

Two features of these effects stand out: they began during a temporary experiment yet persisted after insurance became unavailable, and they emerged on different timelines. Below the threshold, the reduction in smallstock emerged by the end of the experiment and was of similar magnitude ten years later. It did not unwind, consistent with a productive asset reallocation, including higher crop income, that made goats less valuable as a precautionary buffer. Goats are the livestock children most often herd, and households with more goats at baseline have a larger share of children working full-time. So this shift reduced the demand for child herding labor. Completed education rose only by the ten-year follow-up, as freed-up time gradually translated into completed school years. Consistent with a durable shift in educational strategy and household demand for child herding labor, the rise extends to household members who reached school age only after the first three sales seasons. Above the threshold, the increase in large-animal holdings likewise became detectable only at the ten-year follow-up. The long-run effects are most consistent with the *ex ante* reduction in risk exposure that insurance coverage provides, rather than with the *ex post* cash from indemnity payments, though with only 102 households reporting a payout the test of this hypothesis is underpowered.[1]

This paper contributes to the literature on multiple equilibrium poverty traps in this and similar contexts (Lybbert, Barrett, Desta, and Coppock 2004; Barrett et al. 2006; Santos and Barrett 2011; Kraay and McKenzie 2014; Barrett, Garg, and McBride 2016; Santos and Barrett 2019; Banerjee, Breza, Duflo, and Kinnan 2024; Barrett, Carter, and Chavas 2019; Balboni et al. 2022; Jee 2026). This literature has developed theoretical accounts of behavioral and wealth dynamics that bifurcate around an unstable asset threshold and identified where that threshold lies empirically. Directly testing whether temporary exposure to an exogenous shock generates lasting behavioral or welfare changes on either side of such a threshold is rare, since doing so requires both a source of exogenous variation and a panel long enough to observe whether the resulting shift endures. This ten-year follow-up of a randomized encouragement design offers exactly this test, offering direct evidence for a central prediction of the poverty-trap literature that is rarely directly tested.

We also contribute to a small set of companion studies that leverage the randomized premium discount coupons to estimate the shorter-run effects of IBLI during and immediately after the IBLI experiment period (Jensen, Barrett, and Mude 2017; Janzen and Carter 2019; Matsuda, Takahashi, and Ikegami 2019; Noritomo and Takahashi 2020; Jensen, Lopez-Rivas, Morsink, and Rikken 2025; Sakketa, Maggio, and McPeak 2025).[2] These studies find that insurance influences imme-

[1] Other short-run studies document *ex post* effects of payouts (Bertram-Huemmer and Kraehnert 2018; Janzen and Carter 2019).

[2] These first four companion studies document findings that are consistent across countries and with the mechanism we study here: insured households in both Kenya (Jensen, Barrett, and Mude 2017; Noritomo and Takahashi 2020) and Ethiopia (Matsuda, Takahashi, and Ikegami 2019) draw down precautionary savings when insured or paid out,

diate risk-management behavior – reducing distress sales and preserving herd size in the wake of a drought. We do not detect these short-run responses a decade out. We find no significant long-run effects of insurance on total herd size, herd management expenditures, livestock loss, or distress sales of livestock, nor on recent insurance uptake, consistent with commercial insurers discontinuing sales in our study villages once the research team stopped supporting last-mile logistics in 2015 (Jensen et al. 2024a). Instead, the effects we detect a decade out are concentrated in human capital and productive capacity – margins these companion studies did not examine.

This paper makes two further contributions. First, we connect to a literature showing that uninsured exposure to extreme weather shocks damages long-run human capital and labor market outcomes (Maccini and Yang 2009; Dinkelman 2017; Carrillo 2020; Shah and Steinberg 2017). Where prior studies have documented the adverse effects of uninsured experience of severe shocks, we contribute to this literature by showing that insurance against such shocks can instead facilitate human capital investment.

Second, we contribute to the literature on the long-run effects of development interventions (Bouguen, Huang, Kremer, and Miguel 2019). Cash transfers and grant assistance typically generate large short-run gains that dissipate over time (Araujo, Bosch, and Schady 2019; Baird, McIntosh, and Özler 2019; Blattman, Dercon, and Franklin 2022). On the contrary, interventions that build human capital and productive skills through schooling, health, nutrition, and vocational training can generate gains that persist or even compound over the long run (Hoddinott et al. 2008; Banerjee, Duflo, and Kremer 2020; Baird, Hicks, Kremer, and Miguel 2016; Bandiera et al. 2017; Charpak et al. 2017; Barham, Macours, and Maluccio 2024; Bettinger et al. 2018; Gray-Lobe, Pathak, and Walters 2023). We show that a temporary risk-mitigation intervention can generate these same kinds of persistent, long-run gains in human capital and productive capacity, without requiring direct investment in human capital itself.

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and in both countries these effects concentrate among households near or below the herd-size poverty-trap threshold (Noritomo and Takahashi 2020; Matsuda, Takahashi, and Ikegami 2019). This is the same substitution of insurance for a precautionary livestock buffer that motivates our conceptual framework. Where specific point estimates differ across these papers, this reflects each study's single-episode or season-specific design. Jensen, Barrett, and Mude (2017) and Janzen and Carter (2019) both study the single 2011 drought payout in Kenya; Noritomo and Takahashi (2020) studies the same episode but separately estimates *ex ante* and *ex post* effects; and Matsuda, Takahashi, and Ikegami (2019) studies 2014 drought in Ethiopia, and estimates effects separately for each of four sales seasons. Several of these papers explicitly attribute season- or subgroup-specific null results to limited statistical power. Our pooled, decade-long ANCOVA specification, with baseline controls and community fixed effects across both countries, offers a more conservative and higher-powered test.

2 Context and Index-Based Livestock Insurance

The population in the arid and semi-arid lands (ASALs) of northern Kenya and southern Ethiopia depends heavily on extensive livestock grazing - pastoralism - as the most productive livelihood strategy in drylands (Little, McPeak, Barrett, and Kristjanson 2008; McPeak, Little, and Doss 2011; Jensen et al. 2024b). Households herd both large animals (camels and cattle) and small ones (goats and sheep). Herd composition varies with the aridity of the location. In our sample at baseline, the average herd size was equivalent to 19 cattle,[3] 25.6% in camels, 44.6% in cattle and 29.8% in goats and sheep. These animals play different roles in the productive strategies of households. Large animals are lumpy assets with values of USD 120-250 each. They are typically seen as investments yielding high milk production, slower reproduction but with more valuable offspring, and greater social status. Small animals are sometimes referred to as "cash with four legs," a highly liquid, non-lumpy asset, with high rates of reproduction and an average value of roughly USD 10-20 at baseline. In these contexts, they provide households with liquidity where access to banks or mobile money remains limited (McPeak, Little, and Doss 2011).

Measured in current US dollars, mean annual household cash earnings were USD 498.44 at baseline and USD 531.70 at endline, equivalent to USD 1.37 and USD 1.46 per household per day, respectively.[4] Over time, households substantially increased the share of cash income invested in herd management, specifically fodder, water, and veterinary expenditures, from about 9.3% at

[3] Hereafter we use cattle market value equivalents (CMVE) instead of TLU measures that reflect biophysical (i.e., nutrient intake) requirements, because our interest is in total herd size or herd size composition as a productive asset or as a store of wealth. CMVE uses average sales prices by species in the 2009–2020 Kenya and 2012–2015 Ethiopia survey data to establish species' relative average value. These relative values are fixed and applied identically to every household and survey round, so changes in market prices over time do not change a household's measured CMVE. The average market values from the sales and purchases data are presented in Appendix Table A1. In Kenya, 1 CMVE = 0.625 camel = 1 cattle = 10 goats/sheep, and in Ethiopia, 1 CMVE = 0.4 camel = 1 cattle = 6.25 goats/sheep. CMVE is strongly, positively correlated with TLU; the two measures just aggregate across species using different weighting schemes. All of our results are qualitatively invariant to the use of CMVE versus TLU. Throughout, we use TLU when referring to the insurance product, which was denominated in TLU, and to the herd-size bifurcation threshold, which the prior literature states in TLU. We use CMVE for outcome measures reported here.

[4] Converting the country-specific mean cash earnings back to local currency and deflating by annual national CPI for the respective baseline and endline years implies declines in real cash earnings of about one-third in Kenya and one-tenth in Ethiopia. Using the country means in Appendix Tables A2 and A3, we recover local-currency values using the exchange rates applied in constructing the tables: KES/USD 77.35 at baseline and 106.45 at endline, and ETB/USD 17.70 at baseline and 51.952 at endline. Dividing the resulting nominal local-currency income ratios by the annual national CPI ratios—2.08 for Kenya (2020/2009) and 4.00 for Ethiopia (2022/2012)—gives real cash-earnings ratios of 0.66 and 0.89, respectively. Our total income estimates ignore prospective growth in the metabolic mass of livestock, which might occur with changing herd demographic profiles if distress sales fall (Janzen and Carter 2019), although we suspect such effects, if any, are small. These changes are computed using the full pooled sample. Only about 5.9 percent of households received no discount coupon during the first three sales seasons, too few to support a separate, reliable descriptive comparison for this subsample alone. The causal estimates presented in Sections 6 and 7 net out common trends using baseline outcome controls and community fixed effects. The changes described in this section are intended as descriptive context for the study setting, not as evidence of a causal effect of insurance.

baseline to 32.4% at endline. Investing in veterinary services is an effective strategy for reducing livestock mortality and for maintaining lactation rates, especially for large animals (Admassu et al. 2005; Homewood et al. 2006; Sieff 1999; Santos and Barrett 2011).

Only 10% to 15% of surveyed household heads ever went to school; the average completed education is approximately one year. Investments in education have, however, increased substantially over time. Using the same age ranges at both survey waves—6–17 years in Kenya and 7–17 years in Ethiopia—the mean household school-attendance share was 51.7% at baseline and 61.0% at endline. Education outcomes are closely linked to households' productive strategies. Children aged 5-17 commonly help with herding, especially of small animals when not studying full-time. For Ethiopian households, the mean share of children in the household who were school-aged (7–17) and working was 47% at baseline and 44% at endline (Table 2 and Appendix Table A4); comparable endline activity data were not collected in Kenya.

During the study period, both Kenya and Ethiopia implemented a series of policies aimed at increasing access to and/or quality of education. For example, between 1997-2020, the education sector in Ethiopia was guided by a series of five-year Education Sector Development Plans aimed at improving access to and quality of education across the country. As of 2025, six of those plans have been developed and implemented. The gross enrollment rate (GER) for children ages 4-6 years in Ethiopia increased from less than 5% before 2009 to 50% during the 2022/2023 school year. In the Oromia Region, where this study takes place, the GER for 4-6 years olds increased from 15% in 2011/2012 (Rossiter et al. 2018) to 47% in 2022/2023 (FDRE Ministry of Education 2023).

In Kenya, the 2010 Constitution conferred the right of every child to free basic education. Statistics on the change to child enrollment between 2010 and 2020 in Marsabit County, where this study takes place, are inconsistent, in part because of a large change in administrative boundaries and units in 2013 and in part due to different methodologies in how the data are collected and computed. Nevertheless, published estimates of primary gross enrollment ratios (GERs) exist for several years. Reported GERs are 79.5% in 2014 (Republic of Kenya, Ministry of Education, Science and Technology 2014), 69.2% in 2017 (UN Women Kenya 2019) and 54.8% in 2019 (Republic of Kenya, Ministry of Education 2020). For an earlier benchmark, the 2009 population census reports a primary GER of 72.6% in Marsabit County (Kenya National Bureau of Statistics 2012). Despite data quality limitations, no considerable rise in primary school enrollment can be detected. This makes the educational effects of IBLI coverage especially noteworthy.

The pastoral households in our sample are vulnerable to catastrophic drought shocks. Drought-related starvation, dehydration and disease account for 47 percent of livestock losses in the region

(Jensen, Barrett, and Mude 2016). Following droughts, pastoralists rebuild herds slowly, relying largely on biological reproduction supported by complex systems of inter-household livestock gifts and loans (McPeak and Barrett 2001; Lybbert, Barrett, Desta, and Coppock 2004; Little, McPeak, Barrett, and Kristjanson 2008; McPeak, Little, and Doss 2011; Takahashi, Barrett, and Ikegami 2019).

Informal insurance networks have, however, been fraying in the region, in part because of seemingly more frequent and severe droughts that affect all households simultaneously (McPeak, Little, and Doss 2011; Huysentruyt, Barrett, and McPeak 2009). During droughts herders need cash and concurrently seek to sell livestock with declining weight and productivity – which affect animals' value. As a result livestock markets offer little income or wealth stabilization against drought shocks (Barrett et al. 2003). Prior to IBLI, financial services were largely unavailable in these areas (McPeak, Little, and Doss 2011). Therefore, herd accumulation has long been the key risk management strategy to help households rebuild assets after catastrophic shocks, for the simple reason that greater pre-drought herd size is strongly associated with increased post-drought herd size (Lybbert, Barrett, Desta, and Coppock 2004; McPeak 2005; Barrett and Swallow 2006; Cissé and Barrett 2018).

Formal insurance markets for drought-related risks have historically struggled to take hold in poor, rural settings. Conventional indemnity-based agricultural insurance is vulnerable to moral hazard and adverse selection, and the cost of verifying individual losses in remote, dispersed pastoral areas makes it commercially unviable at scale (Binswanger-Mkhize 2012; Mobarak and Rosenzweig 2013; Carter, de Janvry, Sadoulet, and Sarris 2017). Index insurance products, which pay out against an observable proxy rather than a verified individual loss, were designed to sidestep these frictions. Unfortunately they have also struggled to achieve durable uptake and scale, hampered by basis risk, low product trust, and thin distribution networks (Jensen and Barrett 2017; Hill et al. 2019). IBLI is a rare case of an index product that has scaled and persisted commercially in this environment.[5] Therefore it is a useful setting in which to study insurance's downstream effects rather than merely its short-run take-up.

IBLI offers a novel means to manage catastrophic drought risk. Forage availability offers a key signal of drought in rangelands. So IBLI was designed around near-real-time measures of the Normalized Difference Vegetation Index (NDVI). NDVI is a reliable signal of forage availability (Meroni et al. 2014; Prince 1991; Tucker, Vanpraet, Sharman, and Van Ittersum 1985) and has been shown to be strongly correlated with livestock mortality in this region (Chantarat, Mude, Barrett, and Carter 2013). NDVI is generated globally and provided freely every ten days by the United

[5] Unlike most agricultural index insurance products, which insure against low annual crop yield realizations, IBLI insures against the loss of durable assets, in this case livestock, like most commercial insurance products worldwide.

States Geological Survey from satellite sensor data. IBLI uses an index that aggregates NDVI data within geographically defined units in each of two intra-annual seasons that characterize the region's bimodal annual rainfall pattern. Historic NDVI data for each insurance unit were used to develop a statistical distribution of outcomes. Insurers and reinsurers used those estimates to determine a strike level below which indemnity payments would be made (Chantarat, Mude, Barrett, and Carter 2013; Vrieling et al. 2016). The specifics of the IBLI policy differ modestly between the two countries. First, during the period of the experimental treatments, low NDVI readings triggered indemnity payments four times in Kenya and once in Ethiopia. Second, the premium discount coupons we use for identification varied more widely in Ethiopia (10 to 80 percent) than in Kenya (10 to 60 percent), but in both countries they were capped at a maximum of 15 insured TLUs per household. The underlying index construction and strike-level methodology, however, are similar across both countries.[6]

IBLI was piloted in Marsabit County, in northern Kenya, in January 2010 as a purely commercial index insurance product sold directly to individual pastoral households. A similar product was introduced in the neighboring Borana region of southern Ethiopia in August 2012. Towards the end of our experiment, in 2015, the Government of Kenya added IBLI to its social protection programming by launching the Kenya Livestock Insurance Program (KLIP), which used public resources to purchase individual IBLI policies on behalf of vulnerable pastoralists. In Borana, commercial sales were sustained at the same or higher volumes after the original pilot ended. Despite the scaling of IBLI more broadly, IBLI supply in our study locations effectively stopped when the research team ceased providing last mile extension and logistics in 2015, with insurance companies focused on new areas where growth rates from premium income were higher (Jensen et al. 2024a).

IBLI's growth beyond our study sites, however, illustrates its durability. Since the Marsabit pilot, IBLI has expanded to over 560,000 households across Ethiopia, Kenya, and Zambia (Jensen et al. 2024a), and the World Bank-supported DRIVE project has scaled IBLI to approximately 3.2 million pastoralists across Djibouti, Ethiopia, Kenya, and Somalia (Endo, Calcutt, and Morsink 2025). IBLI's design also now underpins sovereign-level drought insurance arrangements in Kenya and Mauritania (Jensen et al. 2024a). This growth and persistence outside our specific study communities is itself informative. The product we study is not a fragile artifact of an academic experiment but one that has proven commercially and institutionally viable well beyond the original pilot, even though, as described above, supply lapsed in our own 33 study locations once the research team's last-mile support ended.

Despite this scale, evidence on the long-run consequences of temporary insurance access remains

[6] See Jensen et al. (2024b) for the full underwriting and index-design documentation, including how strike levels and premium rates were negotiated between insurers, reinsurers, and each country's regulator.

scarce. Existing evaluations of index insurance, including of IBLI itself, have focused on effects observed during or shortly after a relatively short period of insurance coverage (Karlan, Osei, Osei-Akoto, and Udry 2014; Jensen, Barrett, and Mude 2017; Hill et al. 2019; Janzen and Carter 2019; Stoeffler, Carter, Guirkinger, and Gelade 2022). Whether these short-run behavioral responses translate into durable changes in welfare or production strategy once coverage lapses — the central policy question for any insurance product delivered as a time-limited pilot or subsidy — has not, to our knowledge, been directly tested over a decade-long horizon in this or a comparable setting.

Both study countries have also implemented broader social protection programs alongside IBLI. In Kenya, the government-run Hunger Safety Net Programme (HSNP) provided cash transfers to targeted households in the same region during our study period. Jensen, Barrett, and Mude (2017), using data from this same population, find only minor overlap in coverage between HSNP and IBLI clients. They find no strong evidence of positive interaction effects between the two programs, suggesting HSNP does not confound our IBLI-specific estimates. Ethiopia's Productive Safety Net Programme (PSNP) was introduced in our study communities only after our experimental period ended.

3 Conceptual framework

In this section we develop a conceptual framework to interpret our results. The outcomes and the heterogeneity by herd size it implies were pre-specified, drawing on predictions arising from the prior literature.

3.1 Poverty traps

A well-established literature shows that if the mapping from a household's current productive asset stock to its future productive asset stock exhibits a non-convexity, the resulting S-shaped wealth dynamics can produce multiple stable dynamic equilibria separated by an unstable one, a threshold at which wealth dynamics bifurcate (Barrett, Carter, and Chavas 2019; Bandiera, Burgess, Sulaiman, and Heil 2026). Households below the threshold are expected to decumulate toward a low-level stable dynamic equilibrium, while those above it are expected to accumulate toward a high-level one. Two sources of non-convexity are particularly relevant for our setting. The first is a technology-side non-convexity; some production technology or occupation requires a fixed, indivisible investment. Households that cannot afford this investment or cannot access a loan to finance it are confined to a low-return activity. Households that can afford the investment switch

to a discontinuously higher-return one (Skiba 1978; Banerjee and Newman 1993; Galor and Zeira 1993).

The second is a consumption-side non-convexity; every household must consume some fixed, absolute minimum of nutrients each period to survive, which represents a large share of a poor household's asset base but a small share of a wealthier household's (Dasgupta and Ray 1986; Dasgupta and Ray 1987; Dasgupta 1997; Zimmerman and Carter 2003). These mechanisms generate a bifurcation such that the same exogenous change causes households on either side of the dynamic threshold to respond differently. The hallmark of a trap is that those responses may persist, and even compound after the initial exogenous change ends – in our case, catastrophic drought insurance coverage. Recent experimental evidence finds the same S-shaped pattern from the technology-side mechanism alone, in asset transfers to the ultra-poor in Bangladesh (Bandiera et al. 2017; Balboni et al. 2022) and in roughly 60 percent of 27 randomized transfer experiments across 17 countries (Jee 2026).

Lybbert, Barrett, Desta, and Coppock (2004) provide an empirical demonstration of the resulting S-shaped transition dynamic, in the very pastoral setting we study. Using a 17-year observational panel of Boran pastoralist households in southern Ethiopia, they identify a low equilibrium at a herd size of one and a high equilibrium of 40–75 head (depending on the lag used), separated by an unstable threshold of 10–15 animals. The poverty trap mechanism they identify combines technology-side and consumption-side non-convexities. Households face a fixed subsistence draw from the herd each season, with diets heavily dependent on animal source foods (milk, meat, blood). Because this draw is set by the number of people the herd must feed, while herd growth and drought losses scale with the number of animals, it rises less than proportionally with herd size. For a small herd, this subsistence draw exceeds what biological reproduction can replace. This is the consumption-side mechanism. For a large herd, the same subsistence draw is a small share of the stock and is easily outpaced by biological reproduction, so the herd expands. Larger herds can also sustain seasonal transhumant migration to more distant grass and water, which raises livestock productivity, whereas small herds confined to the grazing range of a permanent settlement are less productive (Coppock 1994; McPeak 2003; Toth 2015). This is the technology-side mechanism.

Pastoral economies are a natural setting for either account of this bifurcation. Livestock have historically been the dominant productive asset and store of wealth in this environment. The absence of access to formal financial services necessitates savings held mainly in the form of smallstock (goats or sheep), easily liquidated in the increments needed to cover the household's subsistence needs. Large animals like camels and cattle offer a discontinuously different technology from smallstock. They yield more meat and milk but also require access to more distant grazing, greater mobility, and dedicated adult herding labor to manage efficiently. Indeed, single-asset, single-occupation

economies of this kind are where S-shaped asset dynamics, whichever their source, are most likely to occur and easiest to detect empirically, since every household faces a common technology set and a common relevant time horizon (Kraay and McKenzie 2014; Barrett, Garg, and McBride 2016; Bandiera, Burgess, Sulaiman, and Heil 2026).

3.2 Insurance and precautionary savings

In this context, the experience of a shock can have persistent effects that differ based on households' initial conditions, especially if it causes households to cross the threshold. Forward-looking households that lack access to finance respond to the threat of a drought shock by holding a precautionary buffer stock of non-financial assets as self-insurance against an especially low income draw. When the income process is nonstationary, however, as is true when the productive asset stock that generates income is subject to stochastic shocks, precautionary savings only occur in the face of a non-convexity (Deaton 1991; Zimmerman and Carter 2003). This distinguishes our framework from a single-equilibrium model in which precautionary savings decline smoothly with wealth under the (overly) strong assumption of stationarity. Such a model implies that the response to insurance falls monotonically with wealth and is largest among the poorest households. With a non-convexity and nonstationarity the response is instead non-monotone. Households far below the threshold live close to hand-to-mouth and hold little buffer to release, while those near it respond most by substituting insurance for precautionary holdings of smallstock, and those above it accumulate large animals (Chantarat, Mude, Barrett, and Turvey 2017).

Both the consumption-side and technology-side mechanisms are consistent with our setting. Each generates the same predicted behavioral response of a below-threshold household to newly available insurance coverage. Under a pure consumption-side reading, insurance coverage relaxes the need for precautionary in-kind savings in smallstock (Barrett, Carter, and Chavas 2019; Ikegami, Carter, Barrett, and Janzen 2019; Janzen and Carter 2019; Barrett and Schofield 2026). The resources freed up by reduced precautionary savings flow toward whichever feasible alternative productive use offers the highest return. Under a technology-side reading, resources freed-up through the reduction in precautionary savings can be invested in the more productive technology, large animals. For households with modest herds, however, the funds freed-up from precautionary savings are insufficient for this large investment. Instead they may resort to different, smaller lump-sum productive investments, like children's education or crop agriculture.

Children are typically responsible for tending smallstock, which require constant husbandry but are physically manipulable even by primary school age children. Thus reduced precautionary savings in kind – as smallstock – not only free up assets, but also reduce the household's demand

for child labor, which can then be re-allocated towards school attendance and/or crop production. In addition to freeing up assets to invest in crop production, insurance coverage plausibly eases crop production's *ex ante* risk exposure, because drought is also the prime crop production risk in this setting.[7]

A crucial feature of poverty traps is that the initial impact of a temporary shock can compound after the shock ends. Thus the initial shock of insurance coverage induces a change in equilibrium behaviors after coverage ends, even though the underlying catastrophic risk remains unchanged. For example, temporary reallocation of child time from herding goats to education while the household enjoys insurance coverage changes the subsequent returns to child labor allocation. A child who spent several years in school rather than herding will, over those same years, have lost some herding-specific skill – certainly relative to a child who herded continuously – and will have accumulated some academic capital. As a result withdrawing the child from school is less attractive at the margin than when the initial reallocation occurred, consistent with standard dynamic complementarity in skill formation (Ben-Porath 1967; Cunha and Heckman 2007). That effect self-reinforces over time. Independently, an established alternative income stream, such as crop income that has generated storable grain, would permanently lower the marginal value of an additional goat as a precautionary asset through simple portfolio diversification.

3.3 Implications

This logic yields two distinct implications of the effect of insurance coverage in the presence of a poverty trap. Below the unstable herd threshold, in the absence of insurance, households hold smallstock primarily as a liquid precautionary reserve against catastrophic loss. IBLI coverage then substitutes for this reserve, inducing a reduction in smallstock holdings, lowering demand for child herding labor, and increasing incentives to invest in education and crop production. We expect this response to be strongest among households close to the threshold. As explained above, after coverage ends, we do not expect the effect on smallstock to revert back, and we expect the education response to persist and even build. Above the threshold, households were neither subsistence-constrained nor technology-constrained prior to insurance's arrival, and did not need a precautionary buffer of smallstock. For them, insurance coverage simply reduces overall portfolio risk, potentially incentivizing investment either in building the herd, especially higher risk-higher re-

[7] Boucher et al. (2024) show experimentally that bundling insurance with higher-risk, higher-return agricultural inputs increases uptake of those inputs specifically because it buffers the downside risk that otherwise deters investment. Although IBLI insures livestock rather than crops directly, IBLI coverage may lower the risk penalty on crop investments both because index payouts are likely to coincide with drought-related crop losses and because lower livestock risk reduces the household's overall risk exposure.

turn large stock like cattle, or in productivity gains through complementary investments, such as veterinary care (Jensen, Barrett, and Mude 2017), without a corresponding change in smallstock holdings or child labor demand. These are separate implications for separate sub-populations.

3.4 Locating the threshold

Because the theoretical threshold is determined by parameters we cannot observe directly - and that should be endogenous to the presence or absence of insurance (Ikegami, Carter, Barrett, and Janzen 2019; Barrett and Schofield 2026) - we choose a threshold of 20 TLU in two ways. First, we turn to the empirical literature in this setting. Table 1 summarizes threshold estimates from studies of this and related East African pastoralist populations. Across data sets and estimation methods, the household-level estimates in Panels A and B lie between roughly 9 and 22 TLU per household; the per-person estimates are not directly comparable, and two studies of the original Marsabit panel find no unstable threshold (Panel C), with the exact threshold shifting with local ecological conditions and herding ability (Santos and Barrett 2019).[8] Second, and independently of that literature, 20 TLU also roughly corresponds to the boundary between the top herd-size tercile and the lower two, determined from the community rosters before the baseline survey (Section 4). We also show below, in Section 6.2, that the estimated effect of insurance on small-animal holdings among below-threshold households is robust to changing the threshold.

4 Study design and econometric strategy

To study the long-run effects of catastrophic drought insurance, we leverage the original experimental design of seasonally randomized insurance premium discount coupons to 1,439 pastoralists from 17 locations in Borana Zone in Ethiopia and 16 locations in Marsabit County in Kenya. The 33 study locations were selected strategically to ensure representation across environmental conditions and remoteness. Community entry meetings with local leaders were the first point of contact between the research teams and the locations. During these meetings, the project was broadly described and community household rosters were collected from government administrative offices. These meetings took place before any field activities by the insurance firms or their agents.

Household selection for participation in the experiment was based on a random sample, stratified by herd-size tercile, which is one of the most important predictors of resilience against shocks (Cissé

[8] Because the subsistence draw scales with the number of household members, the threshold itself should rise with household size. Using a single per-household threshold is reasonable here because household size varies far less across our sample than herd size does (Table 2).

Table 1: Herd-size threshold estimates in East African pastoralist studies

Study	Sample	Estimated threshold(s) and uncertainty
Panel A. Estimated unstable thresholds in herd dynamics		
Lybbert, Barrett, Desta, and Coppock (2004)	55 Borana HH, southern Ethiopia; 17-year retrospective cattle histories, 1980–97 (833 HH-years).	About 10–15 cattle/HH. Authors regard the equilibrium locations as suggestive.
Barrett and McPeak (2006)	177 HH in six northern-Kenya sites; quarterly PARIMA surveys, March 2000–December 2001.	About 12 TLU/person. No threshold-specific uncertainty reported.
Barrett et al. (2006)	60 HH in Dirib Gombo and Ng'ambo, northern Kenya; quarterly PARIMA surveys, 2000–02.	About 5–6 TLU/person. No threshold-specific uncertainty reported.
Chantarat, Mude, Barrett, and Turvey (2017)	Four Marsabit sites; about 30 HH/site in the 2000–02 panel; 42 HH/site in the 2008 survey.	About 15 TLU/HH; Fitted growth/transition functions shows threshold of [10,20] TLU within the 95% CIs
Santos and Barrett (2019)	120 Borana HH, southern Ethiopia, 2000–03 panel; 115 respondents in 2004 expectations survey; 113 HH in frontier estimation.	Higher ability: about 11–17 cattle/HH. Lowest-ability quartile: no unstable threshold.
Panel B. Estimated behavioral thresholds		
Toth (2015)	Five northern-Kenya sites, 2000–02; 136 HH/931 retained observations; 814 in plotted model, 789 with fuller controls.	About 5 TLU/person. Fitted-response bands are ± 2 SD.
Janzen and Carter (2019)	627 HH in the northern-Kenya IBLI experiment; intended coping following the 2011 drought.	Two herd-size thresholds that bifurcate outcomes, one at 9.3 TLU/HH for changes in consumption and 22.4 TLU/HH for changes in livestock sales.
Panel C. Herd-dynamics estimates finding no unstable threshold		
Cissé and Barrett (2018)	Marsabit IBLI panel: original 924 HH in 16 sublocations; five annual rounds, 2009–13.	No unstable threshold; one stable equilibrium based on estimates of non-linear herd dynamics near 6 TLU/HH, which is graphically illustrated with 95% confidence bands appearing to include [5,7].
Mburu, Kaiser, and Sousa-Poza (2023)	Same original Marsabit IBLI panel of 924 HH; five annual rounds, 2009–13.	No unstable threshold; stable equilibria between 15-18 TLU/HH depending on the lag used and a figure presenting a non-parametric of a stable equilibrium between [7,18].

Notes: HH denotes households, CI confidence interval, and SD standard deviation. Bands for fitted transition or response functions should be distinguished from separately reported confidence intervals for threshold or equilibrium locations. 1 TLU = 0.7 camel = 1 cattle = 10 sheep/goats.

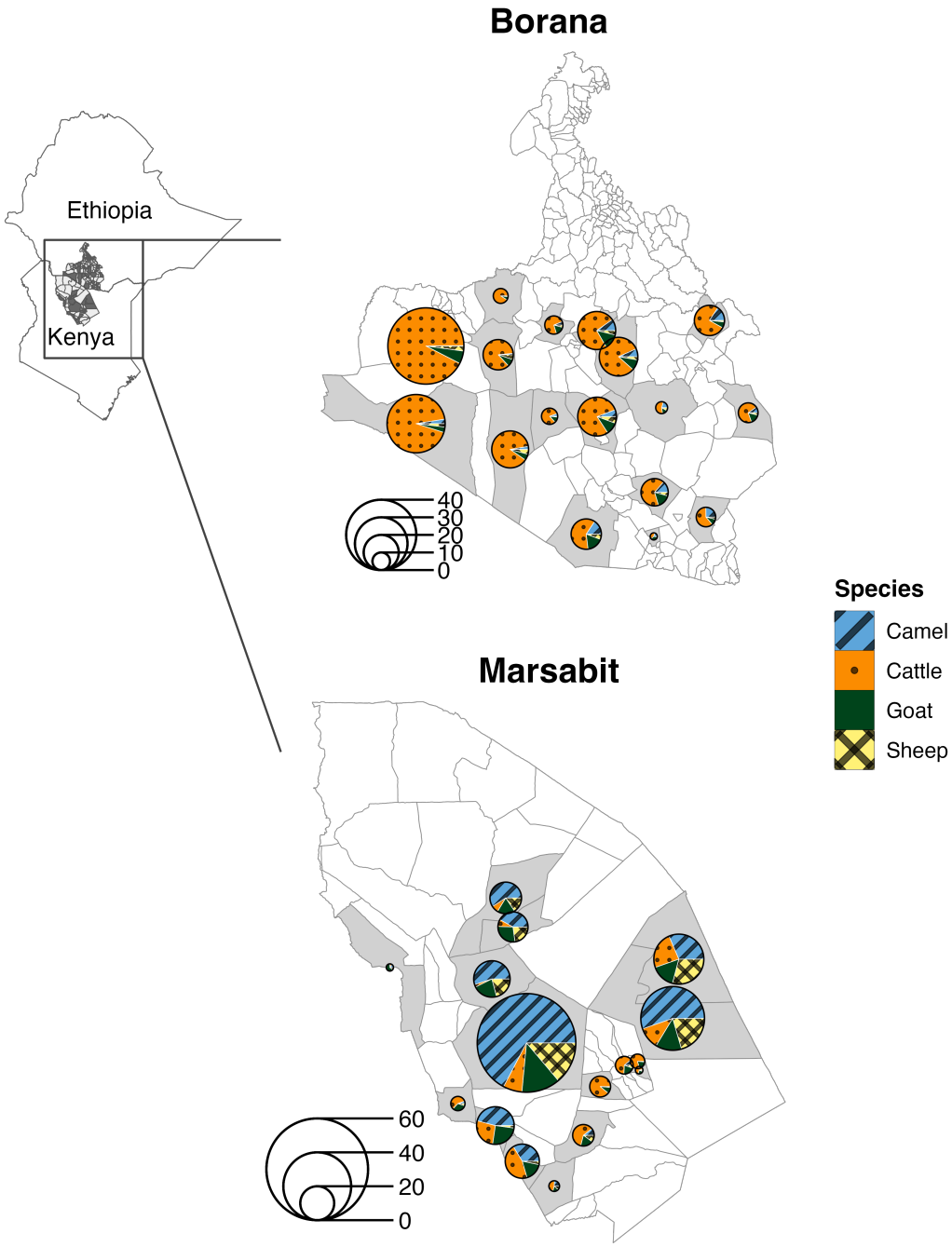
and Barrett 2018). These herd sizes were recorded for the households on each of the 33 community rosters, and households were assigned to terciles of their own community's herd-size distribution at the time the roster was compiled, roughly corresponding to below 10, 10 to 20, and above 20 TLU. Our heterogeneity analysis uses these same terciles, combining the lower two (67 percent of the sample) against the top tercile (33 percent), so the two groups are present in the same proportions in every community by construction. The selected households were then randomly assigned to receive discount coupons or not in each IBLI sales period, with the likelihood of treatment fixed across communities within each country. This resulted in 924 households sampled in Kenya, and 515 households in Ethiopia. Figure 1 maps the study locations and the herd (size) distributions per location.

Baseline household surveys took place in Kenya in the fourth quarter of 2009 and in Ethiopia in the first quarter of 2012, before IBLI's launch was announced in either country. The surveys captured a range of household demographic and economic data.[9] IBLI launched in the first sales season after the baseline in each location (January 2010 in Kenya, August 2012 in Ethiopia), several months before the first follow-up survey (Figure 2). Panel surveys tracked the same households annually for three additional rounds in Ethiopia and five additional rounds in Kenya, until 2015. Individual households were randomly assigned to receive premium subsidies through discount coupons that were distributed directly to respondents just prior to a sales season. Because coupons were re-randomized each season, the set of households receiving a coupon changed from season to season: a household could receive a coupon in one season and not the next. The coupon receipt therefore varied within households over time, rather than the same households being treated throughout with only the discount value varying. The randomized discount coupons were non-transferable, expired at the end of the sales season, and were re-randomized in each of six sales seasons between 2010 and 2015. There was no refusal of the discount coupons. Per community and sales season, the share of sample households assigned a discount coupon was fixed within each country, at 60 percent in Kenya and 80 percent in Ethiopia. The coupons provided households with a discount on the insurance premium for a maximum of 15 TLUs. During the experiment, low NDVI readings arising from drought triggered the index four times in Kenya and one time in Ethiopia, resulting in indemnity payments. Administrative data are used to track purchases.

No surveys nor experiments were conducted in these sites after 2015 until we conducted follow-up surveys in both countries with original panel households in 2020 in Kenya and in 2022 in Ethiopia, ten years after the original baselines. Figure 2 shows the timeline of the original pilots,

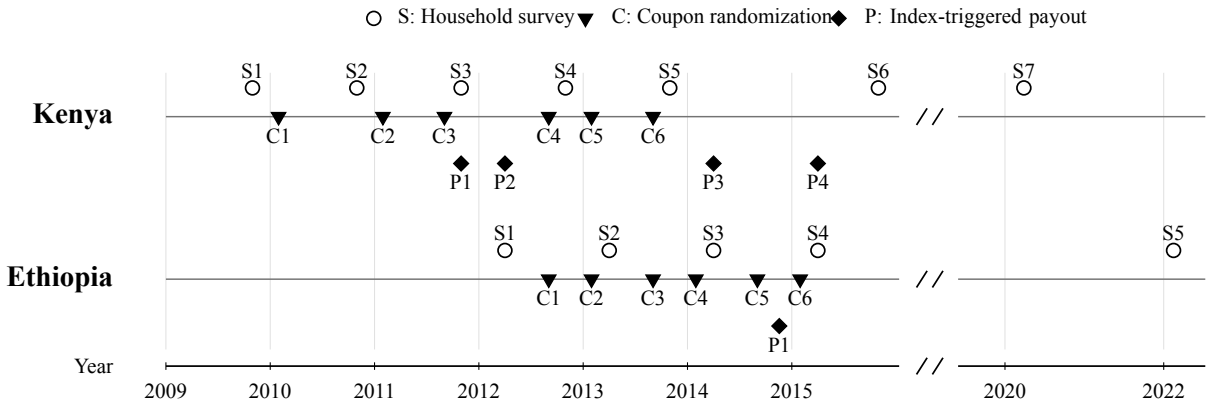
[9] Additional details on the research design, sample, survey tools and discount coupons are on ILRI's data portal: https://data.ilri.org/portal/dataset/ibli-marsabit-r1 and https://data.mel.cgiar.org/dataset.xhtml?persistentId=hdl:20.500.11766.1/FK2/S19DC6 for Kenya and https://data.ilri.org/portal/dataset/ibli-borena-r1 for Ethiopia.

Figure 1: Map of study locations and herd (size) distributions per location



Notes: Geographic distribution, herd size and herd composition in Marsabit County, Kenya, and Borana Zone, Ethiopia. The map illustrates the spatial variation and proportional distribution of livestock (e.g., cattle, camel, goats and sheep) across administrative units (i.e., sublocations in Kenya and kebeles in Ethiopia). The pie sizes are proportional to the total average herd size per sampled household (in TLU) in each of the 33 study locations. Blue with stripes, orange with dots, solid green and yellow with cross hatch represent the average herd share of camels, cattle, goats, and sheep, respectively.

Figure 2: Timeline of Surveys, Coupon Randomization, and Insurance Payouts



Notes: Circles indicate household survey rounds, triangles indicate sales seasons in which premium-discount coupons were randomly assigned, and diamonds indicate index-triggered payout events in the study locations through March–April 2015. Payouts occurred in Kenya in October–November 2011, March–April 2012, March–April 2014, and March–April 2015, and in Ethiopia in November 2014. Each payout occurred in all or a subset of study locations; a payout marker therefore does not imply that all study locations or sampled households received a payment. Payments were made only to insured households in locations where the index triggered. The horizontal position of a marker within a year indicates the season. Coupons were re-randomized in each sales round. The break in the horizontal axis compresses the period between the experimental panel and the long-run follow-up surveys.

discount coupon treatments, as well as the timing of the latest rounds of surveys in each country. Of the 1,439 baseline households, we managed to re-survey 82 percent ten years later, a high retention rate given average annual attrition rates of 7.5 percent in panel surveys in other settings (Molina-Millán and Macours 2025).

We estimate the LATE of insurance purchase for the outcomes, instrumenting for insurance purchase by the number of seasons in which the pastoralist received a discount coupon, restricting to the first three sales seasons for the reasons detailed in the next paragraphs. We discuss the dynamics of coupons and purchases across seasons in Section 5, and potential mechanisms driving long-run impacts in Section 7.

Equations (1) to (3) describe the outcome and IV equations, where y_{ijT} is outcome y for individual i in location j at endline T, $t = 0$ refers to the baseline period before any insurance was sold in location j, and $t = T$ is the final survey period, ten years after the baseline. We use an ANCOVA specification to estimate the LATE of insurance purchase on long-run outcome y in Equation (1), controlling for the baseline value of the outcome, y_{ij0}, and a vector of baseline household characteristics, X_{ij0}. We instrument for insurance purchase using the number of discount coupons received by households in the first three sales seasons, D_{ij}, from Equation (2). Equation (3) generates a binary variable that takes the value one if individual i purchased insurance during any of the first

three sales seasons. We aggregate the number of discount coupons received (D_{ijt}) by an individual household i in location j in sales period t over the first three seasons ($t = 1,2,3$), yielding our instrument, $\sum_{t=1}^{3} D_{ijt}$. We control for the number of discount coupons received in sales seasons 4, 5, and 6 ($\sum_{t=4}^{6} D_{ijt}$).

$$y_{ijT} = \beta_{LATE}\widehat{I}_{ij} + \beta_1 y_{ij0} + \beta_2 X_{ij0} + \beta_3 \sum_{t=4}^{6} D_{ijt} + \rho_j + \varepsilon_{ijT} \tag{1}$$

$$I_{ij} = \alpha_1 \sum_{t=1}^{3} D_{ijt} + \alpha_2 y_{ij0} + \alpha_3 X_{ij0} + \alpha_4 \sum_{t=4}^{6} D_{ijt} + \rho_j + \mu_{ij} \tag{2}$$

$$I_{ij} = \begin{cases} 1 \text{ if there exists } t \in \{1,2,3\} \text{ such that } I_{ijt} > 0 \\ 0 \text{ otherwise} \end{cases} \tag{3}$$

We restrict our instrument to the first three sales seasons because 84 percent of ever-purchasing households took up insurance within this window (Section 5). In the first three seasons of program rollout, the number of coupons received is strongly correlated with the decision to insure at any point in time, satisfying the relevance assumption. We use a binary extensive-margin indicator of insurance purchase, rather than the cumulative count of seasons purchased specified in the pre-analysis plan, because most of the variation in the cumulative measure lies at the extensive margin, and the variation beyond it is concentrated in a small number of households. Of the 518 households in the analysis sample that purchased insurance during the first three sales seasons, 396 (76.4 percent) purchased in one season, 106 (20.5 percent) in two seasons, and 16 (3.1 percent) in all three; 122 households purchased in more than one season, representing 10.3 percent of the 1,179-household analysis sample (Appendix Table B1, Panels A-B). With an ordered instrument and an ordered treatment, two-stage least squares recovers a weighted average of average causal responses across adjacent coupon margins (Angrist and Imbens 1995). In our case the response at the highest margin would be identified off sixteen households, and repeat purchases account for a minority of the variation in the cumulative measure. The extensive-margin indicator focuses on the margin that carries most of the identifying variation; because the two estimands weight additional seasons of coverage differently, we also report results using the cumulative measure.

Take-up is monotone in coupon receipt on the margins that carry the identifying variation. Sixty-nine households received no coupon during the first three seasons, 265 received one, 473 received two, and 372 received all three. The probability of purchasing in at least one season rises without reversal across coupon values — 20, 33, 47, and 52 percent among households receiving zero,

one, two, and three coupons, respectively — as does the probability of purchasing in at least two seasons (2.9, 5.7, 11.4, and 13.7 percent). The probability of purchasing in all three seasons is not monotone in the number of coupons (1.4, 1.1, 0.8, and 2.2 percent), but that cell contains one, three, four, and eight households, respectively, so the pattern is uninformative in either direction and we do not consider this a monotonicity violation. We report counts alongside percentages in Appendix Table B1 so that readers can assess this directly.[10]

An alternative design would exploit the substantial variation in the discount rate itself — from 10 to 60 percent in Kenya and 10 to 80 percent in Ethiopia, in 10 percentage point intervals — as a continuous instrument for insurance purchase, rather than relying on the number of coupons received. We do not use this variation because insurance take-up does not respond to the depth of the discount within the range offered; we find no statistically significant relationship between take-up and discount magnitude. The number of coupons received could in principle also affect outcomes directly, through the premium savings of households that would have purchased insurance anyway; these savings are small relative to our estimated effects, so this channel is unlikely to account for our results. Restricting the instrument to the first three sales seasons also implies that our estimates identify the LATE for compliers induced to purchase insurance by coupons received in those seasons. We cannot separately identify the effect of insurance for households only induced to purchase by coupons received in later seasons. Our estimates also include any effect of later insurance purchases induced by purchase in the first three seasons.[11]

We similarly do not use the number of insured livestock units or the insured share of the herd as an alternative endogenous variable, because the number of coupons received is not a significant predictor of this intensive margin of uptake.[12] We do not further decompose long-run effects by the specific season in which a household first purchased insurance. Doing so would compare households with different remaining exposure windows before the experiment ended, confounding timing with dosage, and the resulting subsamples would face power constraints.

Equations (1) and (2) estimate the average effect of insurance purchase. Because our conceptual framework predicts divergence rather than a common effect, we estimate the heterogeneity as a single interaction specification on the full sample. Let B_{ij} equal one for households in the lower

[10] Appendix Tables B2, B3, and B4 report results using the pre-specified intensive-margin measure.

[11] Appendix Tables B6–B20 report results using alternative combinations of sales seasons to define the instrument, including all six seasons. Our central livestock findings retain the same signs across windows covering the first one, two, four, five, and six seasons. Both findings remain significant at the ten percent level under all three inference procedures using the first season, first four seasons, or the first five seasons, and under at least two procedures in every other window. The only exceptions are the small-animal reduction under cumulative-coupon inference using two seasons ($p = 0.109$) and under season-wise inference using six seasons ($p = 0.122$).

[12] Appendix Tables B2–B4 report results using the number of insurance contracts purchased (up to three, one per season) as an alternative endogenous variable; these are qualitatively similar to our main results.

two herd-size terciles and zero for those in the highest tercile, and write the group-specific purchase and instrument terms as $I^B_{ij} \equiv I_{ij}B_{ij}$, $I^T_{ij} \equiv I_{ij}(1-B_{ij})$, $D^B_{ij} \equiv D_{ij}B_{ij}$ and $D^T_{ij} \equiv D_{ij}(1-B_{ij})$. We then estimate

$$y_{ijT} = \beta_{LATE,B}\widehat{I}^B_{ij} + \beta_{LATE,T}\widehat{I}^T_{ij} + \gamma B_{ij} + \beta_1 y_{ij0} + \beta_2 X_{ij0} + \beta_3 \sum_{t=4}^{6} D_{ijt} + \rho_j + \varepsilon_{ijT} \tag{4}$$

$$I^k_{ij} = \alpha^k_1 D^B_{ij} + \alpha^k_2 D^T_{ij} + \alpha^k_3 B_{ij} + \alpha^k_4 y_{ij0} + \alpha^k_5 X_{ij0} + \alpha^k_6 \sum_{t=4}^{6} D_{ijt} + \rho^k_j + \mu^k_{ij}, \qquad k \in \{B,T\} \tag{5}$$

The two excluded instruments are D^B_{ij} and D^T_{ij}, the interactions of the first-three-season coupon count with B_{ij} and with $1-B_{ij}$, and each of I^B_{ij} and I^T_{ij} is projected on both. The group indicator itself enters as a control, and the remaining controls are not interacted with B_{ij}, so they are constrained equal across the two groups. There is no uninteracted purchase term, so $\beta_{LATE,B}$ and $\beta_{LATE,T}$ are the local average treatment effects for compliers below and above the threshold, estimated jointly on the full sample. Their difference, $\beta_{LATE,B} - \beta_{LATE,T}$, is the object our framework's prediction concerns; we report the p-value from a test that it is zero in the row "p-value threshold interaction" of Tables 4 and 5. Appendix Tables C2 and C3 report the estimated difference, its community-clustered standard error, and community-clustered and wild cluster bootstrap equality tests. We also report the conditional first-stage F-statistics of Sanderson and Windmeijer (2016) to assess instrument strength for each endogenous insurance term conditional on the other.

We include location fixed effects to control for time-invariant, location-level unobservables. Because households rarely migrate alone and typically travel with community members from their same location, location fixed effects effectively control for effects at broader grazing ranges that are episodically used by the households in each community j (McPeak, Little, and Doss 2011; Huysentruyt, Barrett, and McPeak 2009). For the individual-level education analysis, we additionally include country-by-age fixed effects and an indicator for gender. In these specifications, we replace the baseline outcome with the household-level cohort mean of the corresponding baseline education outcome.

Given that the likelihood of treatment among selected households is fixed across communities within each country, and treatment was randomized at the household level, we compute robust standard errors for the household specification and we cluster standard errors at the household-level for the individual specifications, following Abadie, Athey, Imbens, and Wooldridge (2023) and De Chaisemartin and Ramirez-Cuellar (2024). We report all inference results in our main tables as p-

values: p-values from robust standard errors and two randomization-inference p-values. The first uses an Anderson-Rubin test of the null hypothesis of zero LATE, which coincides with a reduced form randomization test of the coupon instrument on the outcome. We compute these p-values under 2,000 permutations, following Young (2019). Our primary procedure re-randomizes coupon receipt separately within each of the first three sales seasons before reconstructing the cumulative instrument, mirroring the way coupons were actually allocated. Alongside it we report a second procedure that permutes the cumulative coupon count directly. Both procedures permute coupon assignment within community, conditioning on the stratified design under which coupons were actually allocated; inference that does not exploit this stratification is conservative (Bugni, Canay, and Shaikh 2018).[13] For individual-level outcomes, all members of a household receive the same reassigned household coupon history. For the interaction specifications, both interactions are reconstructed after every reassignment, and each reported p-value uses the corresponding group's unstudentized reduced-form coefficient as its statistic. The reference distributions are constructed under the sharp null that coupon assignments have no effect on the outcome for any unit in either group.

Following the framework of Abadie, Athey, Imbens, and Wooldridge (2023), two channels can call for clustering. Assignment clustering does not arise here; coupons were assigned to individual households, with a fixed share of households in each community and sales season receiving a coupon, rather than to groups of households, so household-level inference is the design-appropriate default. Sampling clustering does arise, since our households were sampled within 33 communities, and community-level clustering is the relevant adjustment if the target of inference is a broader population of pastoralist communities rather than the 33 we study. We therefore report both. Our central findings on livestock holdings and education above and below the threshold remain supported under community-level clustering, although the herd-shares estimated on the full sample lose statistical significance. We report p-values based on community-clustered standard errors and CGM wild-cluster bootstrap p-values, both clustered by community, separately in Appendix Tables C1–C3, corresponding to our three main specifications — first stage (Table 3), herd composition (Table 4), and education (Table 5) — for ease of comparison.

[13] Our two randomization-inference procedures differ in how closely they reproduce the original assignment mechanism, and this shows in the p-values. Neither procedure produces p-values that are uniformly smaller than the p-values from heteroskedasticity-robust standard errors. The cumulative procedure, which does not reproduce the season-by-season structure of the assignment, is the more liberal of the two wherever estimated effects are large. The season-wise procedure, which mirrors how coupons were actually allocated, sits closer to the robust p-values on most coefficients but not all. We report all three so that the spread is visible rather than inferred.

5 Balance and Attrition

Table 2 presents the means and standard deviations of pre-specified household characteristics, and baseline values of our primary and secondary outcomes in each country and pooled, for the non-attrited sample of households (see below for attrition analysis). Endline values for this same sample are presented in Appendix Table A4. We filed a pre-analysis plan[14] after the 2020 and 2022 endline data had been collected but before we analyzed them. This implies that it therefore disciplined our choice of outcomes and specifications rather than our data collection. Throughout the paper, "pre-specified" refers to outcomes, samples, and specifications designated in that plan, and Appendix E.1 catalogs where our main specification departs from it.

We do not observe any statistically significant imbalance in any sales round for any of the balance variables (Appendix Table D1). Normalized differences are below 0.25 in all the comparisons. Joint tests of all variables within each sales round are insignificant, as are joint tests of each variable across all six sales rounds. We also test directly for balance on our aggregated instrument — the cumulative number of coupons received in the first three sales seasons — for both our baseline household characteristics and the baseline values of our main outcomes. Three of the 48 individual pairwise comparisons of baseline household characteristics are statistically significant at the five percent level — the difference in the share of male-headed households between the zero- and three-coupon groups ($p = 0.013$), and the differences in adult equivalents between the zero- and two-coupon groups ($p = 0.039$) and between the two- and three-coupon groups ($p = 0.046$). One of 42 comparisons among baseline outcomes is significant — baseline maximum years of education between the zero- and three-coupon groups, ($p = 0.018$). None of the 29 joint tests (the 15 per-variable F-tests across coupon groups, 6 joint Wald tests for each panel's variables for the pairwise coupon-group comparisons, and a separate omnibus Wald test for each panel across all four coupon groups) is significant at the five percent level. The omnibus statistics are $\chi^2(24) = 23.78$, $p = 0.474$ for the eight household characteristics and $\chi^2(18) = 21.11$, $p = 0.274$ for the seven baseline outcomes (the large- and small-animal shares sum to one, so three of the 21 contrasts are redundant). We find no evidence of systematic imbalance across coupon groups on either baseline characteristics or outcomes (Appendix Table D2).

[14] See AEARCTR-0011184 at https://www.socialscienceregistry.org/trials/11184. At the time of registration the authors had accessed the baseline survey and the 2010–2015 panel rounds; the 2020 and 2022 endline data had been collected and cleaned, but no outcome analysis had been run on them.

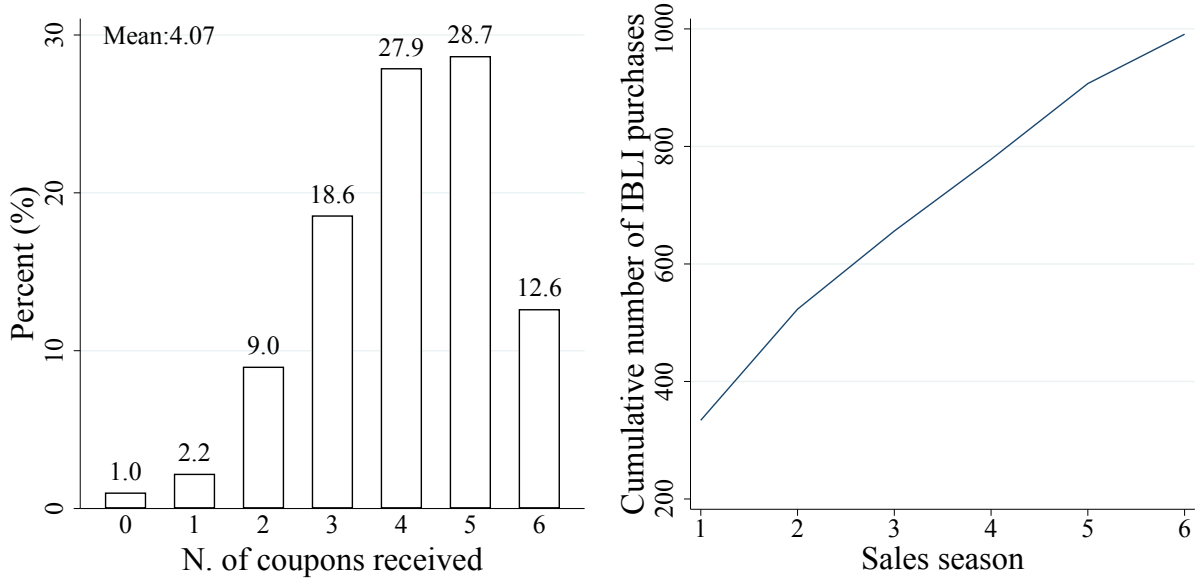
Table 2: Summary statistics of the baseline characteristics

	Kenya				Ethiopia				Pooled			
	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs
Prespecified household characteristics												
Age of household head in years	47.01 [16.60]	18.00	96.00	781	50.23 [18.30]	20.00	100.00	398	48.10 [17.25]	18.00	100.00	1179
Male headed household	0.63 [0.48]	0.00	1.00	781	0.79 [0.41]	0.00	1.00	398	0.68 [0.47]	0.00	1.00	1179
Household head's years of education	1.05 [3.07]	0.00	16.00	771	0.54 [1.84]	0.00	13.00	397	0.87 [2.72]	0.00	16.00	1168
Adult equivalent	4.68 [1.95]	0.70	12.90	781	4.94 [2.01]	1.40	14.90	398	4.77 [1.97]	0.70	14.90	1179
Dependency ratio	1.24 [1.04]	0.00	11.00	781	1.42 [0.93]	0.00	6.00	398	1.30 [1.01]	0.00	11.00	1179
Baseline herded stock (CMVE)	21.38 [27.64]	0.00	202.92	781	15.58 [16.78]	0.00	89.92	398	19.42 [24.66]	0.00	202.92	1179
Monthly household income per capita (USD)	8.25 [13.63]	0.00	117.92	781	6.82 [10.83]	0.00	113.86	398	7.77 [12.77]	0.00	117.92	1179
Agricultural land size (hectares)	0.51 [2.00]	0.00	33.00	781	0.77 [0.94]	0.00	8.00	398	0.60 [1.72]	0.00	33.00	1179
Baseline prespecified primary outcomes												
Baseline camel share in herded stock	0.33 [0.34]	0.00	1.00	730	0.12 [0.21]	0.00	0.96	395	0.26 [0.31]	0.00	1.00	1125
Baseline cattle share in herded stock	0.33 [0.37]	0.00	1.00	730	0.67 [0.25]	0.00	1.00	395	0.45 [0.37]	0.00	1.00	1125
Baseline goat share in herded stock	0.22 [0.27]	0.00	1.00	730	0.17 [0.18]	0.00	1.00	395	0.20 [0.24]	0.00	1.00	1125
Baseline sheep share in herded stock	0.12 [0.16]	0.00	1.00	730	0.05 [0.07]	0.00	1.00	395	0.09 [0.14]	0.00	1.00	1125
Annual household cash earnings (USD)	516.55 [828.25]	0.00	6877.83	781	462.92 [594.14]	0.00	5423.73	398	498.44 [757.52]	0.00	6877.83	1179
Maximum years of education	3.56 [3.32]	0.00	13.00	640	2.92 [2.55]	0.00	10.00	333	3.34 [3.09]	0.00	13.00	973
Baseline prespecified secondary outcomes												
Herd management expenditure (USD)	48.79 [153.93]	0.00	2395.60	781	41.00 [129.63]	0.00	2146.89	398	46.16 [146.17]	0.00	2395.60	1179
Annual milk income (USD)	884.08 [1666.05]	0.00	12192.44	781	161.81 [265.31]	0.00	2496.61	398	640.26 [1406.56]	0.00	12192.44	1179
Livestock lost in the past 12 months (CMVE)	9.49 [13.72]	0.00	109.38	781	9.20 [16.96]	0.16	200.60	343	9.40 [14.78]	0.00	200.60	1124
Number of camels lost in the past 12 months	1.15 [3.56]	0.00	61.00	728	0.28 [0.81]	0.00	6.00	343	0.87 [3.00]	0.00	61.00	1071
Number of cattle lost in the past 12 months	5.13 [11.40]	0.00	96.00	728	7.58 [16.04]	0.00	199.00	343	5.92 [13.11]	0.00	199.00	1071
Number of goats/sheep lost in the past 12 months	32.52 [55.13]	0.00	607.00	728	5.69 [8.67]	0.00	66.00	343	23.93 [47.39]	0.00	607.00	1071
Distress sale in the past 12 months (CMVE)	0.63 [1.72]	0.00	26.58	781	0.95 [1.84]	0.00	12.00	398	0.73 [1.76]	0.00	26.58	1179
Share of children working	. [.]	.	.	0	0.47 [0.32]	0.00	1.00	383	0.47 [0.32]	0.00	1.00	383
Share of children studying full-time	. [.]	.	.	0	0.08 [0.18]	0.00	1.00	383	0.08 [0.18]	0.00	1.00	383
Share of children attending school	0.56 [0.41]	0.00	1.00	627	0.40 [0.35]	0.00	1.00	335	0.50 [0.40]	0.00	1.00	962
Observations	781				398				1179			

Notes: The table presents the summary statistics – mean, standard deviation (in square brackets), minimum value, maximum value, and the number of observations of each variable – of the study sample, by country, and in total. Household size in adult equivalents is the weighted sum of household members using the following age-specific weights: members aged 16–60 receive weight 1, children younger than 5 receive weight 0.5, members aged 5–15 receive weight 0.7, and members aged 61 or older receive weight 0.7. The dependency ratio is the number of household members younger than 15 or older than 64 divided by the number aged 15–64. Baseline herd size is the sum of the animals herded by the household, aggregated using cattle market-value equivalent. Cattle market-value equivalent (CMVE) is a unit to aggregate the animals across different animal types based on their market values using panel survey data. In Kenya, 1 CMVE= 0.625 camel=1 cattle=10 goats/sheep, and in Ethiopia, 1 CMVE=0.4 camel=1 cattle=6.25 goats/sheep. Monthly household income per capita is annual household cash earnings divided by 12 and by the number of household members. Annual total household cash earning is the sum of cash income from the following categories: sale of livestock, sale of livestock products, crop cultivation, salaried employment, casual labor, business and petty trading, and other major sources of income excluding gifts and remittances in the past 12 months. Herd management expenditure is the sum of the expenditure on water, fodder, supplementary feeding, and veterinary expenses. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is the mean observed school attendance among all children in the household at baseline. The endline measure instead uses children aged 6–17 in Kenya and 7–17 in Ethiopia (Appendix Table A4).

During the period of the experiment, coupons were offered six times, once or twice per year. Given that the product provides coverage for one year, the equivalent of continued insurance coverage during the experimental period in Kenya would have been purchase of insurance three times, while in Ethiopia the equivalent of full insurance coverage during the experimental period would have been purchase of insurance 2.5 times. Across the six sales seasons, 30% of respondents purchased insurance once, and 22% purchased insurance more than once. The left panel of Figure 3 shows the distribution of the number of sales seasons in which pastoralists received discount coupons. On average, they received coupons 4.07 times. The right panel of Figure 3 shows the cumulative insurance purchases across households, counting each household at most once per sales season. Cumulative uptake of insurance increased steadily during the six sales seasons, but 84 percent of ever-purchased households took up the insurance within the initial three sales seasons.

Figure 3: Number of coupons received and cumulative number of policies sold by season



Notes: The left panel x-axis shows the number of coupons respondents received during the six sales seasons. The y-axis shows the percent of respondents who received 0, 1, 2, 3, 4, 5, or 6 discount coupons during these six sales seasons. The right panel shows cumulative insurance purchases across sample households up to each sales season, counting each household at most once per season.

At the 10-year follow-up, we successfully re-interviewed 82 percent of the baseline households (1,179 out of 1,439; Appendix Table D4). Attrition is not significantly associated with our instrument, the number of coupons received during the initial three seasons, in the pooled, Kenya, or Ethiopia samples (Appendix Table D5).[15] Several baseline characteristics are jointly statistically

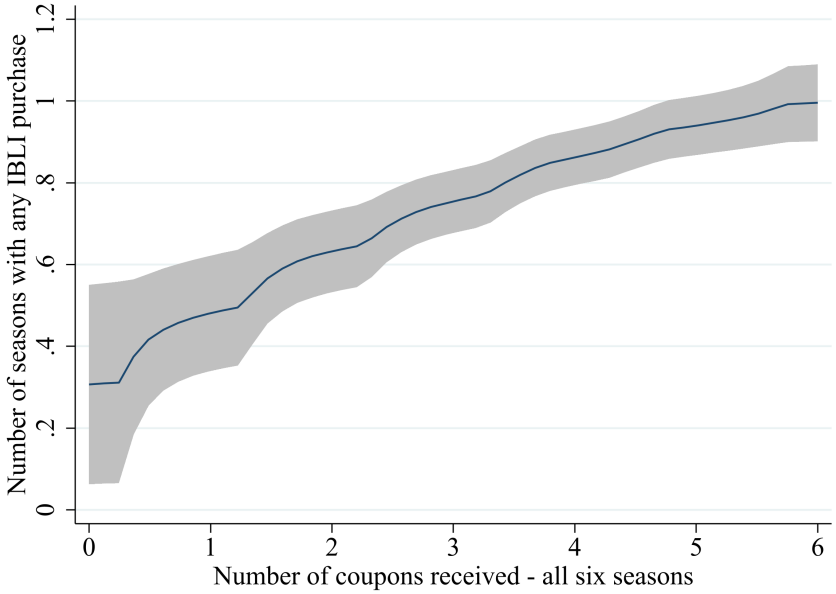
[15] As specified in the pre-analysis plan, Appendix Tables D5, D6, D7, and D8 report the attrition tests separately for Kenya and Ethiopia in addition to the pooled sample.

significantly associated with higher attrition in the pooled sample and Kenya, but not Ethiopia. In the pooled estimates, attriting households are more likely to be female-headed and have fewer adult equivalents and less agricultural land (Appendix Tables D6 and D7).[16]

6 Results

We first examine the effect of randomized discount coupons on insurance purchase, the first stage of our IV strategy. Figure 4 presents the average relationship between the number of times that a pastoral household received coupons during the six experimental rounds and the average number of seasons they purchased insurance.

Figure 4: Correlation of IBLI purchase and coupon receipt



Notes: The x-axis represents the number of discount coupons the respondent received. The y-axis shows the number of seasons in which the respondent purchased insurance over the six seasons. The line is a kernel-weighted local polynomial smooth plot with local mean smoothing. The shaded area represents the 95% confidence interval.

Column 1 of Table 3 presents the first stage estimation results of Equation (2), the estimated effects of the number of discount coupons received during the first three sales seasons on purchase of any insurance within those same seasons. In the main table we report *p*-values based

[16]The joint *p*-values for the eight displayed PAP characteristics in Appendix Table D7 are 0.009 for the pooled sample, 0.003 for Kenya, and 0.141 for Ethiopia. The six coupon indicators and six discount-rate assignments are not jointly significant in any sample in Appendix Table D8.

on heteroskedasticity-robust standard errors as well as from two randomization-inference procedures; community-clustered and CGM wild-cluster-bootstrap p-values are reported separately in Appendix Table C1. The number of coupons received during the first three seasons significantly predicts the probability of purchasing insurance in the first three seasons at the one percent level. An increase of one additional coupon received in these first three seasons increases the likelihood that a respondent purchased insurance by 11.0 percentage points, significant at the one percent level. The effective F-statistic (Olea and Pflueger 2013) is greater than the critical value at the 10 percent level, corroborating the strength of our instrument. Columns 2 through 7 present the estimated effects of receiving a discount coupon on insurance purchases in each round. Appendix Tables B2–B20 show that our main second-stage results are robust to alternative instruments, namely discount coupons during all six seasons, during the first two seasons, during the first four seasons and during the first five seasons, although the education estimates are smaller in some windows, notably when only first-season coupons are used.

Table 3: First stage regression results

	Any insurance purchased – first three seasons	Respondent purchased ANY IBLI in each season					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No. of coupons received – first three seasons	0.110						
	(0.000)						
	[0.000]						
	{0.000}						
Coupon Receipt – first season		0.250					
		(0.000)					
		[0.000]					
Coupon Receipt – second season			0.073				
			(0.001)				
			[0.000]				
Coupon Receipt – third season				0.128			
				(0.000)			
				[0.000]			
Coupon Receipt – fourth season					0.063		
					(0.000)		
					[0.000]		
Coupon Receipt – fifth season						0.067	
						(0.000)	
						[0.000]	
Coupon Receipt – sixth season							0.058
							(0.000)
							[0.000]
Controls	✓	✓	✓	✓	✓	✓	✓
Effective F-statistics	50.390	115.088	11.201	52.731	13.476	16.398	17.731
10% Critical Value	23.109	23.109	23.109	23.109	23.109	23.109	23.109
Control mean	0.203	0.123	0.117	0.046	0.061	0.051	0.026
N	1179	1166	1154	1162	1150	1143	1143

*Notes:*The table reports first-stage estimates. Column 1 shows the effect of the number of discount coupons received during the first three sales seasons on whether the household purchased any insurance during those seasons. Columns 2–7 show the estimated effect of coupon receipt in each season on insurance purchase in that season. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report randomization-inference *p*-values from 2,000 replications testing the null of no effect of coupon receipt on insurance purchase. In column 1, coupon receipt is re-randomized separately within each community and each of the first three sales seasons, and the resulting season-specific assignments are summed to reconstruct the cumulative coupon instrument. In columns 2–7, coupon receipt is re-randomized within each community for the corresponding sales season. Braces { } report the corresponding procedure that permutes the cumulative first-three-season coupon count within community. In columns 2–7, the assignment for the corresponding sales season is permuted within community; the braces row is omitted because the procedures coincide for a single season. Community fixed effects are included because randomization was stratified at the community level. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in cattle market-value equivalents (CMVE), monthly household income per capita, and agricultural land size. The effective *F*-statistics and 10 percent critical values are from Olea and Pflueger (2013) are reported. Columns 2–7 exclude observations with unresolved purchase responses for the corresponding season.

Because two-stage least squares identifies a local average treatment effect, the population our estimates describe is the compliers: households that purchased insurance because they received coupons during the first three sales seasons and would not have purchased otherwise. We characterize that population in Appendix B.1, using two procedures that rest on different assumptions — a descriptive decomposition of the sample into the three compliance types, and instrumental variables weighting. Compliers are an estimated 33.1 percent of the estimation sample, against 19.8 percent always-takers and 47.1 percent never-takers. On joint tests the compliers are not distinguishable from the full sample on the pre-specified household characteristics, on the six baseline outcomes included in the joint tests, nor on the baseline herd-size distribution, under either procedure.

Two results are, however, relevant for the interpretation of the results. First, both procedures place more compliers in the top herd-size tercile than the full sample contains — 46.0 and 47.3 percent against 33.0 percent — so our below threshold estimates rest on a smaller pool of compliers than the size of that subsample alone would suggest, although neither difference is statistically significant, either individually or jointly. Second, the always-takers, who insured without any encouragement, hold smaller herds, farm more land and have more baseline schooling than the sample as a whole; they are not simply the wealthier pastoralists, as one might naively assume.

6.1 Long-run Effects of Temporary Drought Insurance Coverage

We report the results for all our pre-specified primary and secondary outcomes in Appendix Tables E1, E2, E3, and E4. We observe no statistically significant effects of insurance on mean total herd size (robust to using TLU instead of CMVE; Appendix Table A6), annual household cash earnings, herd management expenditure, livestock losses, distress sales (measured in Kenya only, where endline distress-sale data were collected), livestock sales, or the likelihood of purchasing insurance in the 12 months prior to the endline. The impacts on total milk income are large in magnitude — 413 USD against a control mean of 493 USD — but noisily estimated ($p = 0.316$). The two pre-specified primary outcomes on which we find an effect are the share of goats herded and the maximum years of education among household members who were school-aged during the experiment. The goat share is reduced by 21.4 percentage points ($p = 0.024$) in our main specification. The maximum years of education rises by 2.89 years ($p = 0.087$) in our main specification. We return to this outcome, and to the heterogeneity underlying it, below.

Table 4 shows a substantial change in insured households' production strategies, reflected in changes in herd composition. Column 2 shows a decrease of 21.7 percentage points in the share of small animals (goats and sheep) herded, relative to a control mean share of 48.6, implying a 44.7 percent decrease. The estimate is significant at the ten percent level using heteroskedasticity-robust

standard errors and at the five percent level under both randomization-inference procedures. By construction the herd share of large animals (camels and cattle) increased by the same magnitude (Column 1).

These full-sample averages mask important heterogeneity. We therefore include an interaction term to test for heterogeneous effects on either side of that threshold (Equations 4 and 5).[17]

Below the threshold, we find that insured households reduce smallstock holdings by 3.6 CMVE relative to a control mean of 3.9 CMVE ($p = 0.052$)[18] — equivalent to roughly 36 goats or sheep at Kenyan conversion rates, or 22 at Ethiopian rates, or 93 percent of the control mean.[19] This same group drives our education results (Panel B of Table 5). Maximum years of education among school-aged household members rises by 5.3 years relative to a control mean of 6.9, a 77 percent increase ($p = 0.021$); [20] total years of education rises 14.2 years relative to a control mean of 11.5, a 124 percent increase ($p = 0.009$); and average years of education rises 4.4 years relative to a control mean of 5.1, an 86 percent increase ($p = 0.032$).

[17] The pre-analysis plan specified heterogeneity by country, by full herd tercile, and by gender of household head. Appendix Tables F1 and F2 report treatment effects by baseline herd tercile, Appendix Tables F3 and F4 report treatment effects by gender of household head, and Appendix F reports country-disaggregated estimates, all as pre-specified.

[18] Throughout, the control mean is the raw mean among households that received no coupons in the first three seasons (about 6 percent of the sample), calculated within each group. These households include never-takers and a small number of always-takers as well as untreated compliers, so percentage changes relative to this mean are descriptive benchmarks rather than proportional effects on compliers' own counterfactual outcomes.

[19] Given average insurance purchase volumes, we can also rule out that the sale of goats to pay for insurance premiums explains more than a small share ($\sim$ 3.2 percent) of this estimated effect. This compares the goats needed to pay the premiums directly with the estimated reduction in holdings.

[20] Sample size drops to 736, the number of endline households with members who were school-aged during the experiment.

Table 4: Long-run effects of catastrophic drought insurance on herd composition

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.217	-0.217	5.853	-1.301	-3.475	-3.584	18.395	1.888
	(0.056)	(0.056)	(0.320)	(0.306)	(0.596)	(0.052)	(0.069)	(0.272)
	[0.048]	[0.048]	[0.255]	[0.442]	[0.554]	[0.070]	[0.045]	[0.652]
	{0.023}	{0.023}	{0.210}	{0.416}	{0.514}	{0.048}	{0.022}	{0.660}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
ITT coefficient (per coupon)	0.024	-0.024	0.643	-0.143	-0.307	-0.347	2.478	0.264
p-value threshold interaction					0.054	0.022	0.054	0.022
First-stage coefficient (per coupon)	0.110	0.110	0.110	0.110	0.098	0.098	0.134	0.134
p-value first-stage coefficient	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sanderson-Windmeijer *F*-stat.					28.22	28.20	29.03	28.68
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Because insurance may affect whether a household still herds livestock at follow-up, the share estimates are conditional on livestock ownership; the estimates in levels (columns 3–8) use all households. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS using the same sample and controls as the corresponding IV specification. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. The row "First-stage coefficient (per coupon)" reports the coefficient on the first-three-season coupon count in the first-stage regression for insurance purchase. For group-specific estimates, it reports the coefficient on the corresponding coupon-by-group term in the first-stage equation for the matching insurance-purchase interaction; both coupon-by-group terms and all included controls enter each equation. The *p*-values beneath these coefficients are based on heteroskedasticity-robust standard errors.

These household-level results are not an artifact of aggregation to the household-level. Columns 4 and 5 of Table 5 report the estimated effect on an individual's own completed education directly, rather than as a household maximum, total, or average. Among below threshold households, completed years of education rises by 3.5 years relative to a control mean of 5.3 ($p = 0.016$), and the probability of having completed at least one year of schooling rises by 30.3 percentage points relative to a control mean of 56.6 percent ($p = 0.023$). These individual-level specifications include age-by-country fixed effects and an indicator for the individual's gender, and give equal weight to each individual. Appendix Tables C12 and C13 separately test heterogeneity by gender and by the younger versus older endpoint-age cohort. The household-clustered equality-test p-values are 0.323 for gender and 0.940 for cohort, so we do not reject equal effects on either dimension. Appendix Table F2 reports the pre-specified decomposition by each of the three baseline herd-size terciles separately. Comparing the lowest and the middle tercile, both the education effects and the effect on smallstock holdings appear concentrated in the middle tercile. For smallstock, the difference between the bottom and middle terciles is not statistically significant (Appendix Table F1); for education, the reduced-form difference is significant at the ten percent level for maximum and average years of education ($p = 0.077$ and $p = 0.033$; Appendix Table F2). The middle-tercile first stages are weak (Sanderson–Windmeijer F-statistics of 5.1–8.7), so the magnitudes of the tercile-specific IV estimates should be read with caution. With a third of the 736 households in each tercile, these group-specific estimates are too imprecise to establish that households in the bottom tercile are unaffected, but the pattern is consistent with a response concentrated among households near the threshold, as Section 3 implies. To complement the tercile-specific IV estimates, we also examine reduced-form coupon effects by tercile, for which inference does not rely on a strong first stage. The reduced-form point estimates exhibit a similar non-monotone pattern: each additional coupon increases maximum years of education by an estimated 0.97 years in the middle tercile versus 0.25 years in the bottom tercile, and reduces smallstock holdings by 0.49 versus 0.22 CMVE. The estimated effect on large-animal holdings in the top tercile is an increase of 2.48 CMVE per coupon. Under season-wise re-randomization, the weak-instrument-robust Anderson–Rubin randomization-inference p-values based on the middle-tercile statistics are 0.040 for smallstock holdings and at most 0.002 for the three household-level education outcomes. These tests evaluate the sharp null of no coupon effect in any tercile.

Column (9) in Appendix Table E4, which reports the prespecified secondary outcomes, shows that the household school-attendance share increases by 18.4 percentage points relative to a control mean of 58.2 percent (p=0.087). Among the Ethiopian households with data on children's time use, a much smaller pooled sample – implying our statistical power is limited and precluding a split by herd-size group – we find that the household share of children studying full-time rises by

35.4 percentage points relative to a control mean of 2.5 percent (p=0.089-0.193), and the household share of children working falls by an estimated 63.5 percentage points, relative to a control mean of 65.7 (p=0.006-0.113).[21] Appendix Table G4 shows the estimated relationship between children's educational attainment and the endline-baseline change in small ruminant holdings. The increase in education is greatest for those who with largest reduction in goats or sheep holdings.

A plausible pathway from the herd-composition results runs through children's herding labor. Children are far less likely to herd large animals like camels or cattle than goats or sheep. Camels in particular are large, strong, and ornery, managed overwhelmingly by adult men. Indeed, small animals, particularly goats, are the livestock children most often herd. Appendix Figure G1 shows a positive association between baseline goat holdings and the household share of children working full-time. So the shift away from smallstock held as precautionary savings lowered the marginal productivity of child herding labor, increasing incentives to educate children, similar to Shah and Steinberg (2017) and Bau, Rotemberg, Shah, and Steinberg (2025). Increased crop income may have reinforced this by funding educational investment directly.

Above the threshold, the impact of IBLI coverage differs. Insured households increase large-animal holdings by 18.4 CMVE relative to a control mean of 7.5, a 245 percent increase (p=0.069). We do not find a parallel effect on education or child time use for this group (Panel C of Table 5), consistent with the framework's implication that households above the threshold face no binding subsistence or technology constraint that insurance coverage relieves.

Our conceptual framework implies divergent effects based on initial livestock holdings, with households on either side of the unstable threshold responding to the same reduced uninsured risk exposure in opposite directions (Section 3). We test for this divergence directly. The row "p-value threshold interaction" in Tables 4 and 5 reports on the test that treatment effects are equal above and below the threshold. Equality is rejected for small-animal holdings ($p = 0.022$), for large animals ($p = 0.054$), and for every education outcome: maximum years ($p = 0.024$), total years ($p = 0.005$), average years ($p = 0.031$), individual completed years ($p = 0.055$) and any schooling ($p = 0.020$). A treatment effect operating uniformly across insured households would not produce this pattern; a bifurcated behavioral response around the threshold does.

One result is not threshold-specific. Insurance raised total annual crop income in the pooled sample, by USD 36.6 relative to a control mean of 5.1 ($p = 0.008$; Appendix Table G1).[22] The es-

[21] To determine whether the educational effect is influenced by changes in household composition, Columns 1 and 2 in Appendix Table G3 show no effect of insurance purchase on the number of young adults in the household. Coupon receipt also does not predict whether a household enters the education sample (0.15 percentage points per coupon, $p = 0.920$) or the number of eligible cohort members it contributes (0.010, $p = 0.803$), nor the number of births recorded during the panel or of children aged 0–4 at endline.

[22] Appendix Tables A2 and A3 detail the in-kind income variable construction.

timate is 37.5 below ($p = 0.049$) and 35.7 above ($p = 0.062$) the threshold. But above the threshold the response operates on the extensive margin, with the probability of reporting any crop income rising by 30.1 percentage points ($p = 0.018$) from a control mean of zero, while below the threshold it does not (4.1 percentage points, $p = 0.738$). Other income point estimates are large but imprecise (Appendix Table G2). The crop response may represent a general reduction in *ex ante* risk exposure lowering the risk penalty on crop production for all insured households, consistent with Boucher et al. (2024), rather than as part of the threshold-specific reallocation.

Table 5: Long-run effects of catastrophic drought insurance on education

Education of household members who were school-aged during the first three sales seasons					
	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.886	7.276	2.345	2.018	0.130
	(0.087)	(0.061)	(0.100)	(0.051)	(0.162)
	[0.096]	[0.059]	[0.101]	[0.045]	[0.186]
	{0.052}	{0.032}	{0.065}	{0.029}	{0.143}
Controls	✓	✓	✓	✓	✓
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon)	0.314	0.816	0.255	0.266	0.017
First-stage coefficient (per coupon)	0.109	0.112	0.109	0.132	0.131
p-value first-stage coefficient	0.000	0.000	0.000	0.000	0.000
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	5.284	14.154	4.383	3.537	0.303
	(0.021)	(0.009)	(0.032)	(0.016)	(0.023)
	[0.008]	[0.001]	[0.009]	[0.008]	[0.016]
	{0.002}	{0.001}	{0.004}	{0.004}	{0.006}
Controls	✓	✓	✓	✓	✓
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon)	0.585	1.593	0.474	0.424	0.036
p-value threshold interaction	0.024	0.005	0.031	0.055	0.020
First-stage coefficient (per coupon)	0.107	0.109	0.105	0.120	0.119
p-value first-stage coefficient	0.000	0.000	0.000	0.000	0.000
Sanderson-Windmeijer *F*-stat.	22.03	22.65	20.99	19.79	19.64
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.948	-6.307	-1.483	-0.211	-0.126
	(0.439)	(0.236)	(0.458)	(0.881)	(0.359)
	[0.446]	[0.255]	[0.473]	[0.768]	[0.303]
	{0.394}	{0.203}	{0.409}	{0.767}	{0.253}
Controls	✓	✓	✓	✓	✓
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon)	-0.246	-0.785	-0.198	-0.069	-0.025
p-value threshold interaction	0.024	0.005	0.031	0.055	0.020
First-stage coefficient (per coupon)	0.132	0.133	0.134	0.174	0.173
p-value first-stage coefficient	0.000	0.000	0.000	0.000	0.000
Sanderson-Windmeijer *F*-stat.	17.25	17.66	17.66	31.78	31.94
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline education outcome and the number of discount coupons received during the last three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first three seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS using the same sample and controls as the corresponding IV specification. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. The row "First-stage coefficient (per coupon)" reports the coefficient on the first-three-season coupon count in the first-stage regression for insurance purchase. For group-specific estimates, it reports the coefficient on the corresponding coupon-by-group term in the first-stage equation for the matching insurance-purchase interaction; both coupon-by-group terms and all included controls enter each equation. The *p*-values beneath these coefficients are based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

6.2 Robustness

The main tables report *p*-values based on heteroskedasticity-robust standard errors and *p*-values from two randomization-inference procedures. Community-clustered and CGM wild-cluster bootstrap *p*-values are reported separately in Appendix Tables C1–C3. Our results are robust to the exclusion of control variables (Appendix Tables C4–C6); correction for multiple hypothesis testing (Appendix Tables C9–C10); to the use of alternative instruments and endogenous regressors in the IV specification (Appendix Tables B6–B20), where the within-group estimates keep their direction but the between-group differences are less precisely estimated; and the use of the number of coupons as the instrument and the number of insurance purchases as the endogenous regressor in the first three seasons (Appendix Tables B2–B4). We also show that our main estimates are robust to potential interpersonal spillovers across households within communities in Appendix H. Given known differences between the two study contexts (Section 2), Appendix F reports our main results separately for Kenya and Ethiopia in addition to our pooled main specification. Given the smaller within-country samples, these disaggregated estimates are less precisely estimated.

Finally, we show that our effects on the reduction of small animals for households below the threshold are robust to the choice of threshold. Appendix Figure C1 re-estimates the effect of insurance on small-animal holdings among below-threshold households at every candidate integer cutoff from 11 to 25 TLU-equivalent. The estimate is negative throughout and varies little in magnitude, between -2.0 and -3.1 CMVE. It is significant at the ten percent level at cutoffs of 18–20 and 22–23 TLU-equivalent, under all three inference procedures. At lower thresholds it remains negative but is not consistently significant across all three procedures, consistent with the smaller below-threshold subsample those cutoffs imply. The pattern is therefore not an artifact of the particular threshold we use within the range supported by the prior literature. We also note that nothing distinctive occurs at 15 TLU, the per-household cap on subsidized coverage, and only 30 of the 656 household-season purchases in the first three seasons reached that cap, so the cap is unlikely to generate the threshold effects.

7 Mechanisms

We now explore candidate mechanisms for the observed long-run outcomes of catastrophic drought insurance coverage. Endline insurance coverage can be ruled out because it was not affected by the treatment (Appendix Table E4), for reasons already discussed. The observed effects must thus have begun during the experimental period of (transitory) insurance uptake in the initial few years after the insurance was first introduced. This section explores why effects that began during that

temporary experiment took the specific forms documented in Section 6.1. Two puzzles stand out. First, why did the shift away from smallstock persist, and the education and large-animal effects strengthen, once insurance coverage had become largely unavailable, rather than unwinding? Second, why did this shift and the education gains it produced not appear on the same timeline: smallstock holdings fell almost immediately, while completed education among below-threshold households shows no detectable effect until the ten-year follow-up? We first lay out the trajectory of effects, then resolve each puzzle in turn, and close by ruling out two alternative explanations: that the effects operate through migration rather than herd composition, and that they reflect indemnity payments rather than insurance coverage itself.

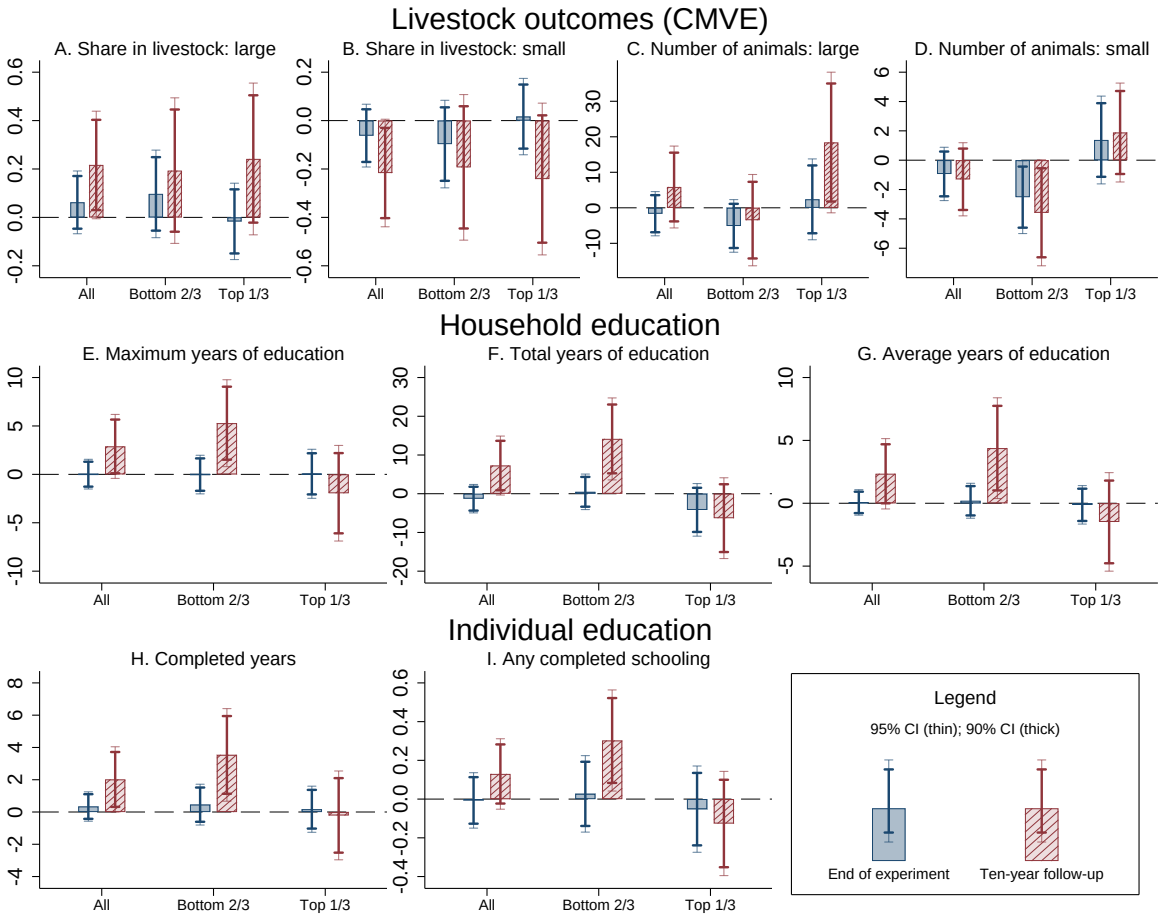
7.1 Effects in the Short Run and at the Ten-Year Follow-Up

The observation that early, temporary adoption of insurance generated effects long after households ceased buying insurance raises the question of whether these effects were already present in the short run. Therefore we re-estimate Equations (1) and (4) using the same set of pre-specified outcomes, but measured at the end of the experiment rather than at the ten-year follow-up. Figure 5 shows these dynamic effects in levels, for all households and separately for the bottom two-thirds and top one-third terciles of the community herd size distribution. (See Appendix Tables G5 and G6 for regression results.)

Among households in the bottom two-thirds, small animal holdings had already fallen by 2.5 CMVE at the end of the experiment ($p = 0.047$), and were 3.6 CMVE lower by the ten-year follow-up ($p = 0.052$, per Table 4); the difference between the two horizons is not statistically significant ($p = 0.585$), while we find no significant effect on large animals for this group at either point in time. For the top one-third sub-sample we observe no effects on small animals at either point, and the 18.4 CMVE increase in large animals is not detectable at the end of the experiment ($p = 0.682$) and becomes statistically detectable only at the ten-year follow-up ($p = 0.069$); the estimate rises from 2.4 to 18.4 CMVE between the two horizons, an increase that is marginally insignificant ($p = 0.124$). Because observed livestock stocks reflect purchases, births, sales, and animal losses, these estimates do not identify the contribution of each mechanism. We therefore interpret the positive long-run estimate as a higher stock of large animals at endline, without attributing it specifically to new purchases.

Panels A and B of Figure 5 show that, in the full sample, the herd-composition effect on small-animal share is only detected later: the reduction is 6.2 percentage points and imprecisely estimated at the end of the experiment ($p = 0.348$), reaching the 21.7-percentage-point reduction we report in Section 6.1 only at the ten-year follow-up ($p = 0.056$).

Figure 5: Short- and long-run effects of IBLI on herd composition and education



Notes: This figure presents estimated Local Average Treatment Effects of any insurance purchase in the first three sales seasons, instrumented by the number of discount coupons received in those seasons. Estimates are reported at the end of the experiment and at the 10-year follow-up. Panels A–B report the shares of large and small animals in livestock, measured in CMVE, and exclude households without livestock. Panels C–D report the numbers of large and small animals, measured in CMVE. Panels E–G report household-level measures of the maximum, total, and average completed years of education. Panels H–I report individual completed years of education and an indicator for positive completed years of education. The education outcomes use the same eligible cohorts at each horizon: individuals ages 8–22 in Kenya and 8–10 in Ethiopia at the end of the experiment, corresponding to ages 15–29 in Kenya and 15–17 in Ethiopia at the 10-year follow-up. Within each panel, the figure reports the effect for the full sample and group-specific treatment effects estimated jointly in the interaction model. The "Bottom 2/3" estimates are for households in the bottom two herd-size terciles, while the "Top 1/3" estimates are for households in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the number of coupons received in the first three seasons and the herd-size tercile indicators. Solid blue bars denote end-of-experiment estimates, and diagonally hatched red bars denote ten-year follow-up estimates. Thick inner and thin outer confidence intervals report the 90% and 95% confidence intervals, respectively. Confidence intervals in Panels A–G are based on heteroskedasticity-robust standard errors; those in Panels H–I are based on standard errors clustered at the household level. All regressions control for the corresponding baseline outcome, the number of discount coupons received during the final three sales seasons, community fixed effects, and the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include country-by-age fixed effects and an indicator for the individual's sex. Community fixed effects are included because randomization was stratified at the community level.

Figure 5 and Appendix Table G7 show that the effects on education achievement only materialized by the time of the 10-year follow-up, both for the full sample and the lowest two-thirds sub-sample while there are no significant effects on education for the top one-third sub-sample. Among below-threshold households the increase in education between the end of the experiment and the ten-year follow-up is itself statistically significant for maximum, total, and average years of education and for individual completed years (p between 0.011 and 0.040). Our education measures — maximum, total, and average years of education — are collected at baseline, at the end of the experiment, and at the 10-year follow-up, which is what allows us to trace their dynamics directly in Figure 5 and Appendix Table G7.[23]

7.2 Persistence After Coverage Lapsed

Section 6.1 shows that below-threshold households cut smallstock holdings and raised crop income (Table 4; Appendix Tables G1 and G2) – consistent with the reallocation our conceptual framework describes (Section 3). Additional crop income, part of it retained production, may have continued to reduce the value of goats as a precautionary buffer even after insurance became unavailable. This would explain why households may not have had a reason to revert to restocking – exactly the self-reinforcing, non-reversing dynamic our framework describes below the threshold. We cannot rule out that some households instead lacked the means to rebuild their smallstock holdings, but the concurrent gains in education and crop income are more consistent with a productive reallocation than with a constraint on restocking.

Non-reversion here is not only what the framework implies; it is visible in the mechanism variable itself. Were the reallocation transitory, the effect on smallstock would have decayed once coverage lapsed. It does not. In the full sample the reduction in the small-animal share is an imprecise 6.2 percentage points at the end of the experiment and 21.7 percentage points by the ten-year follow-up, and among below-threshold households the level effect on smallstock is significant at both horizons (Figure 5). The channel through which insurance operated is therefore still displaced years after the last policy was sold — consistent with education effects that rest on a durable change in household portfolios.

[23] The age restrictions align cohorts across horizons, but the individuals observed may differ. Restricting both horizons to the same 638 households yields insignificant short-run effects and positive long-run effects for the bottom two herd-size terciles, with the latter significant at five percent under both randomization-inference procedures (Appendix Table G8). This check holds household identity fixed, but not individual composition.

7.3 The Timing of Education Effects

The reduction in child herding labor does not mechanically translate into additional years of completed education. Households must first recognize that child labor is underutilized, whether because herds are smaller or because children are needed for other tasks, and then reallocate children's time toward schooling. We expect this reallocation to occur in part along the intensive margin — children who were already combining part-time herding with part-time schooling shifting to full-time studying — as well as along the extensive margin of previously unenrolled children newly enrolling, consistent with how we define children's activity status in our pre-analysis plan (full-time work, part-time work combined with schooling, and full-time schooling). To the extent that the intensive margin matters, enrollment status alone does not capture the full response. Furthermore, several features of the schooling process slow the translation of insurance coverage that induces changes in livestock holdings into education outcomes. School years have fixed completion dates, so a child who begins attending full-time mid-cycle cannot complete an additional grade until the next scheduled completion date. Pass rates in this setting are well below 100 percent, so attendance alone does not guarantee grade completion. As a result, the treatment effect on an individual's completed years of education should accumulate at less than one year per year of elapsed time, even under the most optimistic assumption that households shifted children into full-time schooling immediately upon reducing small-stock holdings.

Household-level aggregation further dampens and delays this accumulation. Household maximum years of education rises only once a treated child's own completed education exceeds the pre-existing household maximum, which may itself be set by an older, untreated sibling. So induced educational attainment by younger children may not affect this measure for several years. And household average years of education is diluted both by members who would have attended school regardless of treatment and by members who never attend school at all. Together, these features are consistent with our finding of no detectable effect on years of education at the end of the experiment period and a large, significant effect by the 10-year follow-up.

As a further test of whether this represents a durable shift in household educational strategy rather than an effect confined to children who were already of school age during the experiment, Appendix Table G9 examines household members who were not yet school-aged during the first three sales seasons but had reached school age by the 10-year follow-up (ages 6–14 in Kenya and 7–14 in Ethiopia), some of whom reached school age before the experiment ended. Because most of these children were still progressing through school at endline, they have had considerably less time to accumulate completed years of education than the older cohort. In Table 5 the control-group means for maximum, total, and average years of education are 7.2, 13.4, and 5.4 years while

they are 3.4, 4.8, and 2.2 in Appendix Table G9. The margin on which this younger cohort can respond is therefore enrollment rather than completed schooling, and it is on that margin that we find effects. The household share of cohort members who have completed at least one year of schooling rises by 26.1 percentage points relative to a control mean of 53.2 percent ($p = 0.033$), and the share currently enrolled rises by 21.7 percentage points relative to a control mean of 60.3 percent ($p = 0.071$). Among households in the bottom two-thirds the corresponding estimates are higher still: 30.4 and 27.0 percentage points ($p = 0.058$ and $p = 0.083$), respectively. Effects on years of education in this cohort are correspondingly small and imprecise. Maximum years rises by 0.98 years in the full sample (29 percent of the control mean, $p = 0.235$) and 0.80 years among the bottom two-thirds (24 percent, $p = 0.450$), and effects on total and average years are smaller still and not distinguishable from zero. This is the pattern the timing argument above predicts — households have moved these children into school, but too recently for completed schooling to register in some measures. We interpret these results as evidence that the educational response we document extends to children who reached school age only after the first three sales seasons, rather than being confined to those already of school age at the time of the intervention.

A related question is whether this persistence reflects a durable gain or simply a control group that failed to progress. The control group did not stagnate. Among below-threshold households, control-group maximum years of education rose from 5.2 at the end of the experiment to 6.9 at the ten-year follow-up, total years from 9.2 to 11.5, and average years from 2.9 to 5.1 (Appendix Table G7). So the informative comparison is the treatment–control gap rather than the level — and that gap widened rather than closed, with the education effects undetectable at the end of the experiment and large and significant by the ten-year follow-up (Figure 5).

7.4 Ruling Out Alternative Explanations

We find no evidence that insurance coverage operated by reducing migration and promoting sedentarization, which could independently have raised school attendance simply by keeping children at home. Goats, which comprise the largest share of small animals herded in our sample, are browsers that typically do not migrate the long distances cattle do, making it unlikely that reduced smallstock holdings affected migration patterns. Appendix Table G10 confirms no significant effects of insurance coverage on migration or sedentarization at the ten-year follow-up. The herd-composition and education effects we document do not appear to be mediated by decreased migration.

We also investigate, in Appendix G.1, whether these effects are driven by *ex ante* insurance coverage or *ex post* indemnity payments. Given limited statistical power – only 102 households in our sample reported receiving an indemnity payment on coverage purchased in the first three sales

seasons – we interpret this analysis as suggestive only. Our evidence is, however, consistent with an interpretation that reduced *ex ante* risk exposure and the behavioral changes it induces generate the long-run effects we observe. This is consistent with prior findings of subjective well-being gains from insurance coverage even in the absence of payouts (Tafere, Barrett, and Lentz 2019), as well as *ex ante* effects of insurance on increases in productive investments, irrespective of indemnity payments (Karlan, Osei, Osei-Akoto, and Udry 2014; Cole and Xiong 2017; Jensen, Barrett, and Mude 2017; Hill et al. 2019; Matsuda, Takahashi, and Ikegami 2019; Janzen, Carter, and Ikegami 2021; Boucher et al. 2024; Son 2025).

8 Conclusions

A growing literature shows that uninsured exposure to catastrophic aggregate shocks can damage long-run human capital accumulation, partly through its effect on the marginal productivity of child labor (Shah and Steinberg 2017; Bau, Rotemberg, Shah, and Steinberg 2025). It follows that insurance against such shocks might instead protect human capital investment — but direct evidence on this question, particularly on whether such protection outlasts the insurance itself, has been lacking.

We test this using a ten-year follow-up of the randomized encouragement design underlying Index-Based Livestock Insurance (IBLI), a catastrophic drought insurance product introduced among pastoralist households in northern Kenya and southern Ethiopia in 2010–12. Temporary insurance coverage induced a shift in herd composition that began during the experiment and persisted through the ten-year follow-up, while its effects on education and large-animal holdings strengthened, well after coverage had become largely unavailable to sample households. Among the poorer two-thirds of households, insurance substituted for smallstock held as precautionary savings, crop income rose, and educational attainment rose sharply in the long run, consistent with a reduced herding labor burden on children. Among wealthier households, insurance instead facilitated accumulation of higher-return large animals, with no comparable effect on schooling. This heterogeneity is consistent with what poverty-trap dynamics predict: households on opposite sides of an unstable herd-size threshold respond to the same reduced uninsured risk exposure in opposite ways (Skiba 1978; Dasgupta and Ray 1986; Dasgupta and Ray 1987; Dasgupta 1997; Galor and Zeira 1993; Zimmerman and Carter 2003; Lybbert, Barrett, Desta, and Coppock 2004; Barrett and Swallow 2006; Barrett, Carter, and Chavas 2019). Our ten-year follow-up offers a rare direct test of this logic: a temporary intervention sufficient to reduce uninsured risk exposure generates a lasting behavioral shift on either side of such a threshold. Evidence suggests that the *ex ante* reduction in risk exposure that holding coverage provides is the operative channel rather than the *ex post* cash

from indemnity payments.

These findings carry real policy weight given how limited take-up was: even with subsidized premiums, only 52 percent of sampled households ever purchased insurance, and commercial sales in our study villages effectively ceased once the research team's last-mile marketing support ended in 2015. Many below-threshold households in our sample likely never had the opportunity we document among compliers, suggesting that policies expanding access – even temporarily – could generate welfare gains well beyond the population we study. This also underscores the importance of households being aware of their own insurance status, which may not hold when aggregators purchase coverage on households' behalf or under large-scale social safety net programs. These results are especially relevant to the ongoing World Bank-supported DRIVE project, which combines insurance and savings to strengthen pastoralists' financial resilience in the Horn of Africa (Endo, Calcutt, and Morsink 2025).

Given this scale, it is natural to ask whether the herd-composition shift we document risks overstocking or rangeland degradation. The households driving our herd-composition results – those with small baseline herds – reduce smallstock without a corresponding increase in large animals, implying reduced rather than increased grazing pressure. Among large-herd households, where grazing pressure could in principle rise, companion research using remotely-sensed rangeland-quality indicators across roughly 643,000 km^2 of the same IBLI rollout area finds a precisely estimated null effect on bare ground and non-photosynthetic vegetation cover, and a small, statistically significant, positive effect on rangeland biological productivity and photosynthetic vegetative land cover, with no evidence of degradation (Wilcox et al. 2026). Catastrophic drought insurance, even when available only temporarily, can help households transition to more productive livestock portfolios and raise investment in children's education. Realizing these gains at scale will, however, require complementary interventions to expand IBLI uptake and to relieve the severe and persistent poverty that continues to afflict pastoralist households across the region.

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Appendix A: Data, variables and summary statistics

In the analysis above, we used Cattle Market-Value Equivalent (CMVE) to aggregate the number of animals across animal species (See Appendix Table A1 for calibration), instead of Tropical livestock Unit (TLU) that is typically used as an aggregation factor.[24] In this context it allows for differences between countries in relative valuations of livestock species to be considered. Since CMVE is a new aggregation approach, we also construct variables in TLU i) to confirm that the values in CMVE are reasonable, and ii) to run the same estimations again with variables in TLU to check whether the results are robust to a changed aggregation unit (Appendix Table A5 and Appendix Table A6).

Appendix Figure A1 illustrates the right-skewed distribution of baseline livestock holdings, both in total and by species; mean holdings exceed the median in every panel.

Appendix Table A5 shows that the results for grouped livestock holdings and herd composition are robust to measuring livestock in TLU. Appendix Table A6 extends this comparison to the livestock outcomes drawn from the pre-specified outcome tables (Appendix Tables E1–E4). We find no statistically significant effects on total herd size, livestock losses, distress sales, livestock sales, or the quantity of livestock insured during the 12 months before the endline survey. The estimated reduction in the goat share is also present when herd composition is measured in TLU. These results are consistent with the corresponding estimates using CMVE.

In addition to the herd size bifurcation, we also present results from quantile regression of effects on herd size, examining effects on the 10th to the 90th herd size percentiles in increments of 10 percentiles. Appendix Table C11 reports positive point estimates across all quantiles, but the estimates are imprecise. As the lowest reported p-values, at the 30th and 40th percentiles, are 0.100 and 0.138, respectively, the table does not support an unqualified claim of statistical significance. It should also be noted that only 37% of the sample households had remained in their original herd-size quantile at the endline.

[24] The PAP describes pooling purchase and sale prices by animal type and country, but its Table reports separate early- and late-round prices for Kenyan small stock without specifying how these should be combined. We clarify the implementation by applying one fixed set of country-specific CMVE weights across survey rounds.

Table A1: The average market values of animals

	(1)	(2)	(3)	(4)	(5)	(6)
	Marsabit, Kenya			Borana, Ethiopia		
	KES	Cattle Equivalent	Data Rounds	Birr	Cattle Equivalent	Data Rounds
Camel	25,132	1.6	1–7	7,447	2.5	1–4
Cattle	15,617	1.0	1–7	3,023	1.0	1–4
Sheep or goat	1,538	0.0985	7	484	0.16	1–4

Notes: The table presents the market value of each species during the study period. Columns 1 and 4 show the value of each species in local currencies (KES for Kenya and Birr for Ethiopia). Columns 2 and 5 show values relative to the cattle equivalent, with the cattle value set to 1 in each country. Columns 3 and 6 indicate the rounds of data collection during which these animals' market values were recorded. The Kenyan small-stock price averages the rounded sheep and goat means from round 7, the only round distinguishing these species in the calibration data (earlier rounds record combined shoats); underlying means use nominal prices weighted by animal quantities

Table A2: Summary statistics of the endline income variables

	Kenya				Ethiopia				Pooled			
	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs
Pre-specified source outcomes												
Annual total household cash earning (USD)	515.08 [671.37]	0.00	5636.45	781	564.31 [597.82]	0.00	3649.52	398	531.70 [647.64]	0.00	5636.45	1179
Annual milk income (USD) (earnings and in-kind)	540.99 [1361.23]	0.00	21957.05	781	111.00 [634.35]	0.00	11895.60	398	395.84 [1184.86]	0.00	21957.05	1179
Selected total and income components												
Annual total household income (USD)	1116.63 [1016.94]	0.00	5574.52	781	700.02 [694.72]	0.00	4685.51	398	975.99 [941.42]	0.00	5574.52	1179
Annual in-kind milk income (USD)	48.96 [163.15]	0.00	766.08	781	64.29 [152.57]	0.00	766.08	398	54.13 [159.76]	0.00	766.08	1179
Annual in-kind slaughter income (USD)	50.80 [76.41]	0.00	288.02	781	2.81 [19.92]	0.00	262.94	398	34.60 [67.19]	0.00	288.02	1179
Annual livestock-product earnings (USD)	381.70 [499.93]	0.00	1817.24	781	54.56 [199.41]	0.00	1539.88	398	271.26 [450.38]	0.00	1817.24	1179
Annual animal birth income (USD)	161.29 [225.37]	0.00	839.67	781	68.67 [133.82]	0.00	839.67	398	130.03 [203.93]	0.00	839.67	1179
Annual constructed in-kind crop income (USD)	8.04 [36.26]	0.00	246.96	781	9.58 [38.18]	0.00	246.96	398	8.56 [36.91]	0.00	246.96	1179
Annual earnings from crop within selected total (USD)	3.57 [25.58]	0.00	246.96	781	9.05 [38.19]	0.00	246.96	398	5.42 [30.52]	0.00	246.96	1179
Annual employment (food for work) income (USD)	1.04 [5.34]	0.00	29.26	781	1.19 [5.63]	0.00	29.26	398	1.09 [5.43]	0.00	29.26	1179
Annual other earnings (USD)	461.23 [578.29]	0.00	1972.76	781	489.87 [495.75]	0.00	1972.76	398	470.90 [551.76]	0.00	1972.76	1179
Observations	781				398				1179			

Notes: The first two rows report the pre-specified income-related source outcomes for context and are not additional components of the selected total. Annual total household income is the sum of the eight components listed after it. Livestock-product earnings combine the selected milk and other livestock-product receipts after reconciling overlapping reports. The two crop components allocate a single capped gross-production total between crop earnings bounded by that total and a constructed in-kind residual. Income construction, currency conversion, component caps, capped shares, and missing-data procedures are described in Appendix A.1.

Table A3: Summary statistics of the baseline income variables

	Kenya				Ethiopia				Pooled			
	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs
Baseline pre-specified outcomes												
Baseline Annual household cash earnings (USD)	516.55 [828.25]	0.00	6877.83	781	462.92 [594.14]	0.00	5423.73	398	498.44 [757.52]	0.00	6877.83	1179
Baseline annual milk income (USD) (earnings and in-kind)	884.08 [1666.05]	0.00	12192.44	781	161.81 [265.31]	0.00	2496.61	398	640.26 [1406.56]	0.00	12192.44	1179
Reconciled baseline income components												
Annual total household income (USD)	1554.73 [2024.61]	0.00	16302.33	781	769.98 [833.24]	4.52	9897.74	398	1289.82 [1756.69]	0.00	16302.33	1179
Annual in-kind milk income (USD)	860.20 [1648.57]	0.00	12192.44	781	154.84 [261.03]	0.00	2496.61	398	622.09 [1390.63]	0.00	12192.44	1179
Annual in-kind slaughter income (USD)	32.12 [58.27]	0.00	885.59	781	37.66 [98.71]	0.00	824.86	398	33.99 [74.42]	0.00	885.59	1179
Annual livestock-product earnings (USD)	33.13 [132.25]	0.00	2405.17	781	5.62 [19.77]	0.00	146.61	398	23.84 [109.00]	0.00	2405.17	1179
Annual animal birth income (USD)	135.03 [219.21]	0.00	2149.97	781	60.23 [106.90]	0.00	1152.54	398	109.78 [192.15]	0.00	2149.97	1179
Baseline in-kind crop income (not collected; coded 0)	0.00 [0.00]	0.00	0.00	781	0.00 [0.00]	0.00	0.00	398	0.00 [0.00]	0.00	0.00	1179
Annual crop earnings (USD)	14.41 [138.19]	0.00	2262.44	781	14.28 [48.33]	0.00	406.78	398	14.36 [115.90]	0.00	2262.44	1179
Annual employment (food for work) income (USD)	5.24 [57.25]	0.00	1120.88	781	54.05 [87.50]	0.00	477.97	398	21.72 [72.69]	0.00	1120.88	1179
Annual other earnings (USD)	474.60 [803.68]	0.00	6877.83	781	443.31 [594.36]	0.00	5423.73	398	464.04 [739.56]	0.00	6877.83	1179
Observations	781				398				1179			

Notes: The first two rows report the pre-specified baseline income-related source outcomes for context and are not additional components of the selected total. The remaining rows report the reconciled baseline total and its eight components, including the zero placeholder for uncollected in-kind crop production. Livestock-product receipts are reconciled using the same source-selection rule as at endline. Baseline components retain their source-level cleaning but do not receive the additional pooled 97th-percentile caps applied to the selected endline components. Construction and currency conversion are described in Appendix A.1.

Table A4: Summary statistics of household characteristics and outcome variables

	Kenya				Ethiopia				Pooled			
	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs	Mean/SD	Min	Max	Obs
Prespecified household characteristics												
Age of household head in years	47.01 [16.60]	18.00	96.00	781	50.23 [18.30]	20.00	100.00	398	48.10 [17.25]	18.00	100.00	1179
Male headed household	0.63 [0.48]	0.00	1.00	781	0.79 [0.41]	0.00	1.00	398	0.68 [0.47]	0.00	1.00	1179
Household head's years of education	1.05 [3.07]	0.00	16.00	771	0.54 [1.84]	0.00	13.00	397	0.87 [2.72]	0.00	16.00	1168
Adult equivalent	4.68 [1.95]	0.70	12.90	781	4.94 [2.01]	1.40	14.90	398	4.77 [1.97]	0.70	14.90	1179
Dependency ratio	1.24 [1.04]	0.00	11.00	781	1.42 [0.93]	0.00	6.00	398	1.30 [1.01]	0.00	11.00	1179
Baseline herded stock (CMVE)	21.38 [27.64]	0.00	202.92	781	15.58 [16.78]	0.00	89.92	398	19.42 [24.66]	0.00	202.92	1179
Monthly household income per capita (USD)	8.25 [13.63]	0.00	117.92	781	6.82 [10.83]	0.00	113.86	398	7.77 [12.77]	0.00	117.92	1179
Agricultural land size (hectares)	0.51 [2.00]	0.00	33.00	781	0.77 [0.94]	0.00	8.00	398	0.60 [1.72]	0.00	33.00	1179
Prespecified primary outcomes												
Herded stock (CMVE)	12.23 [21.41]	0.00	223.62	781	12.05 [14.25]	0.00	77.16	398	12.17 [19.28]	0.00	223.62	1179
Camel share in herded stock	0.31 [0.38]	0.00	1.00	619	0.11 [0.21]	0.00	1.00	390	0.23 [0.34]	0.00	1.00	1009
Cattle share in herded stock	0.21 [0.35]	0.00	1.00	619	0.65 [0.23]	0.00	1.00	390	0.38 [0.38]	0.00	1.00	1009
Goat share in herded stock	0.34 [0.35]	0.00	1.00	619	0.19 [0.17]	0.00	1.00	390	0.28 [0.30]	0.00	1.00	1009
Sheep share in herded stock	0.14 [0.20]	0.00	1.00	619	0.06 [0.09]	0.00	0.83	390	0.11 [0.17]	0.00	1.00	1009
Annual total household cash earning (USD)	515.08 [671.37]	0.00	5636.45	781	564.31 [597.82]	0.00	3649.52	398	531.70 [647.64]	0.00	5636.45	1179
Maximum years of education	7.60 [4.96]	0.00	14.00	577	4.68 [3.78]	0.00	12.00	159	6.97 [4.88]	0.00	14.00	736
Prespecified secondary outcomes												
Herd management expenditure (USD)	139.34 [290.75]	0.00	3648.66	666	227.00 [425.09]	0.00	4817.14	398	172.13 [349.53]	0.00	4817.14	1064
Annual milk income (USD) (earnings and in-kind)	540.99 [1361.23]	0.00	21957.05	781	111.00 [634.35]	0.00	11895.60	398	395.84 [1184.86]	0.00	21957.05	1179
Livestock lost in the past 12 months (CMVE)	2.98 [6.35]	0.00	56.52	781	9.95 [24.68]	0.00	352.32	398	5.33 [15.58]	0.00	352.32	1179
N of lost camel	1.08 [3.25]	0.00	28.00	578	0.57 [2.29]	0.00	25.00	398	0.87 [2.91]	0.00	28.00	976
N of lost cattle	0.53 [2.46]	0.00	40.00	578	8.36 [22.47]	0.00	300.00	398	3.73 [14.97]	0.00	300.00	976
Number of lost goats/sheep	17.95 [32.47]	0.00	270.00	578	1.02 [3.09]	0.00	52.32	398	11.05 [26.40]	0.00	270.00	976
Distress sale in the past 12 months (CMVE)	0.49 [2.00]	0.00	25.60	781	. [.]	.	.	0	0.49 [2.00]	0.00	25.60	781
Share of children working	. [.]	.	.	0	0.44 [0.34]	0.00	1.00	376	0.44 [0.34]	0.00	1.00	376
Share of children attending school	0.63 [0.37]	0.00	1.00	719	0.57 [0.37]	0.00	1.00	354	0.61 [0.37]	0.00	1.00	1073
Share of children studying full-time	. [.]	.	.	0	0.21 [0.28]	0.00	1.00	376	0.21 [0.28]	0.00	1.00	376
IBLI uptake in the past 12 months (=1 if purchased)	0.00 [0.04]	0.00	1.00	781	0.15 [0.36]	0.00	1.00	398	0.05 [0.22]	0.00	1.00	1179
IBLI uptake in the past 12 months (CMVE)	0.02 [0.49]	0.00	13.78	781	1.80 [7.22]	0.00	100.00	398	0.62 [4.30]	0.00	100.00	1179
Observations	781				398				1179			

Notes: All columns present the mean, standard deviation (in square brackets), minimum, maximum, and number of observations for each variable. Among the household characteristics, adult equivalent is the weighted sum of household members: members aged 16–60 receive weight 1, children younger than 5 receive weight 0.5, children aged 5–15 receive weight 0.7, and members aged 61 or older receive weight 0.7. The dependency ratio is the number of household members younger than 15 or older than 64 divided by the number aged 15–64. Monthly household income per capita is annual household income divided by 12 and by the number of household members. Within the primary outcomes, annual total household cash earnings sum income from livestock and livestock-product sales, crop cultivation, salaried employment, casual labor, business and petty trading, and other major income sources excluding gifts and remittances during the most recent four pastoral seasons. Herd management expenditure includes expenditure on water, fodder, supplementary feeding, and veterinary expenses. Share of children working is the mean share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the mean share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Shares are reported when the denominator and relevant activity statuses are observed. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up.

Table A5: Long-run effects of catastrophic drought insurance on herd composition, measured in TLU

	Share in livestock (TLU)		Number of animals (TLU)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.218	-0.218	4.903	-1.038	-3.902	-2.889	16.660	1.587
	(0.051)	(0.051)	(0.363)	(0.362)	(0.518)	(0.077)	(0.071)	(0.304)
	[0.041]	[0.041]	[0.300]	[0.419]	[0.453]	[0.073]	[0.043]	[0.580]
	{0.021}	{0.021}	{0.248}	{0.384}	{0.414}	{0.052}	{0.022}	{0.544}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.523	0.477	9.213	3.501	9.972	3.780	7.063	2.711
Purchaser mean	0.647	0.353	8.585	2.248	5.872	2.001	13.904	2.734
ITT coefficient (per coupon)	0.024	-0.024	0.540	-0.114	-0.346	-0.278	2.250	0.220
p-value threshold interaction					0.048	0.037	0.048	0.037
Sanderson-Windmeijer *F*-stat.					28.23	28.06	29.31	28.41
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1 and 2 are the shares of large and small animals in the household's herd, measured in TLU. Columns 3–8 report holdings of large and small animals in TLU. Tropical Livestock Units (TLU) aggregate cattle, camels, sheep, and goats using typical live-body-weight equivalents: 1 TLU = 0.7 camel = 1 cattle = 10 sheep/goats. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table A6: Long-run effects of catastrophic drought insurance on pre-specified livestock outcomes, measured in TLU

	Herd size (TLU)	Share in herded stock (TLU)				Livestock flows and insurance (TLU)			
	Total	Camels	Cattle	Goats	Sheep	Livestock losses	Distress sales	Livestock sold	Livestock insured (past 12 months)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Any insurance purchased	3.484	0.097	0.110	-0.215	0.009	-0.889	-0.388	-1.480	-0.435
	(0.552)	(0.259)	(0.182)	(0.022)	(0.857)	(0.789)	(0.422)	(0.288)	(0.450)
	[0.500]	[0.260]	[0.160]	[0.015]	[0.858]	[0.841]	[0.488]	[0.216]	[0.551]
	{0.443}	{0.178}	{0.117}	{0.006}	{0.855}	{0.835}	{0.468}	{0.153}	{0.569}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	12.739	0.276	0.247	0.336	0.141	4.226	0.381	2.514	0.066
Purchaser mean	10.491	0.184	0.463	0.258	0.094	4.838	0.737	1.907	0.407
ITT coefficient (per coupon)	0.383	0.011	0.012	-0.024	0.001	-0.102	-0.050	-0.162	-0.048
Observations	1179	982	982	982	982	1124	781	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on the pre-specified livestock outcomes, expressed in Tropical Livestock Units (TLU) as a robustness check. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Column 1 reports total herded livestock in TLU. Columns 2–5 report the shares of camels, cattle, goats, and sheep in the household's herded livestock, measured in TLU, respectively; the four shares sum to one. Columns 6–9 report livestock losses, distress sales, livestock sales, and the quantity of livestock insured during the 12 months before the follow-up survey, all measured in TLU. TLU aggregate livestock using typical live-body-weight equivalents: 1 TLU = 0.7 camel = 1 cattle = 10 sheep/goats. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All reported *p*-values are unadjusted for multiple testing. All regressions control for the total number of discount coupons received during sales seasons 4–6 and the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–8 additionally control for the corresponding baseline outcome, measured in TLU; column 9 has no corresponding baseline outcome. The general baseline herd-size control remains in CMVE, as in Appendix Table A5. Missing baseline livestock sales are replaced by their country-specific mean, following the corresponding pre-specified specification. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the estimation sample in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding estimation sample. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. Columns 1, 8, and 9 include all 1,179 households in the long-run analysis sample. Columns 2–5 include 982 households with observed baseline and endline herd shares; shares are undefined for households without herded livestock. Column 6 includes 1,124 households with observed baseline livestock losses, excluding 55 Ethiopian households with missing baseline values. Column 7 includes 781 households in Kenya because distress-sale information was not collected at the long-run follow-up in Ethiopia.

A.1 Income variable construction

Capturing income in this setting requires valuing both cash receipts and production retained by the household. Appendix Table A2 reports the two pre-specified source outcomes—annual household cash earnings and milk income including retained production—at endline. The corresponding variables at baseline are shown in Appendix Table A3. These two source outcomes are not added directly to form the selected total used in Appendix Tables G1 and G2.

The selected variable, annual total household income, is instead the exact sum of eight components: retained milk, retained slaughter production, livestock-product earnings, the value of animal births, constructed in-kind crop income, crop earnings bounded by the selected crop total, food-for-work income, and other earnings. Source livelihood earnings already include livestock-product and crop receipts. At both baseline and endline, where milk-only livelihood receipts can be identified separately, we replace them with sales reported in the milk module. Where product reports mix milk with other products or cannot be classified, including all Ethiopian endline reports, we retain the livelihood module's livestock-product receipts without adding separate milk sales. Other earnings exclude the entire source livestock-product amount and source crop earnings.

The crop construction uses corrected gross harvested-production value as the selected crop total. Reported quantities are standardized to kilograms, without applying the earlier crop-quantity caps, and valued using positive median prices within country, crop, and harvest period; Kenya contributes one annual harvest period and Ethiopia contributes the gana and hagaiya harvests. Gross production value is capped once under the rule described below. The displayed crop-earnings component equals reported crop earnings, bounded above by this capped total, and constructed in-kind crop income is the remaining nonnegative residual. The two components are not capped independently and sum exactly to the selected crop total. Their common maximum of USD 246.96 in Appendix Table A2 reflects this single cap. This is an accounting construction rather than a directly observed cash/retained-production split.

Two data limitations require explicit assumptions. First, because the Kenya crop-repeat gate was not retained in the harmonized source, absent crop-roster repeats inherit a zero-production assumption; we cannot distinguish genuine non-production from missing roster data for these households. Second, two Ethiopian households have at least one harvested item whose total cannot be valued from a reported unit or price. The primary series completes each household's gross total using the median among complete same-country source households whose total exceeds that household's observed partial value. Excluding these two households and recomputing the caps on the remaining 1,177 households gives a pooled crop-income effect of USD 37.63 ($p = 0.006$), compared with USD 36.57 ($p = 0.008$) in the main analysis, using the same reconciliation rule and regression

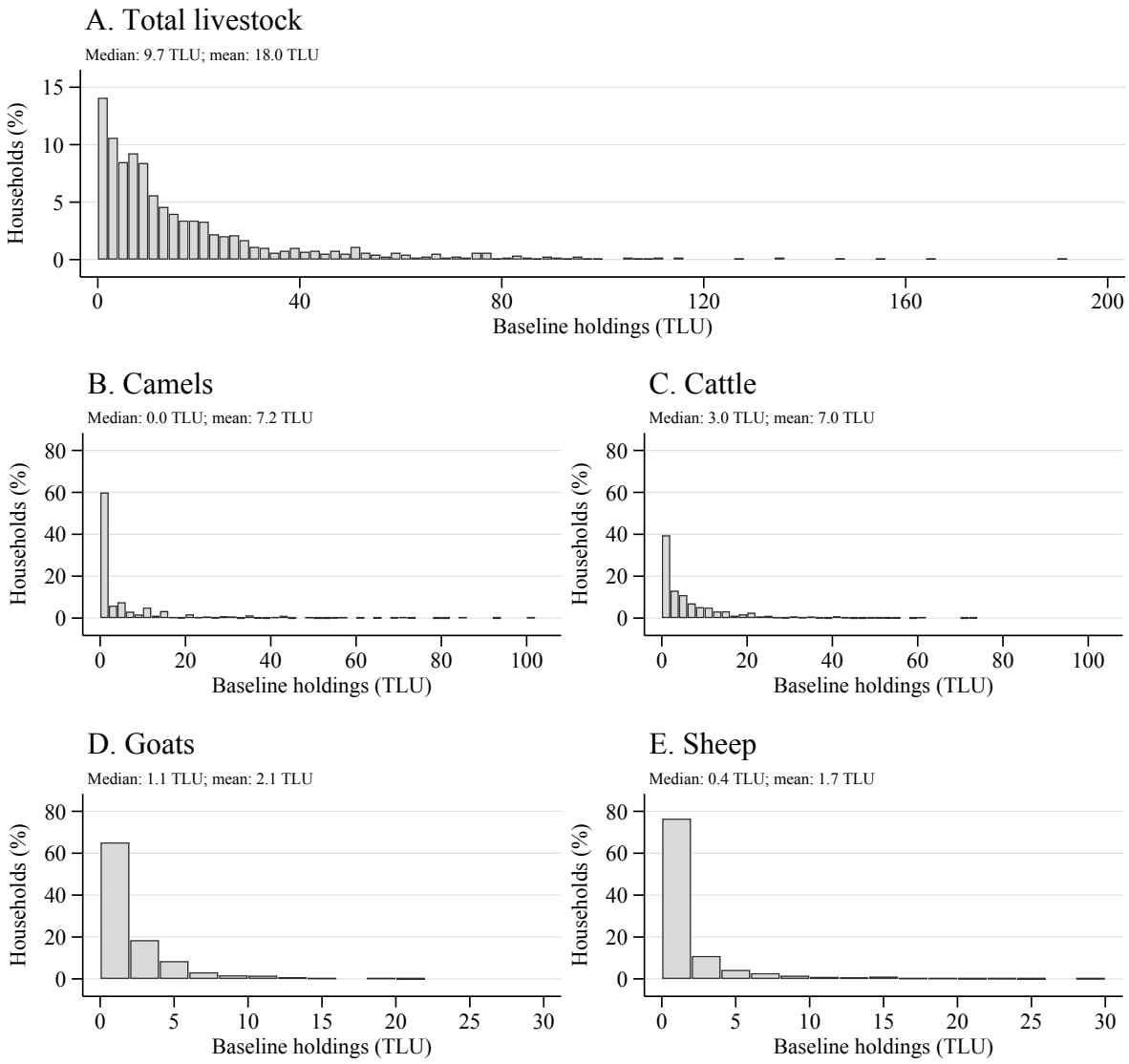
specification.

All endline amounts are converted to nominal USD using KES/USD 106.45 for Kenya in 2020 and ETB/USD 51.952 for Ethiopia in 2022. Baseline amounts use KES/USD 77.35 for Kenya in 2009 and ETB/USD 17.70 for Ethiopia in 2012. Appendix Table A2 reports the resulting country-specific and pooled summary endline income statistics.

After currency conversion, crop imputation, and reconciliation of overlapping receipts, each of the seven analytical components—the four livestock components, gross crop-production value, food-for-work income, and other earnings—is capped at its own pooled 97th percentile, calculated using linear interpolation over all households, including zeros. Aggregate incomes are sums of the components. The capped shares in Kenya and Ethiopia, respectively, are 3.46% and 2.26% for retained milk; 4.61% and 0.00% for retained slaughter production; 4.61% and 0.00% for livestock-product earnings; 3.84% and 1.51% for animal births; 2.18% and 4.77% for gross crop production; 1.41% and 3.27% for food-for-work income; and 3.20% and 1.01% for other earnings.

Summary statistics of household characteristics and additional outcome variables are reported in Appendix Table A4.

Figure A1: Histogram of baseline livestock holdings



Notes: The figure shows the baseline livestock holdings. All holdings, including species-specific holdings, are expressed in cattle market value equivalents (CMVE), using country-specific market-value conversion factors (Appendix Table A1). All panels use 2-CMVE bins starting at zero, with zero holdings included in the first bin. Bar heights indicate the percentage of households in each bin. Panel annotations report the median and arithmetic mean across all households, including those with zero holdings. The four species panels share a common vertical scale; horizontal ranges match within the camel/cattle and goat/sheep pairs. The total-holdings panel uses its own axis ranges.

Appendix B: Instrument validity

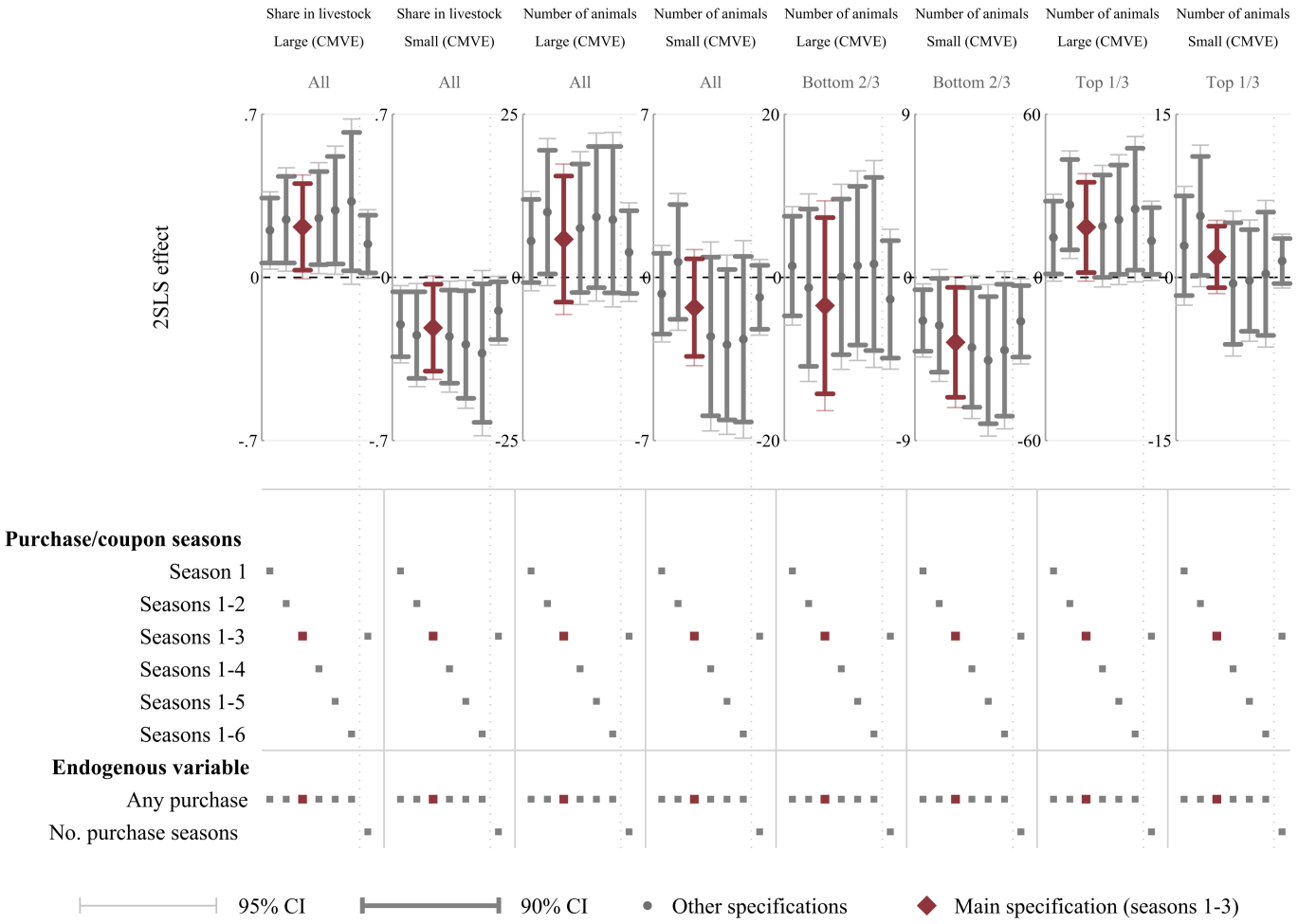
Table B1: Coupon receipt and insurance take-up in the first three sales seasons

Panel A		Number of seasons with an IBLI purchase			
Coupons received	No. of households	0	1	2	3
0	69	55 (79.7)	12 (17.4)	1 (1.4)	1 (1.4)
1	265	177 (66.8)	73 (27.5)	12 (4.5)	3 (1.1)
2	473	251 (53.1)	168 (35.5)	50 (10.6)	4 (0.8)
3	372	178 (47.8)	143 (38.4)	43 (11.6)	8 (2.2)
All	1,179	661 (56.1)	396 (33.6)	106 (9.0)	16 (1.4)

Panel B		Purchased in at least			
Coupons received	No. of households	1	2	3	Mean
0	69	14 (20.3)	2 (2.9)	1 (1.4)	0.25
1	265	88 (33.2)	15 (5.7)	3 (1.1)	0.40
2	473	222 (46.9)	54 (11.4)	4 (0.8)	0.59
3	372	194 (52.2)	51 (13.7)	8 (2.2)	0.68
All	1,179	518 (43.9)	122 (10.3)	16 (1.4)	0.56

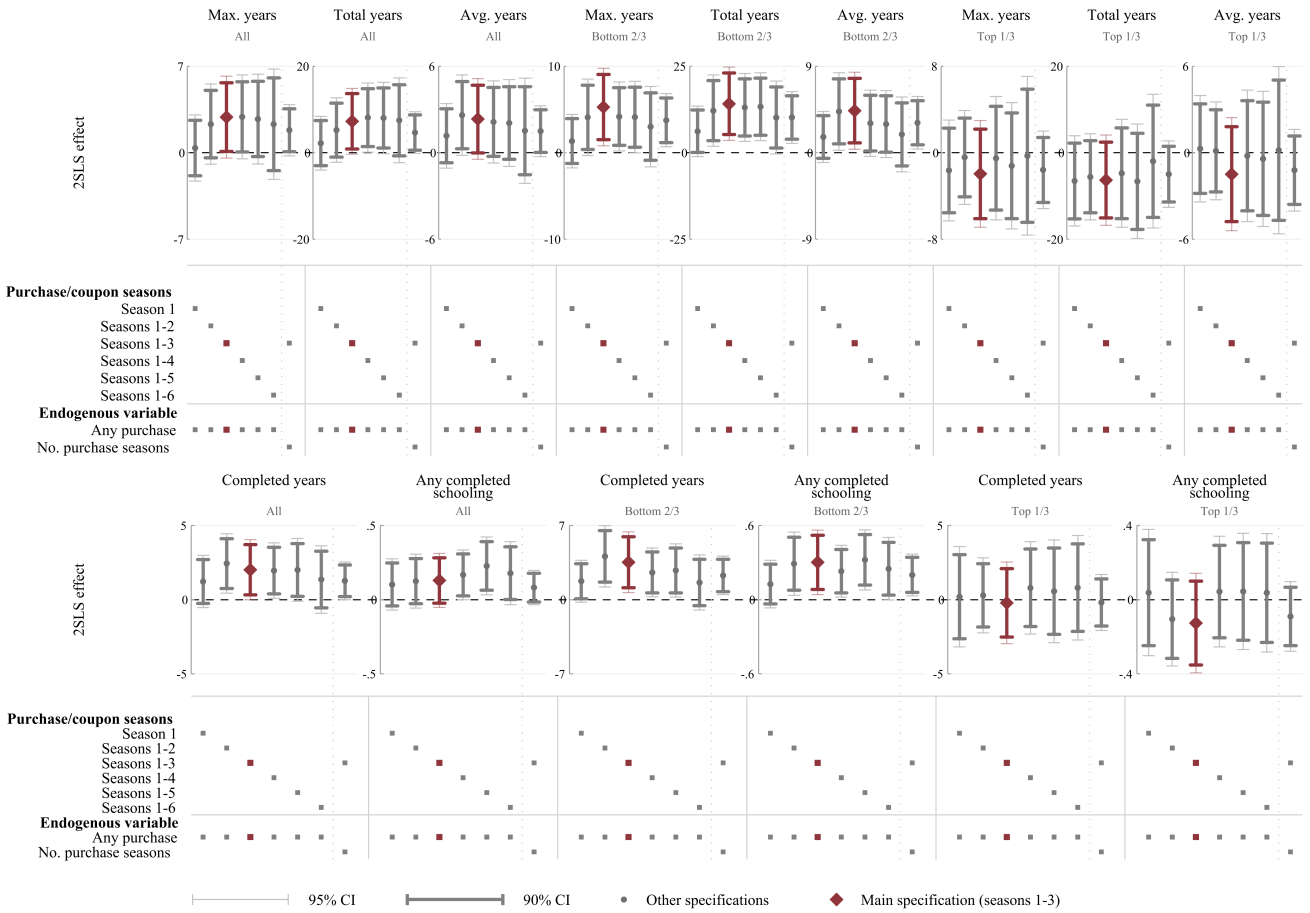
Notes: This table relates the number of randomly assigned discount coupons received by a household to its IBLI purchases during the first three sales seasons. Entries are household counts, with row percentages in parentheses; the final column of Panel B reports means. Panel A reports the distribution of the number of seasons with any IBLI purchase. Panel B reports purchases in at least one, two, or three seasons and the mean number of seasons with a purchase. Both panels include all 1,179 households.

Figure B1: Specification Chart: Sensitivity of Long-Term IV Estimates to Treatment and Instrument Definitions—Livestock Outcomes



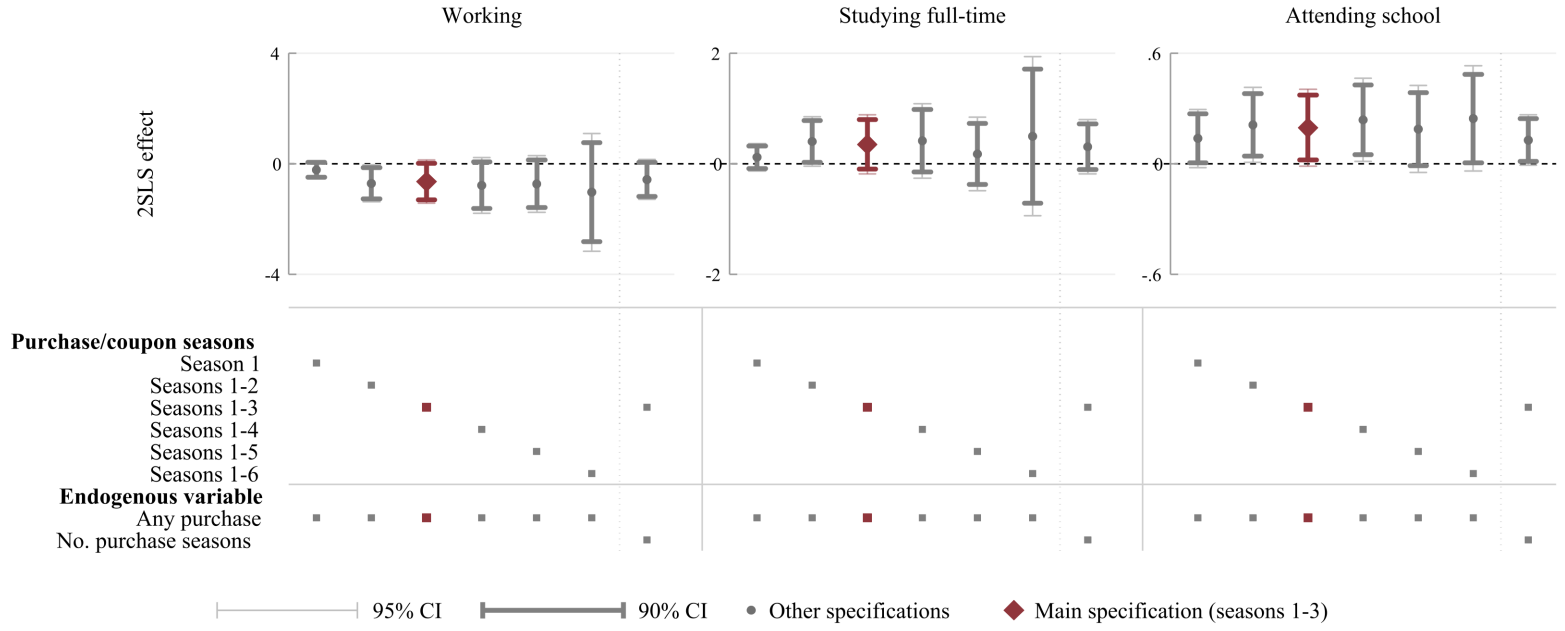
Notes: This figure examines the sensitivity of the long-term IV estimates for livestock outcomes to alternative definitions of insurance purchase and its randomized discount-coupon instrument. Within each outcome block, the first six estimates use windows $s = 1, \ldots, 6$: an indicator for any purchase during seasons 1–s is instrumented by the total number of coupons received during the same seasons. The seventh estimate instead instruments the number of seasons purchased during seasons 1–3 with coupons received during those seasons. The maroon diamond is the preferred seasons 1–3 specification; gray circles are alternatives. Thick inner and thin outer bars are 90% and 95% confidence intervals based on heteroskedasticity-robust standard errors, respectively. The dashed line is zero, and the aligned matrix identifies each estimate's window and endogenous variable. The dependent variables in the first two outcome blocks are the numbers of large and small animals as shares of total household herd size. The remaining outcome blocks are numbers of large and small animals in CMVE. The share outcomes exclude households that do not herd any livestock. The CMVE outcomes are presented for the full sample, households in the bottom two-thirds of the community herd-size distribution ("Low/mid TLU"), and households in the top one-third ("High TLU"). Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All models also include the corresponding baseline outcome and, where applicable, the total number of coupons received in subsequent sales seasons through season 6. No subsequent-season coupon control is included for the six-season window. Community fixed effects are included as randomization was stratified at community level. Estimates and randomization-inference p-values are reported in Table 4 and Appendix Tables B2, B6, B9, B12, B15, and B18.

Figure B2: Specification Chart: Sensitivity of Long-Term IV Estimates to Treatment and Instrument Definitions—Education Outcomes



Notes: This figure examines the sensitivity of the long-term IV estimates for education outcomes to alternative definitions of insurance purchase and its randomized discount-coupon instrument. Within each outcome block, the first six estimates use windows $s = 1, \ldots, 6$: an indicator for any purchase during seasons 1–s is instrumented by the total number of coupons received during the same seasons. The seventh estimate instead instruments the number of seasons purchased during seasons 1–3 with coupons received during those seasons. The maroon diamond is the preferred seasons 1–3 specification; gray circles are alternatives. Thick inner and thin outer bars are 90% and 95% confidence intervals based on heteroskedasticity-robust standard errors for household-level outcomes and standard errors clustered at the household level for individual-level outcomes, respectively. The dashed line is zero, and the aligned matrix identifies each estimate's window and endogenous variable. Coefficients are reported in the original units of each outcome. Each outcome has its own symmetric vertical scale, so magnitudes should be compared across specifications within an outcome, not across outcomes. The dependent variables are the maximum, total, and average years of education of household members who were school-aged during at least part of the first three sales seasons. The second part of the figure reports completed years of education and an indicator for positive completed years of education for the same individual records. These household members are aged 15–29 years in Kenya and 15–17 years in Ethiopia at the long-term follow-up. Results are presented for the full education-outcome sample, households in the bottom two-thirds of the community herd-size distribution ("Low/mid TLU"), and households in the top one-third ("High TLU"). Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. The individual-level models additionally include sex and country-by-age fixed effects and use standard errors clustered at the household level. All models also include the corresponding baseline outcome and, where applicable, the total number of coupons received in subsequent sales seasons through season 6. No subsequent-season coupon control is included for the six-season window.. Community fixed effects are included as randomization was stratified at community level. Estimates and randomization-inference p-values are reported in Table 5 and Appendix Tables B3, B7, B10, B13, B16, and B19.

Figure B3: Specification Chart: Sensitivity of Long-Term IV Estimates to Treatment and Instrument Definitions—Child Time-Use Outcomes



Notes: This figure examines the sensitivity of the long-term IV estimates for child time use and school attendance to alternative definitions of insurance purchase and its randomized discount-coupon instrument. Within each outcome block, the first six estimates use windows $s = 1, \ldots, 6$: an indicator for any purchase during seasons 1–s is instrumented by the total number of coupons received during the same seasons. The seventh estimate instead instruments the number of seasons purchased during seasons 1–3 with coupons received during those seasons. The maroon diamond is the preferred seasons 1–3 specification; gray circles are alternatives. Thick inner and thin outer bars are 90% and 95% confidence intervals based on heteroskedasticity-robust standard errors, respectively. The dashed line is zero, and the aligned matrix identifies each estimate's window and endogenous variable. Coefficients are reported in the original units of each outcome. Each outcome has its own symmetric vertical scale, so magnitudes should be compared across specifications within an outcome, not across outcomes. For Ethiopia in 2022, the working share counts school-aged children (7–17) working in either primary or secondary activity, including economic and domestic work, as a share of all children in the household. The studying-full-time share uses the same denominator and counts school-aged children studying in either activity with no work in either. Each activity equation includes its own observed baseline share with the same age and denominator rules; undefined baseline or endline shares are excluded. Attendance is the household share of children aged 6–17 in Kenya in 2020 and 7–17 in Ethiopia in 2022 attending school, with children in these age ranges as the denominator. The attendance baseline control is the mean of observed attendance among all children in the household, with an undefined household mean filled with zero and no missing-value indicator. Outcomes are proportions, so a coefficient of 0.10 represents a 10-percentage-point change. All models also include the corresponding baseline outcome and, where applicable, the total number of coupons received in subsequent sales seasons through season 6. No subsequent-season coupon control is included for the six-season window. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size.. Community fixed effects are included as randomization was stratified at community level. Estimates and randomization-inference p-values are reported in Appendix Tables B4, B8, B11, B14, B17, B20, and E4 (columns 6, 8, and 10).

Table B2: Effects on livestock holdings with the number of IBLI as the endogenous variable

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of insurance-purchase seasons	0.143	-0.143	3.848	-0.856	-2.687	-2.428	13.434	1.504
	(0.056)	(0.056)	(0.319)	(0.302)	(0.539)	(0.044)	(0.072)	(0.233)
	[0.048]	[0.048]	[0.255]	[0.442]	[0.554]	[0.070]	[0.045]	[0.652]
	{0.023}	{0.023}	{0.210}	{0.416}	{0.514}	{0.048}	{0.022}	{0.660}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
ITT coefficient (per coupon)	0.024	-0.024	0.643	-0.143	-0.307	-0.347	2.478	0.264
p-value threshold interaction					0.059	0.023	0.059	0.023
Sanderson-Windmeijer *F*-stat.					30.91	30.88	22.65	22.53
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated IV effects of an additional season in which insurance was purchased during the initial three seasons on herd composition. The number of insurance-purchase seasons is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1 and 2 are the share of animals household herds. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in a single interaction model. Columns 5–6 examine households in the lower two terciles of within community baseline herd-size, while Columns 7–8 is restricted to those in the top tercile. The group-specific number-of-insurance-purchase-seasons terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B3: Effects on education with the number of IBLI as the endogenous variable

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Number of insurance-purchase seasons	1.831	4.680	1.500	1.275	0.082
	(0.083)	(0.058)	(0.095)	(0.050)	(0.163)
	[0.096]	[0.059]	[0.101]	[0.045]	[0.186]
	{0.052}	{0.032}	{0.065}	{0.029}	{0.143}
Controls	✓	✓	✓	✓	✓
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon)	0.314	0.816	0.255	0.266	0.017
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Number of insurance-purchase seasons × Bottom 2/3	3.760	10.220	3.123	2.293	0.200
	(0.016)	(0.007)	(0.025)	(0.014)	(0.020)
	[0.008]	[0.001]	[0.009]	[0.008]	[0.016]
	{0.002}	{0.001}	{0.004}	{0.004}	{0.006}
Controls	✓	✓	✓	✓	✓
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon)	0.585	1.593	0.474	0.424	0.036
p-value threshold interaction	0.030	0.007	0.036	0.065	0.026
Sanderson-Windmeijer *F*-stat.	17.93	18.40	17.36	21.12	21.09
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Number of insurance-purchase seasons × Top 1/3	-1.580	-4.928	-1.205	-0.189	-0.090
	(0.386)	(0.209)	(0.404)	(0.845)	(0.348)
	[0.446]	[0.255]	[0.473]	[0.768]	[0.303]
	{0.394}	{0.203}	{0.409}	{0.767}	{0.253}
Controls	✓	✓	✓	✓	✓
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon)	-0.246	-0.785	-0.198	-0.069	-0.025
p-value threshold interaction	0.030	0.007	0.036	0.065	0.026
Sanderson-Windmeijer *F*-stat.	15.01	15.28	15.08	22.04	22.12
Observations	736	736	736	1431	1431

Notes: This table presents estimated IV effects of an additional season in which insurance was purchased during the initial three seasons on education outcomes. The number of insurance-purchase seasons is instrumented by the number of discount coupons received in the first three seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific number-of-insurance-purchase-seasons terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first three seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B4: Effects on child time use with the number of IBLI as the endogenous variable

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Number of insurance-purchase seasons	-0.560	0.312	0.130
	(0.132)	(0.211)	(0.065)
	[0.039]	[0.174]	[0.067]
	{0.006}	{0.089}	{0.048}
Controls	✓	✓	✓
Control mean	0.657	0.025	0.582
Purchaser mean	0.440	0.214	0.620
ITT coefficient (per coupon)	-0.050	0.027	0.021
First-stage *F*-stat.	4.23	4.17	48.88
Observations	362	362	1073

Notes: The table presents estimated IV effects of an additional season in which insurance was purchased during the initial three seasons, instrumented by the number of discount coupons received during those seasons, on child time-use outcomes. Both activity shares use all children in the household as the denominator. The working share counts children aged 7–17 who work in either their primary or secondary activity. The studying-full-time share counts children aged 7–17 who study in either activity and do not work in either. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. The attendance baseline control is the mean observed attendance among all children in the household.x Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports the raw outcome mean among households receiving no coupons in the first three seasons, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. Columns 1 and 2 use 362 Ethiopian households; column 3 uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "First-stage *F*-stat." reports the heteroskedasticity-robust *F*-statistic testing the excluded coupon instrument in the first-stage regression, using the estimation sample and controls of each column.

Table B5: Coupon receipt and insurance take-up across alternative sales-season horizons

Panel A. Sales-season horizon	Coupons received	No. of households	Any IBLI purchase: No	Any IBLI purchase: Yes
Season 1	0	411	362 (88.1)	49 (11.9)
	1	768	483 (62.9)	285 (37.1)
Seasons 1–2	0	151	126 (83.4)	25 (16.6)
	1	519	339 (65.3)	180 (34.7)
	2	509	267 (52.5)	242 (47.5)
Seasons 1–4	0	40	32 (80.0)	8 (20.0)
	1	129	92 (71.3)	37 (28.7)
	2	321	178 (55.5)	143 (44.5)
	3	425	204 (48.0)	221 (52.0)
	4	264	121 (45.8)	143 (54.2)
Seasons 1–5	0	20	15 (75.0)	5 (25.0)
	1	81	58 (71.6)	23 (28.4)
	2	182	106 (58.2)	76 (41.8)
	3	343	178 (51.9)	165 (48.1)
	4	363	153 (42.1)	210 (57.9)
	5	190	78 (41.1)	112 (58.9)
Seasons 1–6	0	12	9 (75.0)	3 (25.0)
	1	26	18 (69.2)	8 (30.8)
	2	106	65 (61.3)	41 (38.7)
	3	219	117 (53.4)	102 (46.6)
	4	329	161 (48.9)	168 (51.1)
	5	338	132 (39.1)	206 (60.9)
	6	149	59 (39.6)	90 (60.4)

Panel B. Coupons received	No. of households	Purchased in at least: 1	Purchased in at least: 2	Purchased in at least: 3	Mean
0	69	14 (20.3)	2 (2.9)	1 (1.4)	0.25
1	265	88 (33.2)	15 (5.7)	3 (1.1)	0.40
2	473	222 (46.9)	54 (11.4)	4 (0.8)	0.59
3	372	194 (52.2)	51 (13.7)	8 (2.2)	0.68
All	1,179	518 (43.9)	122 (10.3)	16 (1.4)	0.56

Notes: This table relates the number of discount coupons received to insurance purchases over alternative sales-season horizons. Entries are household counts, with row percentages in parentheses; the final column of Panel B reports means. In Panel A, "No" and "Yes" count households that did not purchase and purchased insurance at least once, respectively, within the stated horizon; coupon counts cover the same horizon. Panel B reports purchases in at least one, two, or three of the first three sales seasons and the mean number of seasons with a purchase during those seasons. All horizons include the same 1,179 households.

Table B6: Effects on livestock holdings using coupon assignments from all six sales seasons

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.325	-0.325	8.827	-2.661	1.638	-4.016	25.101	0.331
	(0.072)	(0.072)	(0.196)	(0.218)	(0.800)	(0.070)	(0.066)	(0.923)
	[0.049]	[0.049]	[0.224]	[0.280]	[0.901]	[0.122]	[0.054]	[0.886]
	{0.009}	{0.009}	{0.093}	{0.135}	{0.894}	{0.034}	{0.006}	{0.863}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.250	0.750	0.333	4.065	0.364	4.435	0.000	0.000
Purchaser mean	0.642	0.358	9.487	2.640	6.801	2.320	14.744	3.268
ITT coefficient (per coupon)	0.016	-0.016	0.483	-0.145	-0.041	-0.239	1.631	0.062
p-value threshold interaction					0.065	0.162	0.065	0.162
Sanderson-Windmeijer *F*-stat.					23.82	23.51	14.13	14.03
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first six seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first six seasons. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first six sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first six sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-six-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first six seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first six seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first six sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B7: Effects on education using all six seasons as instruments

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.313	7.518	1.530	1.363	0.179
	(0.310)	(0.133)	(0.411)	(0.241)	(0.099)
	[0.331]	[0.150]	[0.439]	[0.262]	[0.134]
	{0.205}	{0.060}	{0.313}	{0.153}	{0.053}
Controls	✓	✓	✓	✓	✓
Control mean	4.889	7.333	4.333	4.714	0.429
Purchaser mean	6.951	11.956	5.554	6.144	0.681
ITT coefficient (per coupon)	0.129	0.439	0.086	0.107	0.014
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	3.023	10.196	1.917	1.621	0.250
	(0.202)	(0.058)	(0.335)	(0.223)	(0.053)
	[0.189]	[0.050]	[0.351]	[0.263]	[0.058]
	{0.092}	{0.011}	{0.224}	{0.143}	{0.012}
Controls	✓	✓	✓	✓	✓
Control mean	5.500	8.250	4.875	5.077	0.462
Purchaser mean	7.088	12.835	5.563	6.182	0.687
ITT coefficient (per coupon)	0.206	0.724	0.126	0.131	0.020
p-value threshold interaction	0.361	0.129	0.557	0.690	0.261
Sanderson-Windmeijer *F*-stat.	17.68	19.42	17.66	20.26	20.18
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-0.277	-1.947	0.179	0.812	0.038
	(0.941)	(0.805)	(0.952)	(0.651)	(0.817)
	[0.838]	[0.674]	[0.969]	[0.739]	[0.977]
	{0.813}	{0.604}	{0.956}	{0.709}	{0.976}
Controls	✓	✓	✓	✓	✓
Control mean	0.000	0.000	0.000	0.000	0.000
Purchaser mean	6.705	10.381	5.539	6.063	0.668
ITT coefficient (per coupon)	-0.047	-0.205	-0.008	0.051	-0.001
p-value threshold interaction	0.361	0.129	0.557	0.690	0.261
Sanderson-Windmeijer *F*-stat.	8.16	8.42	8.49	14.99	15.00
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first six seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first six seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-six-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first six sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first six sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first six seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first six seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first six sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B8: Effects on child time use using all six seasons as instruments

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-1.021	0.503	0.247
	(0.347)	(0.494)	(0.090)
	[0.192]	[0.454]	[0.091]
	{0.052}	{0.273}	{0.047}
Controls	✓	✓	✓
Control mean	0.575	0.000	0.444
Purchaser mean	0.438	0.221	0.620
ITT coefficient (per coupon)	-0.022	0.010	0.014
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase during seasons 1–6, instrumented by the number of discount coupons received during seasons 1–6, on child time-use outcomes. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All regressions control for the corresponding baseline outcome. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the six sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during all six sales seasons. The row "Control mean" reports the raw outcome mean among households receiving no coupons during seasons 1–6, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first six sales seasons, estimated by OLS.

Table B9: Effects on livestock holdings using coupon assignment from the first sales season

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.202	-0.202	5.562	-0.702	1.395	-2.386	14.637	2.909
	(0.017)	(0.017)	(0.151)	(0.506)	(0.707)	(0.021)	(0.073)	(0.297)
	[0.009]	[0.009]	[0.147]	[0.580]	[0.757]	[0.039]	[0.089]	[0.471]
	{0.009}	{0.009}	{0.147}	{0.580}	{0.757}	{0.039}	{0.089}	{0.471}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.551	0.449	8.588	3.000	6.940	2.844	11.922	3.315
Purchaser mean	0.628	0.372	9.541	2.628	6.672	2.246	15.385	3.407
ITT coefficient (per coupon)	0.051	-0.051	1.411	-0.178	0.281	-0.620	3.773	0.725
p-value threshold interaction					0.118	0.085	0.118	0.085
Sanderson-Windmeijer *F*-stat.					86.70	86.86	42.33	42.20
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first sales season on herd composition. Insurance purchase is instrumented by coupon receipt in the first sales season. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt within community in the first sales season. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the number of coupons received during the first sales season within community. Because coupon receipt and the cumulative coupon count are identical over a single season, the bracketed and braced randomization-inference *p*-values are identical by construction. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 2–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the lower two terciles of within-community baseline herd-size, while Columns 7–8 focus on those in the top tercile. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-season coupon assignment and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive a coupon in the first sales season, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first sales season, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of receiving a discount coupon in the first sales season, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B10: Effects of IBLI purchase in season 1 on education

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	0.386	2.226	1.180	1.226	0.102
	(0.777)	(0.483)	(0.301)	(0.173)	(0.246)
	[0.781]	[0.473]	[0.292]	[0.181]	[0.255]
	{0.781}	{0.473}	{0.292}	{0.181}	{0.255}
Controls	✓	✓	✓	✓	✓
Control mean	7.302	12.736	5.505	6.103	0.662
Purchaser mean	7.305	12.850	5.770	6.468	0.706
ITT coefficient (per coupon)	0.090	0.525	0.275	0.315	0.026
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	1.352	6.204	1.651	1.747	0.127
	(0.390)	(0.096)	(0.222)	(0.083)	(0.196)
	[0.327]	[0.060]	[0.207]	[0.084]	[0.181]
	{0.327}	{0.060}	{0.207}	{0.084}	{0.181}
Controls	✓	✓	✓	✓	✓
Control mean	7.030	11.837	5.299	5.762	0.642
Purchaser mean	7.579	14.605	5.895	6.727	0.733
ITT coefficient (per coupon)	0.370	1.683	0.409	0.493	0.035
p-value threshold interaction	0.273	0.042	0.538	0.421	0.644
Sanderson-Windmeijer *F*-stat.	45.80	46.24	44.29	42.50	41.96
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.630	-6.506	0.285	0.198	0.038
	(0.493)	(0.222)	(0.880)	(0.909)	(0.826)
	[0.505]	[0.228]	[0.896]	[0.930]	[0.841]
	{0.505}	{0.228}	{0.896}	{0.930}	{0.841}
Controls	✓	✓	✓	✓	✓
Control mean	7.758	14.242	5.850	6.651	0.693
Purchaser mean	6.743	9.243	5.512	5.748	0.630
ITT coefficient (per coupon)	-0.378	-1.504	0.064	0.037	0.008
p-value threshold interaction	0.273	0.042	0.538	0.421	0.644
Sanderson-Windmeijer *F*-stat.	21.94	22.23	22.28	20.78	20.73
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first sales season on education outcomes. Insurance purchase is instrumented by coupon receipt in the first sales season. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-season coupon assignment and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt within community in the first sales season. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the number of coupons received during the first sales season within community. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 2–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive a coupon in the first sales season, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first sales season, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of receiving a discount coupon in the first sales season, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B11: Effects of IBLI purchase in season 1 on child time use

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-0.211	0.122	0.139
	(0.197)	(0.332)	(0.085)
	[0.172]	[0.341]	[0.068]
	{0.172}	{0.341}	{0.068}
Controls	✓	✓	✓
Control mean	0.485	0.192	0.592
Purchaser mean	0.434	0.218	0.640
ITT coefficient (per coupon)	-0.056	0.033	0.036
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in season 1, instrumented by the coupon assignment in season 1, on child time-use outcomes. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 2–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference p-values from 2,000 replications that re-randomize coupon receipt within community in the first sales season. Braces { } report Anderson–Rubin randomization-inference p-values from 2,000 replications that permute the number of coupons received during the first sales season within community. The row "Control mean" reports the raw outcome mean among households receiving no coupon in season 1, and the row "Purchaser mean" reports the raw outcome mean among households purchasing insurance in season 1. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first sales season, estimated by OLS.

Table B12: Effects on livestock holdings using coupon assignments from the first two sales seasons

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.248	-0.248	10.001	0.662	-1.274	-2.650	26.725	5.652
	(0.028)	(0.028)	(0.083)	(0.659)	(0.828)	(0.093)	(0.008)	(0.089)
	[0.011]	[0.011]	[0.028]	[0.646]	[0.766]	[0.098]	[0.001]	[0.040]
	{0.009}	{0.009}	{0.025}	{0.664}	{0.739}	{0.109}	{0.001}	{0.033}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.567	0.433	9.405	3.102	9.207	3.214	9.884	2.831
Purchaser mean	0.633	0.367	9.555	2.675	6.634	2.251	15.514	3.541
ITT coefficient (per coupon)	0.035	-0.035	1.465	0.097	-0.202	-0.368	5.000	1.091
p-value threshold interaction					0.008	0.026	0.008	0.026
Sanderson-Windmeijer *F*-stat.					37.30	37.37	37.51	37.09
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first two seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first two seasons. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first two sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first two sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 3–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-two-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first two seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first two seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first two sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B13: Effects of IBLI purchase in season 1-2 on education

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.321	5.257	2.612	2.441	0.125
	(0.161)	(0.166)	(0.066)	(0.017)	(0.176)
	[0.156]	[0.149]	[0.063]	[0.012]	[0.186]
	{0.132}	{0.137}	{0.045}	{0.013}	{0.175}
Controls	✓	✓	✓	✓	✓
Control mean	7.190	12.770	5.382	5.967	0.659
Purchaser mean	7.010	12.346	5.598	6.238	0.685
ITT coefficient (per coupon)	0.326	0.745	0.363	0.405	0.021
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	4.095	12.182	4.304	4.091	0.291
	(0.069)	(0.021)	(0.036)	(0.006)	(0.026)
	[0.039]	[0.004]	[0.012]	[0.002]	[0.015]
	{0.026}	{0.004}	{0.008}	{0.001}	{0.012}
Controls	✓	✓	✓	✓	✓
Control mean	7.045	11.358	5.207	5.475	0.612
Purchaser mean	6.984	13.511	5.466	6.307	0.693
ITT coefficient (per coupon)	0.563	1.718	0.574	0.635	0.046
p-value threshold interaction	0.121	0.009	0.093	0.035	0.020
Sanderson-Windmeijer *F*-stat.	21.79	21.94	20.69	20.60	20.34
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-0.427	-5.557	0.138	0.293	-0.104
	(0.847)	(0.273)	(0.937)	(0.821)	(0.418)
	[0.764]	[0.178]	[0.918]	[0.904]	[0.299]
	{0.744}	{0.164}	{0.915}	{0.911}	{0.291}
Controls	✓	✓	✓	✓	✓
Control mean	7.485	15.636	5.737	6.880	0.747
Purchaser mean	7.061	10.111	5.850	6.067	0.667
ITT coefficient (per coupon)	-0.123	-1.146	-0.034	-0.034	-0.030
p-value threshold interaction	0.121	0.009	0.093	0.035	0.020
Sanderson-Windmeijer *F*-stat.	21.91	22.31	22.72	34.69	35.42
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first two seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first two seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-two-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first two sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first two sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 3–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first two seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first two seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first two sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B14: Effects of IBLI purchase in season 1-2 on child time use

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-0.701	0.408	0.212
	(0.040)	(0.074)	(0.041)
	[0.003]	[0.040]	[0.026]
	{0.001}	{0.023}	{0.028}
Controls	✓	✓	✓
Control mean	0.574	0.142	0.603
Purchaser mean	0.433	0.212	0.627
ITT coefficient (per coupon)	-0.085	0.050	0.031
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase during seasons 1–2, instrumented by the number of discount coupons received during seasons 1–2, on child time-use outcomes. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 3–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first two sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first two sales seasons. The row "Control mean" reports the raw outcome mean among households receiving no coupons during seasons 1–2, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first two sales seasons, estimated by OLS.

Table B15: Effects on livestock holdings using coupon assignments from the first four sales seasons

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.254	-0.254	7.535	-2.538	0.066	-3.865	18.832	-0.565
	(0.036)	(0.036)	(0.208)	(0.220)	(0.991)	(0.054)	(0.099)	(0.868)
	[0.031]	[0.031]	[0.183]	[0.153]	[0.978]	[0.071]	[0.069]	[0.926]
	{0.009}	{0.009}	{0.084}	{0.103}	{0.986}	{0.034}	{0.020}	{0.919}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.495	0.505	4.475	2.676	4.538	3.238	4.309	1.197
Purchaser mean	0.632	0.368	9.530	2.656	6.663	2.299	15.080	3.347
ITT coefficient (per coupon)	0.022	-0.022	0.661	-0.223	0.009	-0.315	1.919	-0.049
p-value threshold interaction					0.114	0.286	0.114	0.286
Sanderson-Windmeijer *F*-stat.					27.84	27.76	22.91	22.50
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first four seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first four seasons. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first four sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first four sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 5–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-four-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first four seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first four seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first four sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B16: Effects of IBLI purchase in season 1-4 on education

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.909	8.143	2.143	1.966	0.168
	(0.093)	(0.045)	(0.140)	(0.040)	(0.051)
	[0.092]	[0.038]	[0.154]	[0.046]	[0.066]
	{0.047}	{0.016}	{0.088}	{0.016}	{0.032}
Controls	✓	✓	✓	✓	✓
Control mean	7.667	14.148	5.982	6.262	0.656
Purchaser mean	7.059	12.281	5.624	6.237	0.683
ITT coefficient (per coupon)	0.264	0.759	0.195	0.240	0.020
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	4.190	13.108	3.077	2.574	0.230
	(0.039)	(0.009)	(0.080)	(0.029)	(0.031)
	[0.026]	[0.002]	[0.067]	[0.026]	[0.038]
	{0.010}	{0.001}	{0.030}	{0.005}	{0.013}
Controls	✓	✓	✓	✓	✓
Control mean	7.316	12.789	5.606	5.523	0.614
Purchaser mean	7.222	13.300	5.656	6.320	0.692
ITT coefficient (per coupon)	0.413	1.334	0.300	0.314	0.028
p-value threshold interaction	0.156	0.019	0.231	0.364	0.316
Sanderson-Windmeijer *F*-stat.	24.39	25.55	23.78	29.98	30.03
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-0.502	-4.744	-0.207	0.798	0.044
	(0.863)	(0.456)	(0.929)	(0.615)	(0.772)
	[0.841]	[0.435]	[0.909]	[0.675]	[0.854]
	{0.831}	{0.375}	{0.880}	{0.660}	{0.837}
Controls	✓	✓	✓	✓	✓
Control mean	8.500	17.375	6.875	8.176	0.765
Purchaser mean	6.762	10.421	5.565	6.051	0.664
ITT coefficient (per coupon)	-0.052	-0.450	-0.028	0.083	0.004
p-value threshold interaction	0.156	0.019	0.231	0.364	0.316
Sanderson-Windmeijer *F*-stat.	11.32	11.72	11.72	20.02	19.94
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first four seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first four seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-four-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first four sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first four sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 5–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first four seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first four seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first four sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B17: Effects of IBLI purchase in season 1-4 on child time use

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-0.771	0.418	0.240
	(0.133)	(0.223)	(0.037)
	[0.037]	[0.195]	[0.044]
	{0.005}	{0.087}	{0.024}
Controls	✓	✓	✓
Control mean	0.571	0.031	0.559
Purchaser mean	0.441	0.215	0.618
ITT coefficient (per coupon)	-0.041	0.022	0.021
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase during seasons 1–4, instrumented by the number of discount coupons received during seasons 1–4, on child time-use outcomes. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 5–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first four sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first four sales seasons. The row "Control mean" reports the raw outcome mean among households receiving no coupons during seasons 1–4, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. A dot in the "Control mean" row indicates that no estimation-sample household met the corresponding no-coupon definition. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first four sales seasons, estimated by OLS.

Table B18: Effects on livestock holdings using coupon assignments from the first five sales seasons

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.288	-0.288	9.242	-2.890	1.426	-4.578	21.196	-0.295
	(0.040)	(0.040)	(0.160)	(0.141)	(0.810)	(0.032)	(0.082)	(0.918)
	[0.023]	[0.023]	[0.123]	[0.127]	[0.863]	[0.050]	[0.037]	[0.983]
	{0.007}	{0.007}	{0.045}	{0.083}	{0.831}	{0.014}	{0.008}	{0.980}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.342	0.658	1.920	3.306	2.259	3.831	0.000	0.328
Purchaser mean	0.637	0.363	9.537	2.670	6.861	2.326	14.810	3.349
ITT coefficient (per coupon)	0.020	-0.020	0.677	-0.211	0.070	-0.319	1.912	0.009
p-value threshold interaction					0.092	0.110	0.092	0.110
Sanderson-Windmeijer *F*-stat.					27.46	27.25	23.46	23.17
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first five seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first five seasons. The dependent variables in columns 1 and 2 are the share of large and small animals households herd. Columns 3–8 are numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first five sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first five sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales season 6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–8 report group-specific treatment effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-five-season coupon count and the herd-size tercile indicators. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first five seasons, calculated within the group reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first five seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first five sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table B19: Effects of IBLI purchase in season 1-5 on education

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.733	8.056	2.066	2.009	0.228
	(0.140)	(0.056)	(0.177)	(0.064)	(0.022)
	[0.159]	[0.064]	[0.193]	[0.072]	[0.035]
	{0.075}	{0.016}	{0.103}	{0.024}	{0.007}
Controls	✓	✓	✓	✓	✓
Control mean	7.077	11.462	6.077	6.773	0.591
Purchaser mean	6.941	11.912	5.534	6.120	0.676
ITT coefficient (per coupon)	0.207	0.628	0.157	0.191	0.022
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	4.123	13.332	2.987	2.765	0.323
	(0.051)	(0.008)	(0.094)	(0.032)	(0.009)
	[0.026]	[0.004]	[0.072]	[0.028]	[0.004]
	{0.011}	{0.000}	{0.036}	{0.006}	{0.001}
Controls	✓	✓	✓	✓	✓
Control mean	6.500	8.700	5.400	5.438	0.500
Purchaser mean	7.066	12.843	5.545	6.179	0.682
ITT coefficient (per coupon)	0.358	1.205	0.253	0.270	0.032
p-value threshold interaction	0.103	0.009	0.207	0.288	0.149
Sanderson-Windmeijer *F*-stat.	25.02	26.56	24.65	22.98	22.85
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.205	-6.585	-0.420	0.571	0.045
	(0.685)	(0.329)	(0.861)	(0.747)	(0.778)
	[0.641]	[0.259]	[0.815]	[0.889]	[0.970]
	{0.585}	{0.190}	{0.774}	{0.855}	{0.965}
Controls	✓	✓	✓	✓	✓
Control mean	9.000	20.667	8.333	10.333	0.833
Purchaser mean	6.712	10.205	5.512	5.987	0.662
ITT coefficient (per coupon)	-0.116	-0.584	-0.049	0.026	0.001
p-value threshold interaction	0.103	0.009	0.207	0.288	0.149
Sanderson-Windmeijer *F*-stat.	10.66	11.04	10.98	15.88	16.00
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first five seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first five seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-five-season coupon count and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first five sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first five sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales season 6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among observations from households that did not receive any coupons in the first five seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first five seasons, also calculated within the corresponding group. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first five sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table B20: Effects of IBLI purchase in season 1-5 on child time use

	Household shares		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-0.720	0.182	0.190
	(0.170)	(0.590)	(0.116)
	[0.069]	[0.615]	[0.136]
	{0.014}	{0.466}	{0.084}
Controls	✓	✓	✓
Control mean	0.494	0.000	0.539
Purchaser mean	0.444	0.214	0.614
ITT coefficient (per coupon)	-0.032	0.008	0.014
Observations	362	362	1073

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first five seasons on child time-use outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first five seasons. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales season 6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first five sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first five sales seasons. The row "Control mean" reports the raw outcome mean among households receiving no coupons during seasons 1–5, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. A dot in the "Control mean" row indicates that no estimation-sample household met the corresponding no-coupon definition. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first five sales seasons, estimated by OLS.

B.1 Characteristics of the complier population

Table B21: Baseline characteristics of compliance subpopulations

	Full sample (1)	Always-takers (2)	Never-takers (3)	Compliers (4)	Compliers/ full sample (5)
Estimated population share	1.000	0.198	0.471	0.331	
Panel A. Baseline household characteristics and country					
Age of household head (years)	48.10	46.13	47.96	49.47	1.03
		(0.698)	(0.895)	(0.699)	
Male-headed household	0.68	0.51	0.68	0.80	1.17
		(0.234)	(0.780)	(0.177)	
Household head's education (years)	0.87	0.08	0.91	1.29	1.48
		(0.338)	(0.791)	(0.427)	
Household size (adult equivalents)	4.77	5.37	4.66	4.56	0.96
		(0.375)	(0.294)	(0.632)	
Dependency ratio	1.30	1.21	1.30	1.35	1.04
		(0.769)	(0.941)	(0.804)	
Baseline herded stock (CMVE)	19.72	9.11	21.64	23.36	1.18
		(0.047)	(0.170)	(0.395)	
Monthly income per capita (USD)	7.77	7.81	7.83	7.66	0.99
		(0.990)	(0.927)	(0.956)	
Agricultural land (hectares)	0.60	1.69	0.43	0.18	0.29
		(0.039)	(0.067)	(0.148)	
Kenya (share)	0.66	0.60	0.65	0.71	1.07
		(0.660)	(0.704)	(0.571)	
Panel B. Baseline values of main outcomes					
Large-animal share of herd value	0.70	0.78	0.68	0.68	0.97
		(0.437)	(0.383)	(0.747)	
Large animals (CMVE)	15.59	7.85	16.94	18.30	1.17
		(0.100)	(0.259)	(0.458)	
Small animals (CMVE)	4.14	1.26	4.71	5.06	1.22
		(0.013)	(0.105)	(0.332)	
Maximum years of education	3.34	5.16	2.86	2.94	0.88
		(0.066)	(0.008)	(0.589)	
Total years of education	5.42	9.73	4.32	4.39	0.81
		(0.098)	(0.002)	(0.583)	
Average years of education	1.84	2.90	1.61	1.52	0.83
		(0.133)	(0.067)	(0.545)	
Completed education (household mean)	1.89	2.97	1.66	1.56	0.83
		(0.124)	(0.066)	(0.539)	
Panel C. Baseline herd-size distribution					
Share in bottom 1/3 of baseline herd-size distribution (%)	33.5	46.2	33.9	25.3	0.75
		(0.388)	(0.901)	(0.440)	
Share in middle 1/3 of baseline herd-size distribution (%)	33.5	43.1	32.8	28.7	0.86
		(0.510)	(0.847)	(0.636)	
Share in top 1/3 of baseline herd-size distribution (%)	33.0	10.8	33.2	46.0	1.39
		(0.024)	(0.949)	(0.145)	
Joint F-statistic: Panel A		1.56	0.80	0.60	
		{0.132}	{0.607}	{0.778}	
Joint F-statistic: Panel B		1.86	2.33	0.23	
		{0.085}	{0.030}	{0.967}	
Joint F-statistic: Panel C		2.56	0.02	1.06	
		{0.078}	{0.981}	{0.345}	
Observations	1,179				

Notes: The table presents estimated baseline means for the full sample and for three compliance subpopulations. Any insurance purchase refers to purchasing insurance at least once during the initial three sales seasons. Always-takers would purchase whether assigned zero or three discount coupons, never-takers would not purchase under either assignment, and compliers would purchase only when assigned three coupons. Columns (1)–(4) report the full-sample, always-taker, never-taker, and complier means, respectively; Column (5) reports the ratio of the complier mean to the full-sample mean. The compliance-group estimates control for the pre-specified household characteristics presented in Table 2, the number of discount coupons received during the final three seasons, and community fixed effects. Reported in parentheses are unadjusted p-values for tests that the corresponding compliance-group and full-sample means are equal. Braces report p-values from joint F-tests based on 2,000 household bootstrap draws within community. The joint tests cover the eight household characteristics in Panel A (excluding the country indicator), the first six baseline outcomes in Panel B (excluding "Completed education (household mean)"), and the first two herd-size-class indicators in Panel C. Data include 1,179 households. The education measures use household members ages 6–18 in Kenya and 7–19 in Ethiopia.

Table B22: Baseline characteristics of IV-weighted compliers

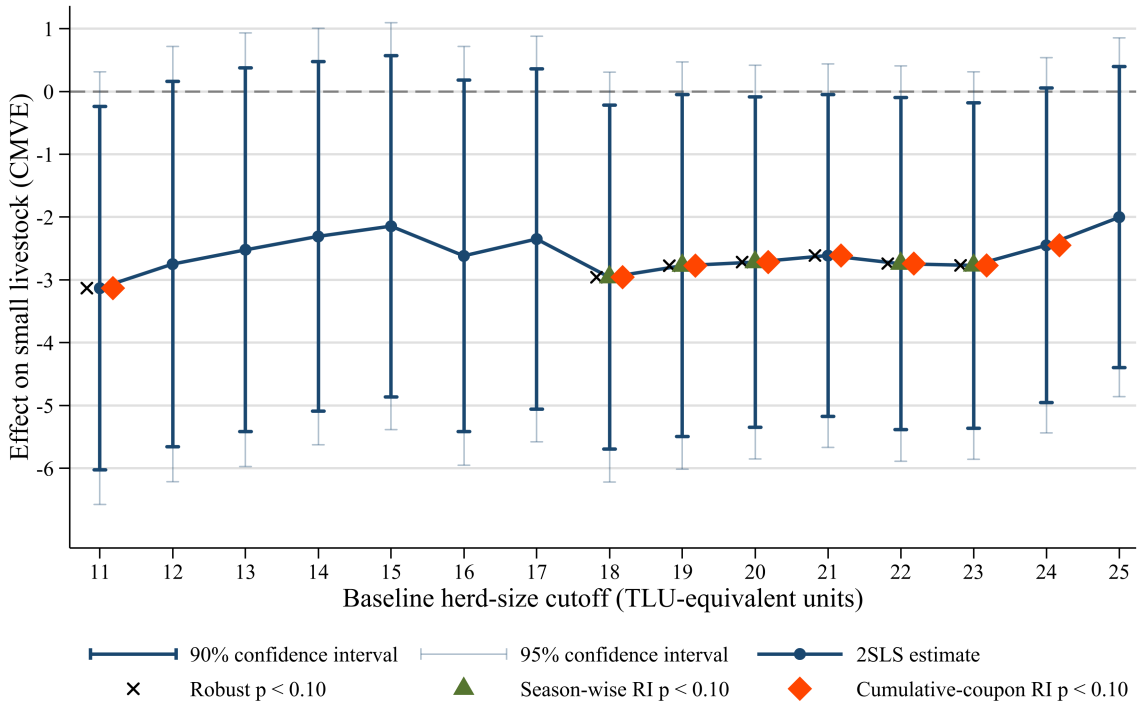
	Full sample (1)	IV-weighted compliers (2)	Standardized difference (3)	Compliers/ full sample (4)
Panel A. Baseline household characteristics and country				
Age of household head (years)	48.10	50.22	[0.123]	1.04
		(0.433)		
Male-headed household	0.68	0.74	[0.129]	1.09
		(0.396)		
Household head's education (years)	0.87	0.90	[0.009]	1.03
		(0.953)		
Household size (adult equivalents)	4.77	4.75	[-0.007]	1.00
		(0.963)		
Dependency ratio	1.30	1.33	[0.033]	1.03
		(0.828)		
Baseline herded stock (CMVE)	19.72	21.42	[0.068]	1.09
		(0.621)		
Monthly income per capita (USD)	7.77	8.69	[0.072]	1.12
		(0.609)		
Agricultural land (hectares)	0.60	0.34	[-0.148]	0.57
		(0.270)		
Kenya (share)	0.66	0.83	[0.360]	1.26
		(0.021)		
Panel B. Baseline values of main outcomes				
Large-animal share of herd value	0.70	0.66	[-0.141]	0.94
		(0.490)		
Large animals (CMVE)	15.59	16.12	[0.025]	1.03
		(0.856)		
Small animals (CMVE)	4.14	5.31	[0.203]	1.28
		(0.177)		
Maximum years of education	3.34	3.30	[-0.016]	0.99
		(0.939)		
Total years of education	5.42	5.04	[-0.063]	0.93
		(0.785)		
Average years of education	1.84	2.18	[0.193]	1.19
		(0.395)		
Completed education (household mean)	1.89	2.23	[0.192]	1.18
		(0.396)		
Panel C. Baseline herd-size distribution				
Share in bottom 1/3 of baseline herd-size distribution (%)	33.5	34.5	[0.021]	1.03
		(0.914)		
Share in middle 1/3 of baseline herd-size distribution (%)	33.5	18.2	[-0.324]	0.54
		(0.122)		
Share in top 1/3 of baseline herd-size distribution (%)	33.0	47.3	[0.304]	1.43
		(0.116)		
Joint F-statistic: Panel A		0.42		
		{0.908}		
Joint F-statistic: Panel B		1.07		
		{0.376}		
Joint F-statistic: Panel C		1.60		
		{0.203}		
Observations	1,179			

Notes: The table presents IV-weighted means of baseline characteristics for compliers. Any insurance purchase refers to purchasing insurance at least once during the initial three sales seasons and is instrumented by the number of discount coupons received during those seasons. Column (1) reports the full-sample mean. Column (2) reports the 2SLS coefficient on any insurance purchase in a regression of the product of each characteristic and purchase on purchase. Column (3) reports the difference between the complier and full-sample means divided by the full-sample standard deviation, in square brackets. Column (4) reports the ratio of the complier mean to the full-sample mean. All specifications include the pre-specified household characteristics presented in Table 2, the number of discount coupons received during the final three seasons, and community fixed effects. Reported in parentheses are unadjusted p-values for tests that the corresponding compliance-group and full-sample means are equal. Braces report p-values from joint F-tests based on 2,000 household bootstrap draws within community. The joint tests cover the eight household characteristics in Panel A (excluding the country indicator), the first six baseline outcomes in Panel B (excluding "Completed education (household mean)"), and the first two herd-size-class indicators in Panel C. Data include 1,179 households. The education measures use household members ages 6–18 in Kenya and 7–19 in Ethiopia.

Appendix C: Inference

This section provides the robustness tables (1) on community level clustering in Appendix Tables C1–C3, (2) sensitivity to the inclusion of control variables in Appendix Tables C4–C6, (3) sensitivity to outcome skewness and upper-tail observations in Appendix Tables C7–C8, together with the zero-holdings diagnostic in Appendix Figure C2, and (4) MHT in Appendix Tables C9–C10, (5) alternative instrument and endogenous-variable definitions in Appendix Tables B2–B4 and B6–B20. Appendix Table B5 reports take-up patterns under each of these alternative definitions. Take-up is non-decreasing in the coupon count for every horizon we consider except the full six-season window, where the probability of any purchase falls slightly between five and six coupons, from 60.9 to 60.4 percent. We attribute this to sampling noise rather than to a substantive violation, and note that the six-season estimates are in any case the least precise we report. We also report effects across quantiles of endline livestock holdings in Appendix Table C11 and heterogeneity in individual education effects by gender and age cohort in Appendix Tables C12–C13. Appendix Figure C3 provides complementary descriptive evidence on gender differences in children's work at baseline, reporting age- and country-adjusted participation in herding, other livestock-related activities, and domestic work.

Figure C1: Effect on small-animal holdings among below-threshold households, by baseline herd-size cutoff



Notes: The figure presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on the number of small animals households herd in CMVE. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Estimates are reported for households below alternative baseline herd-size cutoffs ranging from 11 to 25 TLU-equivalent units. For each cutoff, group-specific treatment effects for households below and above the cutoff are estimated jointly in the interaction model. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the below- and above-cutoff indicators. Because our main results are reported in CMVE (see footnote 3), each TLU cutoff is converted to CMVE using the ratio of aggregate baseline CMVE to aggregate baseline TLU in the full baseline sample. Shaded regions show 90 and 95 percent confidence intervals based on the heteroskedasticity-robust standard errors. Markers indicate statistical significance at the 10 percent level based on heteroskedasticity-robust *p*-values and two randomization-inference procedures. Season-wise randomization inference reports Anderson–Rubin *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Cumulative-coupon randomization inference reports Anderson–Rubin *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All specifications control for baseline small-animal holdings and the number of coupons received during the final three seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The estimation sample of 1,179 households is held fixed across cutoffs and randomization-inference replications.

Table C1: First stage regression results: community-level inference

	Any insurance purchased – first three seasons	Respondent purchased ANY IBLI in each season					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
No. of coupons received – first three seasons	0.110 <0.000> «0.000»						
Coupon Receipt – first season		0.250 <0.000> «0.000»					
Coupon Receipt – second season			0.073 <0.005> «0.011»				
Coupon Receipt – third season				0.128 <0.000> «0.000»			
Coupon Receipt – fourth season					0.063 <0.005> «0.006»		
Coupon Receipt – fifth season						0.067 <0.069> «0.041»	
Coupon Receipt – sixth season							0.058 <0.009> «0.001»
Controls	✓	✓	✓	✓	✓	✓	✓
Effective F-statistic (community)	49.373	59.473	9.160	17.041	8.920	3.557	7.752
10% worst-case-bias critical value	23.109	23.109	23.109	23.109	23.109	23.109	23.109
Control mean	0.203	0.123	0.117	0.046	0.061	0.051	0.026
Communities	32	32	32	32	32	32	32
N	1179	1166	1154	1162	1150	1143	1143

Notes: The table reports first-stage estimates. Column 1 shows the effect of the number of discount coupons received during the first three sales seasons on whether the household purchased any insurance during those seasons. Columns 2–7 show the estimated effect of coupon receipt in each season on insurance purchase in that season. Angle brackets < > report *p*-values based on standard errors clustered at the community level. Double angle brackets « » report wild cluster bootstrap *p*-values from 2,000 replications, using community-level bootstrap weights. Community fixed effects are included because randomization was stratified at the community level. The estimation sample covers 32 of the 33 study communities, because no households from one Ethiopian community (Elama Dima) were retained at the ten-year follow-up. Controls are the pre-specified baseline household characteristics listed in Table 2. The effective F-statistics are recomputed using community-clustered covariance estimates. The 10 percent critical values are from (Olea and Pflueger 2013). Columns 2–7 exclude observations with unresolved purchase responses for the corresponding season.

Table C2: Long-run effects of catastrophic drought insurance on herd composition: community-level inference

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.217	-0.217	5.853	-1.301	-3.475	-3.584	18.395	1.888
	<0.133>	<0.133>	<0.045>	<0.160>	<0.451>	<0.051>	<0.011>	<0.164>
	«0.158»	«0.158»	«0.042»	«0.172»	«0.466»	«0.051»	«0.002»	«0.170»
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
ITT coefficient (per coupon)	0.024	-0.024	0.643	-0.143	-0.307	-0.347	2.478	0.264
Bottom − Top					-21.870	-5.471	-21.870	-5.471
p-value difference (community)					0.028	0.035	0.028	0.035
p-value difference (wild)					0.0193	0.0397	0.0193	0.0397
SW *F*-stat. (community)					30.03	29.61	23.28	23.08
Communities	32	32	32	32	32	32	32	32
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in the first three seasons on herd composition. The dependent variables in columns 1 and 2 are the share of animals household herds. Columns 3-8 are numbers of large and small animals in CMVE. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included as randomization was stratified at community level. Angle brackets < > report coefficient-level *p*-values based on standard errors clustered at the community level. Double angle brackets « » report coefficient-level *p*-values from null-imposed wild restricted efficient bootstrap tests with 2,000 replications and community-level bootstrap weights. The row "Control Mean" reflects average outcomes for those who did not receive any coupons in the first three seasons. The row "Purchaser mean" indicates the average outcomes for those who purchased any insurance in the first three seasons. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 represent the full sample. Columns 5–6 examine households in the bottom two herd-size terciles, while Columns 7–8 focus on those in the top herd-size tercile. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "Bottom − Top" reports the difference between the jointly estimated IV effects for the bottom two terciles and the top tercile. "*p*-value difference (community)" tests that this difference is zero using the community-clustered covariance matrix. "*p*-value difference (wild)" reports the corresponding null-imposed wild restricted efficient bootstrap *p*-value using community-level bootstrap weights. The row "SW *F*-stat. (community)" reports the Sanderson–Windmeijer conditional first-stage *F*-statistic for each insurance interaction, conditional on the other endogenous insurance interaction, recomputed using community-clustered covariance estimates. The estimation sample covers 32 of the 33 study communities, because no households from one Ethiopian community (Elama Dima) were retained at the ten-year follow-up.

Table C3: Long-run effects of catastrophic drought insurance on education: community-level inference

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.886 <0.067> «0.086»	7.276 <0.007> «0.030»	2.345 <0.131> «0.157»	2.018 <0.021> «0.046»	0.130 <0.136> «0.164»
Controls	✓	✓	✓	✓	✓
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon)	0.314	0.816	0.255	0.266	0.017
Communities	32	32	32	32	32
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	5.284 <0.025> «0.034»	14.154 <0.000> «0.002»	4.383 <0.054> «0.061»	3.537 <0.002> «0.009»	0.303 <0.006> «0.013»
Controls	✓	✓	✓	✓	✓
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon)	0.585	1.593	0.474	0.424	0.036
Bottom − Top	7.233	20.462	5.867	3.748	0.429
p-value difference (community)	0.006	0.001	0.006	0.031	0.003
p-value difference (wild)	0.0077	0.0030	0.0055	0.0476	0.0081
SW *F*-stat. (community)	39.26	35.07	37.12	33.94	33.16
Communities	32	32	32	32	32
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.948 <0.359> «0.383»	-6.307 <0.157> «0.153»	-1.483 <0.360> «0.385»	-0.211 <0.876> «0.899»	-0.126 <0.322> «0.359»
Controls	✓	✓	✓	✓	✓
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon)	-0.246	-0.785	-0.198	-0.069	-0.025
Bottom − Top	7.233	20.462	5.867	3.748	0.429
p-value difference (community)	0.006	0.001	0.006	0.031	0.003
p-value difference (wild)	0.0077	0.0030	0.0055	0.0476	0.0081
SW *F*-stat. (community)	18.10	19.18	18.16	32.25	31.61
Communities	32	32	32	32	32
Observations	736	736	736	1431	1431

Notes: This table presents the estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in the first three seasons, on education outcomes. Panel A shows the effects for all sample households, Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. The dependent variables "Maximum years of education", "Total years of education", and "Average years of education" are measured among household members who were school-aged during at least part of the first three sales seasons, i.e., household members who are currently 15-29 years old in Kenya and 15-17 years old in Ethiopia (data in Ethiopia is limited to those up to 17 years old). Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included as randomization was stratified at community level. The row "Control Mean" indicates the average outcomes for those who did not receive any coupons in the first three seasons, while the row "Purchaser mean" indicates the average outcomes for those who purchased any insurance in the first three seasons. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households. Angle brackets < > report *p*-values based on standard errors clustered at the community level. Double angle brackets « » report CGM wild-cluster bootstrap *p*-values from 2,000 replications, clustered at the community level. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "Bottom − Top" reports the difference between the jointly estimated IV effects for the bottom two terciles and the top tercile. "*p*-value difference (community)" tests that this difference is zero using the community-clustered covariance matrix. "*p*-value difference (wild)" reports the corresponding null-imposed wild restricted efficient bootstrap *p*-value using community-level bootstrap weights. The row "SW *F*-stat. (community)" reports the Sanderson–Windmeijer conditional first-stage *F*-statistic for each insurance interaction, conditional on the other endogenous insurance interaction, recomputed using community-clustered covariance estimates. The estimation sample covers 32 of the 33 study communities, because no households from one Ethiopian community (Elama Dima) were retained at the ten-year follow-up.

Table C4: Long-run effects of catastrophic drought insurance on livestock holdings without household controls

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.230	-0.230	5.716	-1.586	-2.938	-3.889	17.393	1.679
	(0.047)	(0.047)	(0.317)	(0.215)	(0.647)	(0.035)	(0.089)	(0.337)
	[0.039]	[0.039]	[0.262]	[0.341]	[0.612]	[0.052]	[0.058]	[0.718]
	{0.017}	{0.017}	{0.208}	{0.317}	{0.585}	{0.030}	{0.030}	{0.709}
Controls								
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
ITT coefficient (per coupon)	0.025	-0.025	0.640	-0.178	-0.258	-0.382	2.315	0.221
p-value threshold interaction					0.081	0.022	0.081	0.022
Sanderson-Windmeijer *F*-stat.					28.93	28.85	27.32	27.00
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in those seasons, on livestock holdings. Columns 1–2 exclude households that do not herd livestock, columns 3–4 use the full sample, columns 5–6 report effects for households in the bottom two herd-size terciles, and columns 7–8 report effects for the top herd-size tercile. Columns 5–8 are group-specific effects estimated jointly in the interaction model; the insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and baseline-herd-size group indicators. All specifications include the corresponding baseline outcome, coupons received during the final three seasons, and community fixed effects, but omit the pre-specified household characteristics. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For columns (5)–(8), both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. The row "Control mean" reports the raw outcome mean among households receiving no coupons in the first three seasons, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. In Kenya, 1 CMVE = 0.625 camel = 1 cattle = 10 goats/sheep; in Ethiopia, 1 CMVE = 0.4 camel = 1 cattle = 6.25 goats/sheep. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table C5: Long-run effects of catastrophic drought insurance on education without household controls

Education of household members who were school-aged during the first three sales seasons					
	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	3.433	8.071	2.507	1.825	0.122
	(0.039)	(0.036)	(0.077)	(0.069)	(0.183)
	[0.038]	[0.034]	[0.076]	[0.073]	[0.213]
	{0.016}	{0.019}	{0.046}	{0.042}	{0.154}
Controls					
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon)	0.395	0.944	0.283	0.242	0.016
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	5.988	14.981	4.537	3.190	0.289
	(0.010)	(0.005)	(0.025)	(0.022)	(0.025)
	[0.004]	[0.002]	[0.007]	[0.015]	[0.024]
	{0.001}	{0.001}	{0.005}	{0.006}	{0.006}
Controls					
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon)	0.669	1.687	0.499	0.382	0.035
p-value threshold interaction	0.027	0.010	0.039	0.085	0.025
Sanderson-Windmeijer *F*-stat.	22.64	23.04	21.83	19.85	19.65
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.455	-4.890	-1.240	-0.133	-0.124
	(0.569)	(0.388)	(0.545)	(0.925)	(0.371)
	[0.577]	[0.401]	[0.540]	[0.831]	[0.323]
	{0.538}	{0.334}	{0.478}	{0.824}	{0.273}
Controls					
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon)	-0.183	-0.606	-0.172	-0.051	-0.025
p-value threshold interaction	0.027	0.010	0.039	0.085	0.025
Sanderson-Windmeijer *F*-stat.	17.10	17.59	17.24	30.98	31.22
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in those seasons, on education outcomes. Panel A reports all eligible households, Panel B examines households in the bottom two herd-size terciles, and Panel C focuses on those in the top herd-size tercile. Maximum, total, and average years of education are measured among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. All specifications include the corresponding baseline outcome, the final-three-season coupon count, and community fixed effects, but omit the pre-specified household characteristics. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. The row "Control mean" reports the raw outcome mean among households receiving no coupons in the first three seasons, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table C6: Long-run effects of catastrophic drought insurance on child time use without household controls

	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Any insurance purchased	-0.565	0.365	0.184
	(0.135)	(0.188)	(0.087)
	[0.059]	[0.155]	[0.087]
	{0.017}	{0.075}	{0.066}
Controls			
Control mean	0.657	0.025	0.582
Purchaser mean	0.440	0.214	0.620
ITT coefficient (per coupon)	-0.044	0.028	0.020
First-stage *F*-stat.	5.55	5.53	46.50
Observations	362	362	1,073

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in those seasons, on child time-use outcomes. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two measures are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. All specifications include the corresponding baseline outcome, the final-three-season coupon count, and community fixed effects, but omit the pre-specified household characteristics. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "Control mean" reports the raw outcome mean among households receiving no coupons in the first three seasons, and the row "Purchaser mean" reports the raw outcome mean among households purchasing any insurance in those seasons. The activity columns use 362 Ethiopian households; the attendance column uses 1,073 households from Kenya and Ethiopia. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "First-stage *F*-stat." reports the heteroskedasticity-robust *F*-statistic testing the excluded coupon instrument in the first-stage regression, using the estimation sample and controls of each column.

C.1 Sensitivity to outcome skewness and zero holdings

Appendix Tables C7 and C8 examine whether the long-run livestock and education estimates are sensitive to skewness and upper-tail observations. Appendix Figure C2 complements these estimates by reporting the descriptive share of households with zero small-livestock and zero total-livestock holdings at the end of the experiment.

In Appendix Tables C7 and C8, parentheses report two-sided p-values based on heteroskedasticity-robust standard errors, square brackets report season-wise Anderson–Rubin randomization-inference p-values, and braces report cumulative-coupon Anderson–Rubin randomization-inference p-values. Both randomization-inference procedures use the full baseline randomization roster, 2,000 draws. The season-wise procedure re-randomizes coupon receipt separately within each of the first three sales seasons and then sums the assignments; the cumulative procedure directly permutes the cumulative coupon count. In the numerical summaries below, the three values following each coefficient are, in order, the robust, season-wise RI, and cumulative-coupon RI p-values.

For livestock, the full-sample large-animal estimates are 5.853 in levels $(0.320; 0.255; 0.210)$, 0.923 using the inverse hyperbolic sine transformation $(0.045; 0.033; 0.021)$, 0.773 using $\log(1+y)$ $(0.046; 0.032; 0.021)$, and 5.207 after winsorizing at the 99th percentile $(0.258; 0.228; 0.181)$. Among the Top 1/3, the corresponding large-animal estimates are 18.395 $(0.069; 0.045; 0.022)$, 1.489 $(0.037; 0.016; 0.005)$, 1.299 $(0.033; 0.011; 0.004)$, and 15.777 $(0.046; 0.025; 0.009)$. Thus, the positive effect on large-animal holdings among initially wealthier households is not driven by the functional form or a small number of upper-tail observations. The small-animal estimates are not statistically significant under any of the four specifications. Livestock-share outcomes are bounded between zero and one and are therefore excluded from this skewness and upper-tail sensitivity analysis.

For education, the level estimates in the full sample are 2.886 maximum years $(0.087; 0.096; 0.052)$, 7.276 total years $(0.061; 0.059; 0.032)$, and 2.345 average years $(0.100; 0.101; 0.065)$. In the Bottom 2/3, the corresponding estimates are 5.284 $(0.021; 0.008; 0.002)$, 14.154 $(0.009; 0.001; 0.001)$, and 4.383 $(0.032; 0.009; 0.004)$. All nine alternative transformation checks for this subgroup remain statistically significant: robust $p \leq 0.032$, season-wise RI $p \leq 0.009$, and cumulative-coupon RI $p \leq 0.004$. By contrast, none of the education estimates for the Top 1/3 is statistically significant under any specification (robust $p \geq 0.158$, season-wise RI $p \geq 0.137$, and cumulative-coupon RI $p \geq 0.103$). These results confirm that the education finding for the Bottom 2/3 is not driven by skewness or upper-tail observations.

At baseline, 13.5% of Bottom 2/3 households had zero small livestock and 6.3% had zero total

livestock; the corresponding shares for the Top 1/3 were 5.9% and 1.0%. At the experiment-end outcome window, among Bottom 2/3 households, the shares with zero small livestock were 9.4% without insurance and 7.5% with insurance, while the shares with zero total livestock were 5.8% and 3.3%, respectively. For the Top 1/3, the corresponding comparisons were 3.8% versus 4.0% for zero small livestock and 1.9% versus 2.9% for zero total livestock. By coupon receipt, the Bottom 2/3 comparisons were 9.1% versus 8.6% for zero small livestock and 6.8% versus 4.6% for zero total livestock; for the Top 1/3, they were 11.1% versus 3.6% and 11.1% versus 1.9%, respectively. These are raw descriptive comparisons, not causal estimates, and the no-coupon cells are small (44 Bottom 2/3 and 18 Top 1/3 households). The results therefore do not indicate that the estimated reduction in small livestock reflects widespread exit from livestock ownership among insured Bottom 2/3 households.

Table C7: Sensitivity of livestock outcomes to skewness and upper-tail observations

Outcome	*Outcome transformation*			
	Levels	IHS	$\log(1+y)$	Winsorized at p99
	(1)	(2)	(3)	(4)
Panel A: All households				
Large animals (CMVE)	5.853	0.923	0.773	5.207
	(0.320)	(0.045)	(0.046)	(0.258)
	[0.255]	[0.033]	[0.032]	[0.228]
	{0.210}	{0.021}	{0.021}	{0.181}
Small animals (CMVE)	-1.301	-0.036	-0.046	-0.889
	(0.306)	(0.901)	(0.843)	(0.432)
	[0.442]	[0.898]	[0.839]	[0.416]
	{0.416}	{0.889}	{0.827}	{0.369}
Panel B: Top 1/3				
Large animals (CMVE)	18.395	1.489	1.299	15.777
	(0.069)	(0.037)	(0.033)	(0.046)
	[0.045]	[0.016]	[0.011]	[0.025]
	{0.022}	{0.005}	{0.004}	{0.009}
Small animals (CMVE)	1.888	0.636	0.501	2.438
	(0.272)	(0.145)	(0.148)	(0.131)
	[0.652]	[0.252]	[0.259]	[0.238]
	{0.660}	{0.153}	{0.158}	{0.144}
Controls	✓	✓	✓	✓
Baseline outcome	✓	✓	✓	✓
Sanderson-Windmeijer F-stat., Large animals, Top 1/3	29.03	28.67	28.67	28.93
Sanderson-Windmeijer F-stat., Small animals, Top 1/3	28.68	28.78	28.79	28.72
Observations (each panel)	1,179	1,179	1,179	1,179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables are the numbers of large and small animals in CMVE. Columns 1–4 report, respectively, the outcomes in levels, using the inverse hyperbolic sine transformation, using $\log(1+y)$, and winsorized at the pooled analysis-sample 99th percentile. Each row identifies the dependent variable; each reported coefficient is the estimated Local Average Treatment Effect of instrumented insurance purchase under the outcome transformation indicated by the column heading. In each specification, the dependent variable and its corresponding baseline outcome are transformed consistently. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. In panel B, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All regressions additionally include the corresponding baseline outcome and the number of coupons received during the final three sales seasons. Community fixed effects are included because randomization was stratified at the community level. Panel A represents the full sample. Panel B reports the treatment effects for households in the top herd-size tercile, estimated jointly with the effect for households in the lower two terciles in the interaction model. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The row "Sanderson-Windmeijer F-stat." reports the conditional first-stage F-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table C8: Sensitivity of education outcomes to skewness and upper-tail observations

	Outcome transformation			
Outcome	Levels	IHS	$\log(1+y)$	Winsorized at p99
	(1)	(2)	(3)	(4)
Panel A: All households				
Maximum years of education	2.886	0.734	0.595	2.868
	(0.087)	(0.118)	(0.113)	(0.088)
	[0.096]	[0.129]	[0.121]	[0.096]
	{0.052}	{0.084}	{0.081}	{0.053}
Total years of education	7.276	0.874	0.732	6.996
	(0.061)	(0.094)	(0.087)	(0.069)
	[0.059]	[0.103]	[0.097]	[0.069]
	{0.032}	{0.056}	{0.051}	{0.036}
Average years of education	2.345	0.675	0.543	2.309
	(0.100)	(0.115)	(0.110)	(0.105)
	[0.101]	[0.121]	[0.115]	[0.107]
	{0.065}	{0.079}	{0.075}	{0.067}
Panel B: Bottom 2/3				
Maximum years of education	5.284	1.555	1.246	5.273
	(0.021)	(0.019)	(0.018)	(0.021)
	[0.008]	[0.004]	[0.004]	[0.008]
	{0.002}	{0.002}	{0.002}	{0.002}
Total years of education	14.154	1.919	1.592	13.828
	(0.009)	(0.010)	(0.009)	(0.010)
	[0.001]	[0.002]	[0.001]	[0.001]
	{0.001}	{0.001}	{0.000}	{0.001}
Average years of education	4.383	1.431	1.142	4.370
	(0.032)	(0.021)	(0.021)	(0.032)
	[0.009]	[0.004]	[0.005]	[0.009]
	{0.004}	{0.001}	{0.001}	{0.004}
Panel C: Top 1/3				
Maximum years of education	-1.948	-0.838	-0.655	-1.983
	(0.439)	(0.239)	(0.250)	(0.431)
	[0.446]	[0.221]	[0.230]	[0.439]
	{0.394}	{0.182}	{0.190}	{0.388}
Total years of education	-6.307	-1.117	-0.913	-6.482
	(0.236)	(0.158)	(0.158)	(0.222)
	[0.255]	[0.137]	[0.142]	[0.232]
	{0.203}	{0.103}	{0.103}	{0.182}
Average years of education	-1.483	-0.755	-0.587	-1.566
	(0.458)	(0.239)	(0.246)	(0.433)
	[0.473]	[0.231]	[0.236]	[0.447]
	{0.409}	{0.178}	{0.186}	{0.379}
Controls	✓	✓	✓	✓
Baseline outcome	✓	✓	✓	✓
Sanderson-Windmeijer *F*-stat., Maximum years, Bottom 2/3	22.03	21.49	21.54	22.10
Sanderson-Windmeijer *F*-stat., Total years, Bottom 2/3	22.65	21.84	21.96	22.70
Sanderson-Windmeijer *F*-stat., Average years, Bottom 2/3	20.99	21.26	21.23	21.04
Sanderson-Windmeijer *F*-stat., Maximum years, Top 1/3	17.25	17.73	17.70	17.27
Sanderson-Windmeijer *F*-stat., Total years, Top 1/3	17.66	17.71	17.69	17.67
Sanderson-Windmeijer *F*-stat., Average years, Top 1/3	17.66	17.75	17.74	17.66
Observations (each panel)	736	736	736	736

Notes: Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three sales seasons on long-run education outcomes. Insurance purchase is instrumented by the number of discount coupons received in those seasons. Panel A reports all households; Panels B and C report group-specific effects estimated jointly in a pooled interaction IV model for the Bottom 2/3 and Top 1/3 of the community herd-size distribution. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. Group-specific insurance-purchase terms are instrumented by interactions between the first-three-season coupon count and the corresponding herd-size-group indicators. The outcomes are the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 1–4 report, respectively, levels, the inverse hyperbolic sine, $\log(1+y)$, and winsorization at the pooled analysis-sample 99th percentile. Each row identifies the dependent variable; each reported coefficient is the estimated Local Average Treatment Effect of instrumented insurance purchase under the outcome transformation indicated by the column heading. Parentheses contain two-sided *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupons separately within each of the first three sales seasons and then sum the assignments. Braces { } report corresponding *p*-values from 2,000 replications that directly permute the cumulative first-three-season coupon count. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions include the corresponding baseline education outcome, transformed in the same way as the dependent variable, and the number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. All four columns use the same 736-household estimation sample. Panels B and C report group-specific effects estimated jointly using this full sample.

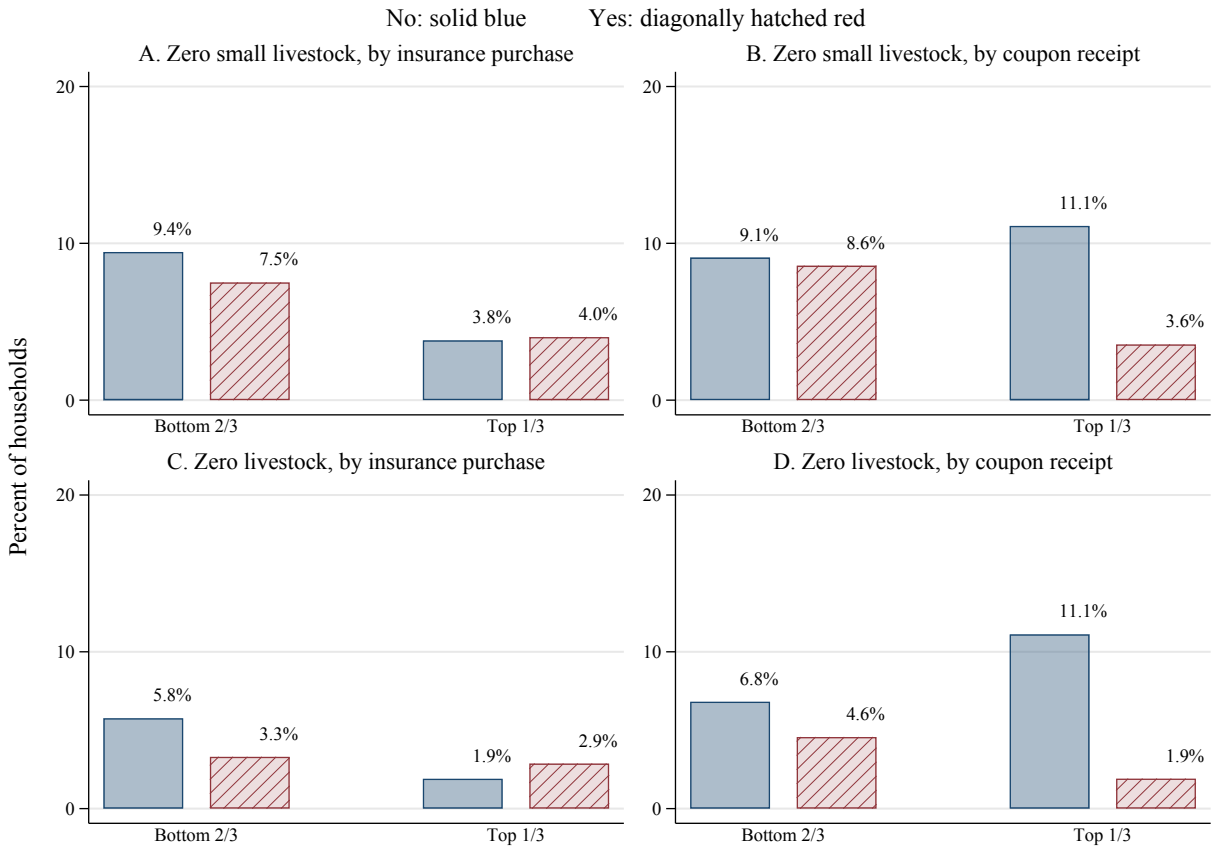


Figure C2: Zero livestock holdings at the end of the experiment

Notes: The figure reports shares at the end of the experiment. "Any insurance" and "any coupon" refer to purchase or receipt during the first three sales seasons. Solid blue bars indicate no insurance purchase (Panels A and C) or no coupon receipt (Panels B and D); diagonally hatched red bars indicate insurance purchase or coupon receipt, respectively. Insurance-group sample sizes are 434 without and 333 with insurance in the Bottom 2/3, and 210 without and 174 with insurance in the Top 1/3. Coupon-group sample sizes are 44 without and 723 with coupons in the Bottom 2/3, and 18 without and 366 with coupons in the Top 1/3; the no-coupon comparisons should therefore be interpreted cautiously.

Table C9: Long-run effects of catastrophic drought insurance on herd composition (Anderson–BKY sharpened FDR q-values)

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.217	-0.217	5.853	-1.301	-3.475	-3.584	18.395	1.888
	(0.056)	(0.056)	(0.320)	(0.306)	(0.596)	(0.052)	(0.069)	(0.272)
	⟨0.060⟩	⟨0.060⟩	⟨0.470⟩	⟨0.470⟩	⟨1.000⟩	⟨0.074⟩	⟨0.074⟩	⟨1.000⟩
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
ITT coefficient (per coupon)	0.024	-0.024	0.643	-0.143	-0.307	-0.347	2.478	0.264
p-value threshold interaction					0.054	0.022	0.054	0.022
Sanderson-Windmeijer F-stat.					28.22	28.20	29.03	28.68
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition. Insurance purchase is instrumented by the number of discount coupons received in those seasons. Columns 1–2 report the shares of large and small animals in households' herded livestock; columns 3–8 report numbers of large and small animals in CMVE. Columns 1–2 exclude households that do not herd livestock, columns 3–4 use the full sample, columns 5–6 report effects for households in the bottom two herd-size terciles, and columns 7–8 report effects for the top herd-size tercile. Columns 5–8 are group-specific effects estimated jointly in the interaction model; the insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and baseline-herd-size group indicators. All specifications include the corresponding baseline outcome, the final-three-season coupon count, the pre-specified household characteristics in Table 2, and community fixed effects. Parentheses report two-sided p-values based on heteroskedasticity-robust standard errors. Angle brackets <> report Anderson–BKY sharpened false-discovery-rate q-values calculated separately for four economically distinct families: the complementary portfolio shares in columns 1–2; pooled livestock levels in columns 3–4; the two effects predicted by the bifurcation framework—small-animal holdings below the threshold in column 6 and large-animal holdings above it in column 7; and the off-diagonal diagnostic effects in columns 5 and 8. The control and purchaser means, ITT coefficients, and threshold-interaction tests are defined as in Table 4. The row "Sanderson-Windmeijer F-stat." reports the conditional first-stage F-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table C10: Long-run effects of catastrophic drought insurance on education (Anderson–BKY sharpened FDR q-values)

Education of household members who were school-aged during the first three sales seasons					
	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: All households					
Any insurance purchased	2.886	7.276	2.345	2.018	0.130
	(0.087)	(0.061)	(0.100)	(0.051)	(0.162)
	⟨0.096⟩	⟨0.112⟩	⟨0.112⟩	⟨0.114⟩	⟨0.114⟩
Controls	✓	✓	✓	✓	✓
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon)	0.314	0.816	0.255	0.266	0.017
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Bottom 2/3	5.284	14.154	4.383	3.537	0.303
	(0.021)	(0.009)	(0.032)	(0.016)	(0.023)
	⟨0.022⟩	⟨0.018⟩	⟨0.018⟩	⟨0.024⟩	⟨0.024⟩
Controls	✓	✓	✓	✓	✓
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon)	0.585	1.593	0.474	0.424	0.036
p-value threshold interaction	0.024	0.005	0.031	0.055	0.020
Sanderson-Windmeijer F-stat.	22.03	22.65	20.99	19.79	19.64
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Top 1/3	-1.948	-6.307	-1.483	-0.211	-0.126
	(0.439)	(0.236)	(0.458)	(0.881)	(0.359)
	⟨0.784⟩	⟨0.846⟩	⟨0.846⟩	⟨1.000⟩	⟨1.000⟩
Controls	✓	✓	✓	✓	✓
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon)	-0.246	-0.785	-0.198	-0.069	-0.025
p-value threshold interaction	0.024	0.005	0.031	0.055	0.020
Sanderson-Windmeijer F-stat.	17.25	17.66	17.66	31.78	31.94
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in those seasons. Panel A reports all households; Panels B and C report group-specific effects estimated jointly in the interaction model for the bottom two and top herd-size terciles. Herd-size terciles and group-specific instruments are defined as in Table 5. Columns 1–3 report household-level maximum, total, and average completed years of education among members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. All specifications include the corresponding baseline outcome, the final-three-season coupon count, the pre-specified household controls, and community fixed effects; individual specifications additionally include age-by-country fixed effects and gender. Parentheses report two-sided p-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Angle brackets ⟨⟩ report Anderson–BKY sharpened false-discovery-rate q-values calculated separately, within each panel, for the pre-specified primary education outcome in column 1, the supplemental household-level measures in columns 2–3, and the individual-level measures in columns 4–5. The row "Sanderson-Windmeijer F-stat." reports the conditional first-stage F-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households, and columns 4–5 include 1,431 individuals from those households. The control and purchaser means, ITT coefficients, and threshold-interaction tests are defined as in Table 5.

Table C11: Effects on herd size at different quantile in endline

	Quantile of total livestock holdings (CMVE)								
	10th	20th	30th	40th	50th	60th	70th	80th	90th
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Any insurance purchased	1.267	2.071	2.619	3.178	3.921	4.792	6.065	7.786	2.519
	(0.326)	(0.154)	(0.100)	(0.138)	(0.178)	(0.316)	(0.517)	(0.459)	(0.720)

Notes: This table reports structural quantile effects of any insurance purchase in the first three sales seasons on endline total livestock holdings in CMVE, at the 10th through 90th quantiles. Insurance purchase is instrumented by the number of discount coupons received during those seasons. The estimates are structural quantile effects under the IVQR model assumptions, rather than complier quantile treatment effects. Community fixed effects are included as randomization was stratified at community level. Parentheses report two-sided Wald *p*-values based on heteroskedasticity-robust standard errors. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All specifications also control for the number of discount coupons received during the last three sales seasons. All columns include the same 1,179 households (781 in Kenya and 398 in Ethiopia), including 170 households with zero endline livestock holdings. In Kenya, 1 CMVE= 0.625 camel=1 cattle=10 goats/sheep, and in Ethiopia, 1 CMVE=0.4 camel=1 cattle=6.25 goats/sheep.

Table C12: Long-run effects of catastrophic drought insurance on individual education, by gender

	Completed years of education	
	(1)	(2)
Any insurance purchased × Female	3.001	3.148
	(0.040)	(0.047)
	[0.043]	[0.042]
	{0.033}	{0.033}
Any insurance purchased × Male	0.991	1.086
	(0.466)	(0.421)
	[0.440]	[0.389]
	{0.379}	{0.335}
p-value for equal treatment effects	0.315	0.323
Controls		✓
K-P F-statistic: female	20.52	19.99
K-P F-statistic: male	32.85	33.48
Control mean, female	5.854	5.854
Control mean, male	6.102	6.102
Purchaser mean, female	7.096	7.096
Purchaser mean, male	5.728	5.728
Female individuals	534	534
Male individuals	897	897
Sanderson-Windmeijer *F*-stat. (Female)	21.04	20.59
Sanderson-Windmeijer *F*-stat. (Male)	32.37	32.91
Individuals	1431	1431
Households	736	736

Notes: Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on completed years of education, separately for female and male children. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The gender-specific treatment effects are estimated jointly in the interaction model. The gender-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the gender indicators. The dependent variable is individual completed years of education for the same cohort examined in columns 4–5 of Table 5. This cohort consists of household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Reported in parentheses are *p*-values based on standard errors clustered at the household level. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. Both columns control for baseline household mean completed education, and the number of discount coupons received during the last three sales seasons. Both columns additionally include an indicator for the individual's gender, community fixed effects, and age-by-country fixed effects. Column 2 also includes the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. The models give equal weight to each individual and use the same 1,431 individuals from 736 households as Table 5, Panel A, columns 4–5. The row "*p*-value for equal treatment effects" reports the *p*-value from a household-clustered Wald test that the estimated treatment effects are equal for female and male household members, allowing for covariance within households. The subgroup K–P first-stage statistics are obtained from the corresponding separate IV regressions. The rows "Control mean" and "Purchaser mean" report person-level subgroup averages among observations from households that received no coupons and households that purchased insurance, respectively, in the first three seasons. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table C13: Long-run effects of catastrophic drought insurance on individual education, by cohort

	Completed years of education	
	(1)	(2)
Any insurance purchased × Younger cohort	1.467	1.707
	(0.129)	(0.088)
	[0.135]	[0.088]
	{0.096}	{0.058}
Any insurance purchased × Older cohort	1.157	1.456
	(0.747)	(0.649)
	[0.782]	[0.717]
	{0.771}	{0.698}
p-value for equal treatment effects	0.933	0.940
p-value for equal effects (weak-IV robust)	0.997	0.997
Controls		✓
K-P F-statistic: younger group	42.28	41.26
K-P F-statistic: older group	4.56	6.91
Control mean, younger group	6.224	6.224
Control mean, older group	5.091	5.091
Purchaser mean, younger group	6.364	6.364
Purchaser mean, older group	5.694	5.694
Younger-group individuals	1173	1173
Older-group individuals	258	258
Sanderson-Windmeijer *F*-stat. (Younger cohort)	41.82	40.62
Sanderson-Windmeijer *F*-stat. (Older cohort)	4.80	7.45
Individuals	1431	1431
Households	736	736

Notes: Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on completed years of education, separately for younger and older endpoint-age groups. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The cohort-specific treatment effects are estimated jointly in the interaction model. The cohort-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the cohort indicators. The dependent variable is individual completed years of education for the same cohort examined in columns 4–5 of Table 5. The younger group comprises Kenya household members ages 15–23 at the 2020 endpoint and Ethiopia household members ages 15–17 at the 2022 endpoint. The older group comprises Kenya household members ages 24–29 at the 2020 endpoint; Ethiopia contributes no older-group observations. These are endpoint-age groups, not directly observed primary- and secondary-school-age groups during the experiment. Reported in parentheses are *p*-values based on standard errors clustered at the household level. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. Both columns control for baseline household mean completed education, and the number of discount coupons received during the last three sales seasons. Both columns additionally include an indicator for the individual's gender, community fixed effects, and age-by-country fixed effects. Column 2 also includes the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. The models give equal weight to each individual and use the same 1,431 individuals from 736 households as Table 5, Panel A, columns 4–5. The row "*p*-value for equal treatment effects" reports the *p*-value from a household-clustered Wald test that the estimated treatment effects are equal for younger and older cohort members, allowing for covariance within households. The row "*p*-value for equal effects (weak-IV robust)" reports a projection Anderson–Rubin test of equal treatment effects across cohorts, using household-clustered covariance estimates and projecting over the unknown common effect. The subgroup K–P first-stage statistics are obtained from the corresponding separate IV regressions. The rows "Control mean" and "Purchaser mean" report person-level subgroup averages among observations from households that received no coupons and households that purchased insurance, respectively, in the first three seasons. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

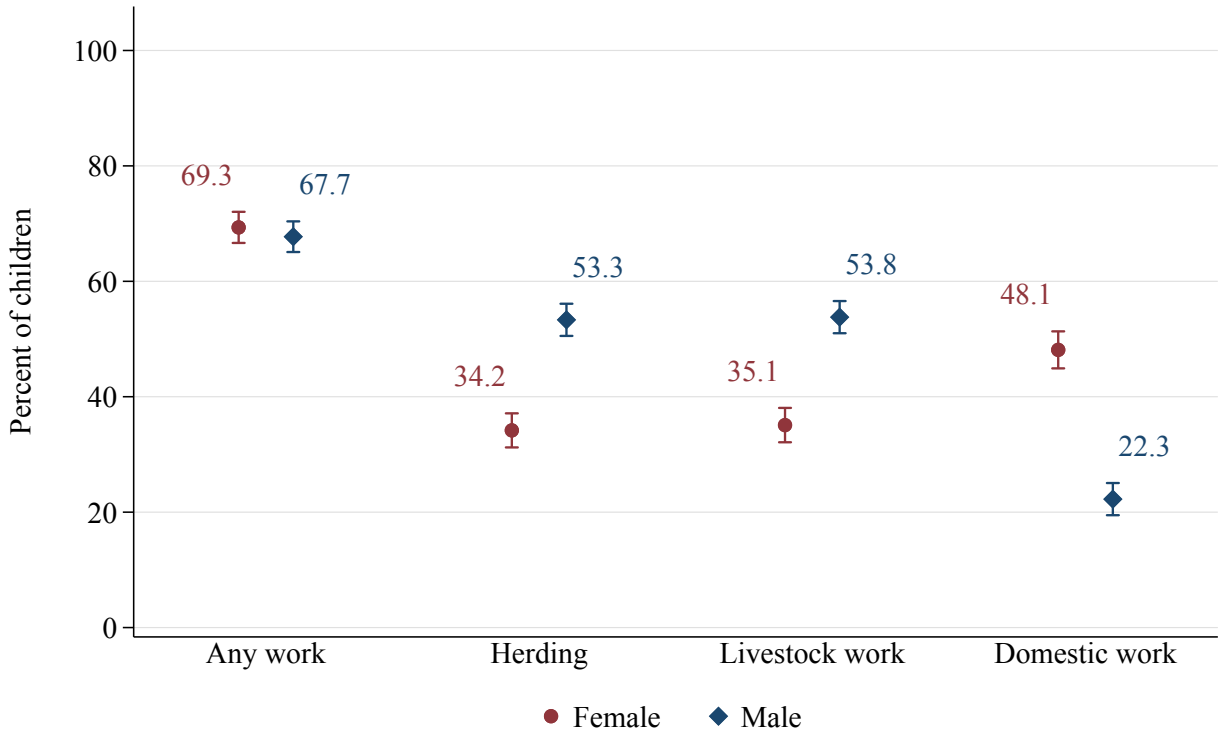


Figure C3: Reported work among children by gender at baseline

Notes: Points are age- and country-adjusted percentages from separate linear regressions with country-by-year-age fixed effects. Bars show 95% confidence intervals based on standard errors clustered at the household level. The sample comprises 2,800 children ages 5–17 in 993 households, observed at baseline before the randomized insurance offers (Kenya, 2009; Ethiopia, 2012). Any reported work includes economic or domestic work reported as either the primary or secondary activity. Own-household herding denotes herding for the household. Livestock-related work includes own-household herding, livestock production, livestock trade or brokerage, and poultry work.

Appendix D: Balance and attrition

D.1 Balance

This subsection presents the tests of balance across the randomized premium subsidies, which were valid for only one sales season, re-randomized each sales season, and distributed in the form of a discount coupon. We estimate the following equation for our pre-specified set of balance variables that were selected following Jensen, Barrett, and Mude (2017) and Takahashi, Ikegami, Sheahan, and Barrett (2016)[25]:

$$k_{ijt} = \gamma_1 \mathrm{D}_{ijt} + \rho_j + \nu_{ijt} \tag{6}$$

where k_{ijt} denotes a characteristic of a household i in location j in sales season t, D_{ijt} is an indicator for whether or not the household received a discount coupon in that sales season, ρ_j is the location fixed effects, and ν_{ijt} is the error term.

In addition to the coefficient estimates and p-values based on heteroskedasticity-robust standard errors, we use the normalized difference as a scale-invariant measure of the size of the difference in means between households with and without discount coupons, which we calculate by:

$$\text{Normalized Difference} = \frac{\bar{X}_{treatment} - \bar{X}_{control}}{\sqrt{(s^2_{treatment} + s^2_{control})/2}} \tag{7}$$

where $\bar{X}$ represents the mean and s the standard deviation of a variable.

As stated in the main body of the text, results reported in Appendix Table D1 show that randomization was balanced across observables in each season.

Appendix Table D2 additionally tests baseline balance across groups receiving zero, one, two, or three discount coupons during the first three sales seasons. We regress each baseline characteristic or outcome on coupon-count indicators and community fixed effects, with zero coupons as the reference group. The table reports all six regression-adjusted pairwise comparisons, variable-specific joint tests of equality across the four groups, and pairwise and omnibus cross-equation Wald tests within each panel. None of the 29 joint tests is significant at the five percent level, although three are marginally significant at the ten percent level. The panel-wide omnibus tests yield p-values of

[25] Variables include: age of the household head, an indicator for whether the household is male headed, years of education of the household head, adult equivalent, dependency ratio, herd size in CMVE, monthly household income per capita in USD, and agricultural land size in hectares.

0.474 for household characteristics and 0.274 for baseline livestock and household education outcomes, providing no statistically significant evidence of systematic imbalance across coupon-count groups.[26]

Appendix Table D3 examines whether randomized community-level coupon intensity is associated with baseline community characteristics. None of the eleven displayed associations is individually significant; the joint p-value is 0.143 for the eight prespecified household characteristics and 0.152 across all rows. Because the test uses 33 communities, it is low-powered and establishes balance only on the observables shown.

D.2 Attrition

This subsection presents the analysis of attrition. At baseline, 1439 households participated in our panel survey. Ten years later we were able to track 1179, or 82% of these households (Appendix Table D4).

We first test for differential attrition by the number of discount coupons received. For each assignment window, we estimate Eq. (8):

$$\text{Attrition}_{ijT} = \delta_s \text{D}_{ij}^{(s)} + \lambda_s' \mathbf{A}_{ij}^{(s)} + \gamma_j + \omega_{ij}, \qquad s \in \{3,6\}. \tag{8}$$

where $Attrition_{ijT}$ equals one if household i in community j was interviewed at baseline (2009 in Kenya and 2012 in Ethiopia) but not during the long-run follow-up (2020 in Kenya and 2022 in Ethiopia). $\text{D}_{ij}^{(s)}$ is the number of discount coupons received during the first s sales seasons, $\mathbf{A}_{ij}^{(s)}$ is the corresponding vector of temporary-absence indicators, and γ_j denotes community fixed effects. The pooled specifications additionally include a country fixed effect. Columns (1)–(3) of Appendix Table D5 report the initial-three-season specification for the pooled sample, Kenya, and Ethiopia; columns (4)–(6) report the corresponding all-six-season specification. None of the six coefficients is statistically significant at conventional levels.

Discount rates may separately affect the probability of a household to attrit differentially, conditional on receiving a discount coupon. Therefore, we estimate the following equation to evaluate attrition by discount coupon receipt and discount rate jointly:

[26] The outcome-panel test has 18 independent restrictions because the large- and small-livestock shares sum to one, making three of the 21 nominal restrictions redundant.

$$\text{Attrition}_{ijT} = \sum_{t=1}^{6} (\kappa_{1t} \text{D}_{ijt} + \kappa_{2t} \text{Discount Rate}_{ijt} + \kappa_3 \text{Absent}_{ijt}) + \rho_j + \omega_{ijt} \quad (9)$$

where D_{ijt} is an indicator equal to one if a household i in location j in sales season t received a discount coupon. $\text{Discount Rate}_{ijt}$ is the coupon discount rate in percentages, defined as zero if the household did not receive any discount. Since some households drop out from the panel survey in a specific round and return later, we include $Absent_{ijt}$, an indicator denoting temporary absence in sales season t. ρ_j represents location fixed effects. Appendix Table D8 reports pooled, Kenya, and Ethiopia estimates. The joint p-values for the six coupon indicators are 0.105, 0.153, and 0.195, respectively; the corresponding joint p-values for the six discount-rate variables are 0.365, 0.488, and 0.140. Thus, the assignment variables are not jointly associated with attrition in either country. Some individual coefficients are nevertheless significant: season-3 coupon receipt in the pooled sample and Ethiopia, and the season-4 discount rate in Ethiopia. Season-3 discount rates in Ethiopia and season-6 coupon receipt in Kenya are marginally significant at the ten percent level. Therefore, these isolated findings should be interpreted cautiously given the number of coefficients examined.

Finally, we consider selective attrition by our pre-specified observable household characteristics. We regress each household characteristic on the attrition indicator:

$$X_{ij0} = \zeta_1 Attrition_{ijT} + \rho_j^1 + \sigma_{ijt}^1 \quad (10)$$

where X_{ij0} is the vector of characteristics of household i in community j at baseline. In addition to each coefficient, we conduct joint significance tests of pre-specified household characteristics. Appendix Table D6 shows that these characteristics jointly differ by attrition status in the pooled sample ($p = 0.002$) and in Kenya ($p < 0.001$), but not in Ethiopia ($p = 0.139$). In the pooled estimates, attriting households are more likely to be female-headed and have fewer adult equivalents and less agricultural land.

As per the pre-analysis plan, we also test selective attrition by regressing the attrition indicator on the vector of baseline household characteristics. We estimate the following equation:

$$Attrition_{ijT} = \theta_1 X_{ij0} + \rho_j^2 + \sigma_{ijt}^2 \quad (11)$$

where all variables are defined following Equation 10. Appendix Table D7 shows that an additional adult equivalent is associated with a 1.0-percentage-point lower probability of attrition ($p = 0.058$), and an additional hectare of agricultural land with a 1.4-percentage-point lower probability ($p =$

0.010). The eight displayed characteristics are jointly significant in the pooled sample ($p = 0.009$) and Kenya ($p = 0.003$), but not Ethiopia ($p = 0.141$).

Table D1: Balance by discount coupon receipt per season

	Received coupon vs. No coupon						
Sales Season Kenya: Sales Season Ethiopia:	2010 JF 2012 AS	2011 JF 2013 JF	2011 AS 2013 AS	2012 AS 2014 JF	2013 JF 2014 AS	2013 AS 2015 JF	Wald χ^2 test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age of household head in years	0.219	1.41	0.00752	0.0315	1.32	0.0289	4.23
	(0.825)	(0.146)	(0.994)	(0.974)	(0.163)	(0.979)	{0.646}
	[0.0519]	[0.107]	[0.0416]	[0.0309]	[0.101]	[0.00159]	
Male headed household	-0.0204	-0.0264	-0.0340	-0.0373	0.00490	-0.0252	7.11
	(0.412)	(0.280)	(0.162)	(0.129)	(0.846)	(0.375)	{0.310}
	[0.0345]	[0.0235]	[0.00977]	[-0.00182]	[0.0790]	[-0.0608]	
Household head's years of education	-0.236	-0.0545	-0.0407	0.0914	-0.225	0.183	5.96
	(0.169)	(0.748)	(0.802)	(0.555)	(0.154)	(0.242)	{0.428}
	[-0.121]	[-0.0606]	[-0.0805]	[-0.0370]	[-0.153]	[0.0777]	
Adult equivalent	-0.00727	0.0527	-0.104	-0.0199	-0.137	-0.141	3.31
	(0.952)	(0.657)	(0.383)	(0.864)	(0.251)	(0.337)	{0.769}
	[0.0307]	[0.0378]	[-0.000732]	[0.0259]	[-0.0243]	[-0.0699]	
Dependency ratio	-0.00191	0.0153	0.0432	0.00266	0.0423	-0.0204	1.49
	(0.975)	(0.785)	(0.418)	(0.962)	(0.438)	(0.737)	{0.960}
	[0.0471]	[0.0742]	[0.105]	[0.0597]	[0.104]	[-0.0210]	
Baseline herded stock (CMVE)	0.861	-0.914	-0.486	-1.25	0.454	-2.00	3.02
	(0.578)	(0.542)	(0.761)	(0.369)	(0.680)	(0.276)	{0.807}
	[-0.0115]	[-0.0482]	[-0.0307]	[-0.00809]	[0.0973]	[-0.0877]	
Monthly household income per capita (USD)	-0.296	-1.11	-0.166	0.720	-0.194	-1.37	3.81
	(0.673)	(0.301)	(0.860)	(0.322)	(0.827)	(0.236)	{0.703}
	[-0.0455]	[-0.116]	[-0.0851]	[0.0122]	[-0.0847]	[-0.0792]	
Agricultural land size (hectares)	0.0819	0.0371	0.00590	0.120	-0.110	0.0568	3.04
	(0.333)	(0.602)	(0.938)	(0.585)	(0.283)	(0.591)	{0.804}
	[0.0878]	[0.0957]	[0.0800]	[0.0445]	[-0.0144]	[0.0125]	
Wald χ^2 statistic of joint test:	4.040	4.891	3.044	5.009	7.803	7.481	
P-value of joint test:	0.853	0.769	0.932	0.757	0.453	0.486	

Notes: The table presents adjusted mean differences in prespecified household characteristics between households that received and did not receive a discount coupon prior to each sales season. Columns (1)–(6) report the estimated mean differences, *p*-values based on heteroskedasticity-robust standard errors, and normalized differences (in square brackets). All specifications include community fixed effects. Column (7) reports, for each characteristic, a joint Wald test that its coupon-receipt coefficients are zero across all six seasons. The first row reports the Wald χ^2 statistic, and the second row reports the corresponding *p*-value in curly brackets.

Table D2: Balance using cumulative coupon receipt in the first three sales seasons

	Zero-coupon mean	Regression-adjusted pairwise mean differences						Joint test statistic	Observations
		1–0	2–0	3–0	2–1	3–1	3–2		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Baseline household characteristics									
Age of household head in years	46.4	1.26	2.53	2.53	1.27	1.26	-0.00103	0.76	1179
		(0.574)	(0.242)	(0.263)	(0.308)	(0.355)	(0.999)	(0.516)	
Male headed household	0.768	-0.0603	-0.0832	-0.125	-0.0230	-0.0651	-0.0422	2.50	1179
		(0.241)	(0.086)	(0.013)	(0.473)	(0.061)	(0.158)	(0.058)	
Household head's years of education	1.19	-0.175	-0.234	-0.267	-0.0583	-0.0921	-0.0338	0.19	1179
		(0.668)	(0.540)	(0.486)	(0.793)	(0.688)	(0.851)	(0.903)	
Adult equivalent	4.33	0.374	0.520	0.248	0.146	-0.126	-0.272	2.23	1179
		(0.161)	(0.039)	(0.332)	(0.355)	(0.449)	(0.046)	(0.083)	
Dependency ratio	1.21	-0.0322	0.0204	0.0309	0.0526	0.0631	0.0105	0.21	1179
		(0.810)	(0.872)	(0.815)	(0.487)	(0.472)	(0.888)	(0.889)	
Baseline herded stock (CMVE)	20.3	-1.49	-0.688	-0.121	0.801	1.37	0.567	0.26	1179
		(0.594)	(0.801)	(0.965)	(0.616)	(0.404)	(0.702)	(0.853)	
Monthly household income per capita (USD)	7.34	1.32	0.128	0.890	-1.19	-0.425	0.762	0.62	1179
		(0.409)	(0.927)	(0.538)	(0.247)	(0.698)	(0.350)	(0.599)	
Agricultural land size (hectares)	0.460	0.0839	0.201	0.184	0.117	0.100	-0.0171	0.64	1179
		(0.722)	(0.383)	(0.478)	(0.233)	(0.480)	(0.892)	(0.590)	
Joint p-value, household characteristics		{0.600}	{0.288}	{0.338}	{0.620}	{0.383}	{0.546}		1179
Omnibus Wald χ^2(24)								23.78	
								{0.474}	
Panel B: Baseline outcomes									
Share of large animals in livestock	0.701	-0.00009	-0.0203	-0.0142	-0.0202	-0.0141	0.00613	0.36	982
		(0.998)	(0.623)	(0.736)	(0.324)	(0.525)	(0.745)	(0.781)	
Share of small animals in livestock	0.299	0.00009	0.0203	0.0142	0.0202	0.0141	-0.00613	0.36	982
		(0.998)	(0.623)	(0.736)	(0.324)	(0.525)	(0.745)	(0.781)	
Large animals (CMVE)	16.2	-1.51	-1.06	-0.519	0.453	0.993	0.539	0.24	1179
		(0.532)	(0.655)	(0.830)	(0.740)	(0.485)	(0.675)	(0.870)	
Small animals (CMVE)	4.11	0.0219	0.370	0.398	0.348	0.376	0.0275	0.47	1179
		(0.974)	(0.564)	(0.538)	(0.356)	(0.302)	(0.932)	(0.701)	
Maximum years of education	4.81	-0.903	-0.842	-1.07	0.0611	-0.170	-0.231	1.88	736
		(0.053)	(0.052)	(0.018)	(0.825)	(0.580)	(0.353)	(0.131)	
Total years of education	8.13	-1.46	-1.20	-2.06	0.251	-0.606	-0.857	1.60	736
		(0.181)	(0.237)	(0.051)	(0.688)	(0.376)	(0.116)	(0.187)	
Average years of education	2.57	-0.509	-0.382	-0.349	0.127	0.160	0.0327	1.19	736
		(0.063)	(0.144)	(0.217)	(0.419)	(0.394)	(0.839)	(0.314)	
Joint p-value, baseline outcomes		{0.566}	{0.507}	{0.270}	{0.744}	{0.065}	{0.279}		
Omnibus Wald χ^2(18)								21.11	
								{0.274}	

Notes: The table tests baseline balance across the cumulative number of discount coupons received during the first three sales seasons. Panel A reports the eight prespecified household characteristics; Panel B reports seven baseline livestock and household education outcomes. Column (1) reports the mean among households receiving no coupons during these seasons, within each row's estimation sample. Columns (2)–(7) report regression-adjusted mean differences between coupon-count groups; each comparison subtracts the second coupon count in the column heading from the first. The estimates come from OLS regressions of the row variable on coupon-count indicators and community fixed effects. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Column (8) reports the robust *F*-statistic for the null hypothesis that the adjusted means are equal across all four coupon-count groups, with its *p*-value in parentheses. Column (9) reports the number of observations used for each variable. Panel A uses all 1,179 households. Each outcome in Panel B uses the estimation sample of its corresponding controlled pooled IV regression in the main analysis. For Columns (2)–(7), the joint-test row in each panel reports heteroskedasticity-robust cross-equation Wald *p*-values for the indicated pairwise comparison across the variables in that panel. The final row of each panel reports the omnibus Wald chi-square statistic in Column (8), with its *p*-value directly below in curly braces. The degrees of freedom are indicated in the row labels: 24 in Panel A and 18 in Panel B. The large- and small-livestock shares sum to one on the same estimation sample, making three of the 21 nominal restrictions redundant; the omnibus test therefore has rank 18. Each equation retains its row-specific estimation sample. Joint-test *p*-values are shown in curly braces { }. In the 1,179-household sample, 69, 265, 473, and 372 households received zero, one, two, and three coupons, respectively. See Table 2 for variable definitions.

Table D3: Community-level balance of randomized encouragement intensity

	Community mean	Effect of 10 pp. higher intensity	*p*-value	Standardized effect
Panel A: Prespecified baseline household characteristics				
Age of household head in years	48.116	1.706	(0.295)	[0.316]
Male-headed household	0.710	-0.034	(0.450)	[-0.183]
Household head's years of education	0.813	-0.012	(0.958)	[-0.016]
Adult equivalents	4.804	0.046	(0.844)	[0.085]
Dependency ratio	1.332	0.047	(0.559)	[0.205]
Baseline herded stock (CMVE)	18.281	-3.020	(0.394)	[-0.260]
Monthly household income per capita (USD)	7.837	-0.078	(0.962)	[-0.016]
Agricultural land size (hectares)	0.596	0.245	(0.204)	[0.351]
Panel B: Community scale and analysis-sample composition				
Households in baseline assignment frame	43.606	-1.097	(0.785)	[-0.046]
Log community household count	5.353	0.112	(0.500)	[0.113]
Share attrited by long-run follow-up	0.189	-0.041	(0.261)	[-0.240]
Joint *p*-value: Panel A			0.143	
Joint *p*-value: Panel B			0.120	
Joint *p*-value: all rows			0.152	
Communities	33			

Notes: Randomized encouragement intensity is the number of coupon assignments received by households in a community during the first three sales seasons divided by three times the number of households from that community. Each row reports a separate community-level OLS regression. The coefficient is the change in the row variable associated with a 10 percentage point increase in randomized encouragement intensity. Parentheses report *p*-values based on the heteroskedasticity-robust standard errors, and square brackets report the coefficient divided by the across-community standard deviation of the row variable. All regressions include a country fixed effect because the intended coupon-assignment rate differed between Kenya and Ethiopia. Panel A reports community means of the prespecified household characteristics. Panel B reports community scale and long-run attrition. The community household-count denominator is defined as in Appendix Table H1. The table uses the full 1,439-household assignment frame and all 33 communities. Joint tests use a robust seemingly unrelated estimation system. IBLI contract features vary at the Unit Area of Insurance level—division in Kenya and woreda in Ethiopia—while randomization communities are sublocations in Kenya and kebeles in Ethiopia; every study community is nested within one insurance unit.

Table D4: Number of households present in each round

	Kenya			Ethiopia		
	Total (1)	Original sample (2)	Net replacement (3)	Total (4)	Original sample (5)	Net replacement (6)
R1	924	924	.	515	515	.
R2	924	887	37	506	474	32
R3	924	857	30	514	479	3
R4	924	838	19	513	470	8
R5	923	829	8	438	398	
R6	919	785				
R7	868	781				
Balanced sample		712 (77 %)			387 (75 %)	
Initial & Last		781 (85 %)			398 (77 %)	

Notes: Columns (1) and (4) report households surveyed in each panel round. Columns (2) and (5) report original round-1 sample households observed in each round. Columns (3) and (6) report the net change in replacement households observed since the preceding round, calculated as the change in (Total minus Original sample). R1–R7 denote survey rounds, with seven rounds in Kenya and five in Ethiopia. The "Balanced sample" row reports original baseline households observed in every survey round within each country. The "Initial & Last" row reports original baseline households observed at both baseline and the country-specific final round: R7 in Kenya and R5 in Ethiopia. Percentages are calculated relative to the original baseline sample in each country. Periods indicate that the net change is not applicable in R1. Blank cells denote unreported net changes or survey rounds not conducted, not zeros.

Table D5: Differential attrition by the number of coupons received

	Outcome: Interviewed at baseline but not in the final round (=1)					
	Initial three seasons			All six seasons		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of coupons received – initial three seasons	-.00756	-.00323	-.0169			
	(0.479)	(0.794)	(0.432)			
Number of coupons received – all six seasons				-.00323	-.000594	-.00726
				(0.660)	(0.946)	(0.591)
Sample	All	Kenya	Ethiopia	All	Kenya	Ethiopia
N	1439	924	515	1439	924	515

Notes: This table presents estimates of differential attrition by the number of discount coupons received. The dependent variable equals one if a household was interviewed at baseline but not during the long-run follow-up. Columns (1)–(3) report regressions of this outcome on the number of discount coupons received during the first three sales seasons for the pooled sample, Kenya, and Ethiopia, respectively. Columns (4)–(6) report the corresponding regressions using the number of discount coupons received during all six sales seasons. Each coefficient therefore gives the change in the probability of attrition associated with one additional coupon. All specifications include indicators for temporary absence during the corresponding sales seasons and community fixed effects; the pooled specifications additionally include a country fixed effect. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. The sample consists of the full 1,439-household baseline assignment frame: 924 households in Kenya and 515 in Ethiopia.

Table D6: Attrition by household baseline characteristics

	Independent variable: Interviewed at baseline but not in the final round (=1)		
	(1)	(2)	(3)
Age of household head in years	-1.918	-1.903	-1.942
	(0.125)	(0.215)	(0.363)
Male headed household	-0.056	-0.034	-0.089
	(0.096)	(0.433)	(0.083)
Household head's years of education	0.362	0.603	-0.020
	(0.111)	(0.076)	(0.931)
Adult equivalent	-0.397	-0.540	-0.170
	(0.006)	(0.004)	(0.435)
Dependency ratio	-0.040	-0.222	0.248
	(0.574)	(0.004)	(0.063)
Baseline herded stock (CMVE)	1.111	0.951	1.364
	(0.557)	(0.710)	(0.618)
Monthly household income per capita (USD)	1.259	2.449	-0.620
	(0.232)	(0.120)	(0.560)
Agricultural land size (hectares)	-0.268	-0.342	-0.152
	(0.001)	(0.006)	(0.076)
Sample	All	Kenya	Ethiopia
Joint p-value: all displayed characteristics	0.002	0.000	0.139
N	1439	924	515

Notes: Each row reports the coefficient from a separate OLS regression of one of the eight displayed prespecified baseline characteristics on an indicator equal to one if the household was interviewed at baseline but not in the final round. Thus, each coefficient represents the regression-adjusted mean difference between attriting and nonattriting households. Columns (1)–(3) report estimates for the pooled, Kenya, and Ethiopia samples, respectively. Missing values in the baseline characteristics are replaced with country-specific means; characteristics without missing values are left unchanged. Consequently, every regression uses the full baseline sample for the relevant column: 1,439 households overall, 924 in Kenya, and 515 in Ethiopia. All specifications include community fixed effects. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. The penultimate row reports the *p*-value from a cross-equation Wald test of the null hypothesis that the coefficients on the attrition indicator are jointly zero across all eight displayed characteristics.

Table D7: Joint test of selective attrition

	Outcome: Interviewed at baseline but not in the final round (=1)		
	(1)	(2)	(3)
Age of household head in years	-0.000	-0.000	-0.001
	(0.463)	(0.630)	(0.302)
Male headed household	-0.033	-0.011	-0.058
	(0.197)	(0.721)	(0.218)
Household head's years of education	0.005	0.004	0.002
	(0.266)	(0.383)	(0.834)
Adult equivalent	-0.010	-0.012	-0.006
	(0.058)	(0.055)	(0.561)
Dependency ratio	-0.003	-0.023	0.037
	(0.789)	(0.013)	(0.079)
Baseline herded stock (CMVE)	0.000	0.000	0.001
	(0.331)	(0.503)	(0.280)
Monthly household income per capita (USD)	0.001	0.001	-0.001
	(0.544)	(0.327)	(0.290)
Agricultural land size (hectares)	-0.014	-0.012	-0.033
	(0.010)	(0.016)	(0.110)
Sample	All	Kenya	Ethiopia
Joint p-value: displayed baseline characteristics	0.009	0.003	0.141
N	1439	924	515

Notes: The outcome is an indicator for having attrited by the long-run follow-up. Columns (1)–(3) report the pooled, Kenya, and Ethiopia samples. The pooled specification includes community fixed effects; the country-specific specifications include community fixed effects. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. The penultimate row jointly tests the eight displayed pre-specified characteristics, excluding fixed effects.

Table D8: Differential attrition across coupon receipt status

	Outcome: Interviewed at baseline but not in the final round (=1)		
	(1)	(2)	(3)
***Sale season 1*: 2010 JF (Kenya), 2012 AS (Ethiopia)**			
Received coupon	0.020	0.049	-0.041
	(0.433)	(0.145)	(0.419)
Discount Rate	-0.000	-0.001	0.000
	(0.838)	(0.441)	(0.668)
***Sale season 2*: 2011 JF (Kenya), 2013 JF (Ethiopia)**			
Received coupon	-0.036	-0.018	-0.032
	(0.135)	(0.579)	(0.452)
Discount Rate	0.001	0.000	0.001
	(0.185)	(0.922)	(0.164)
***Sale season 3*: 2011 AS (Kenya), 2013 AS (Ethiopia)**			
Received coupon	-0.055	-0.038	-0.099
	(0.027)	(0.239)	(0.037)
Discount Rate	0.001	0.001	0.001
	(0.124)	(0.485)	(0.097)
***Sale season 4*: 2012 AS (Kenya), 2014 JF (Ethiopia)**			
Received coupon	0.009	-0.042	0.077
	(0.719)	(0.172)	(0.108)
Discount Rate	-0.000	0.001	-0.001
	(0.439)	(0.193)	(0.034)
***Sale season 5*: 2013 JF (Kenya), 2014 AS (Ethiopia)**			
Received coupon	0.009	0.018	0.025
	(0.718)	(0.598)	(0.546)
Discount Rate	-0.000	-0.000	0.000
	(0.750)	(0.530)	(0.947)
***Sale season 6*: 2013 AS (Kenya), 2015 JF (Ethiopia)**			
Received coupon	0.038	0.063	0.016
	(0.148)	(0.058)	(0.719)
Discount Rate	-0.001	-0.001	-0.000
	(0.168)	(0.148)	(0.637)
Sample	All	Kenya	Ethiopia
Joint p-value: coupon indicators	0.105	0.153	0.195
Joint p-value: discount rates	0.365	0.488	0.140
Joint p-value: all assignment variables	0.443	0.556	0.370
N	1439	924	515

Notes: The table regresses attrition on coupon-receipt indicators, assigned discount rates, and temporary-absence indicators for all six sales seasons. Columns (1)–(3) report the pooled, Kenya, and Ethiopia samples. All specifications include community fixed effects and the temporary-absence controls. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. The final rows report joint tests of the coupon indicators, discount rates, and all twelve displayed assignment variables.

Appendix E: Pre-specified outcomes and departures from the pre-analysis plan

E.1 Departures from the Pre-Analysis Plan

The main analysis follows the pre-analysis plan with respect to the experimental sample, the use of the first three insurance sales seasons for identification, the coupon-based instrument, the ANCOVA specification, the baseline controls, location fixed effects, and the primary and secondary outcome families. We make several departures from the pre-analysis plan, which we describe below. Where the originally specified analysis remains informative, we retain it in the appendix.

First, the pre-analysis plan specifies cumulative insurance uptake—the number of the first three sales seasons in which a household purchased any IBLI policy—as the endogenous treatment variable. Our main specification instead uses an indicator for whether the household purchased insurance in any of those seasons. We make this change because most of the variation in the cumulative measure lies at the extensive margin, and the variation beyond it is concentrated in a small number of households. Of the 518 households that purchased at all during the first three seasons, 396 — 76 percent — purchased in exactly one season, and only 16 purchased in all three (Appendix Table B1). The two specifications therefore target different estimands: the count-based estimate also weights additional seasons of coverage, whereas the binary indicator captures whether a household purchased insurance or not, which is the margin that carries most of the identifying variation. Results using the pre-specified count are qualitatively similar (Appendix Tables B2–B4). Take-up rises monotonically in the coupon count on the margins that carry the identifying variation — the probability of purchasing in at least one season, and of purchasing in at least two — while the top margin is too sparsely populated to be informative in either direction, which is why we report the descriptive pattern rather than a formal test of it (see Section 4).

Second, the pre-analysis plan specifies the maximum years of education attained by any household member. The main text, however, focuses on the maximum, total, and average completed years of education among household members who were of school age during at least part of the first three sales seasons. Household members who had already completed their schooling before IBLI was introduced could not change their educational attainment in response to insurance and therefore add variation that cannot be affected by treatment. The school-aged-cohort outcomes more directly capture the population whose education could respond to the intervention. The total and average education measures within this cohort were not pre-specified and are identified as additional outcomes that inform on the distribution of IBLI's effects across household members.

Third, the pre-analysis plan specifies heterogeneous-effect analyses by country, baseline herd-size tercile, and the gender of the household head. We report these analyses in Appendix F, but the main text emphasizes a comparison between households in the bottom two herd-size terciles, roughly corresponding to at most 20 TLU, and households in the top tercile. This grouping follows the conceptual framework, which predicts different responses on opposite sides of a herd-size bifurcation threshold, and prior evidence placing that threshold between roughly 9 and 22 TLU per household (Table 1) among East African pastoralists. The 20-TLU cutoff also roughly corresponds to the boundary between the medium- and high-herd-size strata used in the original sampling design.

Fourth, the pre-analysis plan specifies robust standard errors and sharpened false-discovery-rate-adjusted q-values within outcome families. The main tables instead report p-values based on heteroskedasticity-robust standard errors alongside two Anderson–Rubin randomization-inference p-values. One procedure re-randomizes coupon receipt separately within each sales season before reconstructing the cumulative instrument, while the other permutes the cumulative number of coupons received. These procedures reflect the household-level randomization and the original season-specific assignment process. Sharpened false-discovery-rate-adjusted q-values are reported in Appendix Tables C9–C10.

We supplement the pre-specified activity-based schooling measure with the household share attending school among children aged 6–17 years in Kenya (2020) and 7–17 years in Ethiopia (2022), allowing Kenya to enter despite the absence of comparable endline activity data (Appendix Table E4). Kenyan attendance responses skipped because no education level was completed are coded zero, which assumes nonattendance even though some children may already be attending without having completed a grade. Because this coding links recorded attendance to grade completion, the Kenyan attendance measure may partly reflect school progression as well as participation.[27]

Finally, the paper reports several supplementary analyses that were not specified in the pre-analysis plan, including grouped measures of large and small livestock, additional education outcomes, disaggregated cash and in-kind income, threshold-sensitivity exercises, comparisons of short- and long-run effects, analyses of ex ante insurance coverage and ex post indemnity payments, and tests for interpersonal spillovers. These analyses are used to assess robustness and mechanisms and do not replace the full set of pre-specified outcomes reported in Appendix Tables E1–E4.

[27] Among Kenyan children aged 6–17 in the analysis sample, 723 of 2,079 (34.8%) have these skipped responses: 58 of 161 (36.0%) in households receiving no coupons and 665 of 1,918 (34.7%) in households receiving at least one coupon during the first three sales seasons.

E.2 Pre-specified outcomes

Table E1: Prespecified primary outcomes: Herd size, earnings, education

	Number of animals (CMVE)		Annual household cash earnings (USD)		Maximum years of education	
	(1)	(2)	(3)	(4)	(5)	(6)
Any insurance purchased	3.276	4.220	14.533	31.702	3.433	2.886
	(0.594)	(0.505)	(0.946)	(0.883)	(0.039)	(0.087)
	[0.574]	[0.459]	[0.939]	[0.876]	[0.038]	[0.096]
	{0.499}	{0.394}	{0.929}	{0.849}	{0.016}	{0.052}
FDR *q*-value	1.000	1.000	1.000	1.000	0.133	0.354
Controls		✓		✓		✓
Control mean	13.556	13.556	622.165	622.165	7.208	7.208
Purchaser mean	11.591	11.591	541.487	541.487	7.115	7.115
ITT coefficient (per coupon)	0.367	0.464	1.625	3.487	0.395	0.314
Observations	1179	1179	1179	1179	736	736

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on the pre-specified primary outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1–2, 3–4, and 5–6 are household livestock holdings in CMVE, annual household cash earnings in USD, and the maximum completed years of education among household members who were school-aged during at least part of the first three sales seasons, respectively. Annual household cash earnings aggregate seasonal cash income from livestock and livestock-product sales, crop sales, casual labor, salaried employment, and trading. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "FDR *q*-value" reports Anderson–BKY sharpened false-discovery-rate *q*-values calculated from the conventional two-sided *p*-values across the outcomes reported in this table, separately for specifications with and without the pre-specified household characteristics. All regressions control for the corresponding baseline outcome and the number of discount coupons received during the last three sales seasons. Within each outcome pair, the odd-numbered column omits the pre-specified household characteristics, while the even-numbered column includes them. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the sample reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding sample. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. Columns 1–4 include all 1,179 households in the long-run analysis sample. Columns 5–6 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep. The pre-analysis plan specifies the maximum completed years of education of any household member; columns 5–6 instead report the maximum among household members who were school-aged at least part of the first three sales seasons (Appendix E.1).

Table E2: Prespecified primary outcomes: Herd composition

	Outcome: share of animal type in herded stock (CMVE)							
	Camel		Cattle		Goats		Sheep	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased	0.122	0.112	0.095	0.094	-0.216	-0.214	-0.003	0.008
	(0.185)	(0.213)	(0.270)	(0.261)	(0.026)	(0.024)	(0.946)	(0.872)
	[0.189]	[0.219]	[0.249]	[0.245]	[0.019]	[0.015]	[0.949]	[0.871]
	{0.118}	{0.141}	{0.197}	{0.192}	{0.008}	{0.007}	{0.946}	{0.868}
FDR q-value	0.370	0.354	0.370	0.354	0.115	0.107	0.563	0.535
Controls		✓		✓		✓		✓
Control mean	0.286	0.286	0.228	0.228	0.344	0.344	0.142	0.142
Purchaser mean	0.197	0.197	0.431	0.431	0.273	0.273	0.099	0.099
ITT coefficient (per coupon)	0.013	0.012	0.010	0.010	-0.024	-0.024	-0.000	0.001
Observations	982	982	982	982	982	982	982	982

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on pre-specified herd-composition outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1–2, 3–4, 5–6, and 7–8 are the shares of camels, cattle, goats, and sheep in the household's herded livestock, measured in CMVE, respectively. The four shares sum to one and are therefore mechanically dependent. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "FDR q-value" reports Anderson–BKY sharpened false-discovery-rate q-values calculated from the conventional two-sided p-values across the outcomes reported in this table, separately for specifications with and without the pre-specified household characteristics. All regressions control for the corresponding baseline outcome and the number of discount coupons received during the last three sales seasons. Within each outcome pair, the odd-numbered column omits the pre-specified household characteristics, while the even-numbered column includes them. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the sample reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding sample. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The table includes 982 of the 1,179 households in the long-run analysis sample, excluding households that do not herd any livestock. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep.

Table E3: Prespecified secondary outcomes

	Herd management expenditure (USD)		Milk Income (USD)		Livestock loss (CMVE)		Distress sales (CMVE)		Livestock Sale (CMVE)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Any insurance purchased	-5.010	-21.701	353.834	412.812	-0.039	-0.475	-0.318	-0.401	-1.295	-1.367
	(0.961)	(0.830)	(0.379)	(0.316)	(0.991)	(0.891)	(0.537)	(0.426)	(0.381)	(0.351)
	[0.969]	[0.850]	[0.341]	[0.271]	[0.993]	[0.922]	[0.596]	[0.498]	[0.338]	[0.310]
	{0.957}	{0.827}	{0.268}	{0.197}	{0.993}	{0.908}	{0.574}	{0.478}	{0.268}	{0.243}
FDR q-value	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Controls		✓		✓		✓		✓		✓
Control mean	211.051	211.051	493.427	493.427	4.359	4.359	0.378	0.378	2.624	2.624
Purchaser mean	169.442	169.442	431.342	431.342	5.070	5.070	0.759	0.759	2.069	2.069
ITT coefficient (per coupon)	-0.559	-2.391	39.707	45.465	-0.005	-0.054	-0.041	-0.051	-0.144	-0.150
Observations	1064	1064	1179	1179	1124	1124	781	781	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on pre-specified secondary outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables in columns 1–2, 3–4, 5–6, 7–8, and 9–10 are herd-management expenditures, milk income, livestock losses, distress sales, and livestock sales, respectively. Herd-management expenditures include spending on water, fodder, supplementary feeding, and veterinary services during the past 12 months and are expressed in USD. Milk income includes cash and in-kind income from milk and is expressed in USD. Livestock losses, distress sales, and livestock sales are measured in CMVE. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "FDR q-value" reports Anderson–BKY sharpened false-discovery-rate q-values calculated from the conventional two-sided p-values across the outcomes reported in this table, separately for specifications with and without the pre-specified household characteristics. All regressions control for the corresponding baseline outcome and the number of discount coupons received during the last three sales seasons. Within each outcome pair, the odd-numbered column omits the pre-specified household characteristics, while the even-numbered column includes them. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the sample reported in each column. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding sample. Both means are calculated within the estimation sample for each column. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. Columns 1–2 include 1,064 households with observed endline herd-management expenditure, excluding 115 Kenyan households with missing values. Columns 5–6 include 1,124 households with observed baseline livestock loss, excluding 55 Ethiopian households with missing baseline values.Columns 7–8 include 781 households in Kenya because distress-sale information was not collected at the long-run follow-up in Ethiopia. The remaining columns include all 1,179 households in the long-run analysis sample. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep.

Table E4: Secondary outcomes: IBLI purchase, children's activities, and school attendance

	IBLI uptake in the past 12 months (=1 if purchased)		Livestock insured in the past 12 months (CMVE)		Working		Studying full-time		Attending school	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Any insurance purchased	0.036	0.036	-0.894	-0.837	-0.565	-0.635	0.365	0.354	0.184	0.197
	(0.465)	(0.471)	(0.349)	(0.396)	(0.135)	(0.113)	(0.188)	(0.193)	(0.087)	(0.066)
	[0.536]	[0.538]	[0.488]	[0.514]	[0.059]	[0.039]	[0.155]	[0.174]	[0.087]	[0.067]
	{0.526}	{0.528}	{0.507}	{0.533}	{0.017}	{0.006}	{0.075}	{0.089}	{0.066}	{0.048}
FDR *q*-value	0.459	0.395	0.459	0.395	0.459	0.394	0.459	0.394	0.459	0.394
Controls		✓		✓		✓		✓		✓
Control mean	0.014	0.014	0.116	0.116	0.657	0.657	0.025	0.025	0.582	0.582
Purchaser mean	0.064	0.064	0.700	0.700	0.440	0.440	0.214	0.214	0.620	0.620
ITT coefficient (per coupon)	0.004	0.004	-0.100	-0.092	-0.044	-0.050	0.028	0.027	0.020	0.021
First-stage *F*-stat.	52.01	50.39	52.01	50.39	5.55	5.49	5.53	5.47	46.50	46.33
Observations	1,179	1,179	1,179	1,179	362	362	362	362	1,073	1,073

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in those seasons, on insurance uptake, child activities, and school attendance. Endline IBLI uptake is measured as any purchase during the 12 months before the survey and as the number of animals insured in CMVE. Share of children working is the share of all children in the household who are ages 7–17 years and work. Share of children studying full-time is the share of all children in the household who are ages 7–17 years, study, and do not work. These two measures are available only for Ethiopia. Each activity equation includes its own observed baseline share with the same age and denominator rules; undefined baseline or endline shares are excluded. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. Within each outcome pair, the odd-numbered column omits the pre-specified household characteristics and the even-numbered column includes them. All specifications include final-three-season coupons and community fixed effects; child outcomes additionally include their baseline controls. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "FDR *q*-value" reports Anderson–BKY sharpened false-discovery-rate *q*-values calculated from the conventional two-sided *p*-values across the outcomes reported in this table, separately for specifications with and without the pre-specified household characteristics. "Control mean" is the raw outcome mean among households receiving no initial coupons, and "Purchaser mean" is the raw mean among households that purchased insurance at least once during the first three seasons. Columns (1)–(4) use 1,179 households; columns (5)–(8) use 362 Ethiopian households with observed baseline and endline activity shares; columns (9)–(10) use 719 Kenyan and 354 Ethiopian households. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "First-stage *F*-stat." reports the heteroskedasticity-robust F-statistic testing the excluded coupon instrument in the first-stage regression, using the estimation sample and controls of each column.

Appendix F: Heterogeneity

This section reports the heterogeneity analyses specified in the pre-analysis plan — by baseline herd-size tercile, by gender of the household head, and by country — together with a sensitivity analysis of the herd-size threshold used in the main specification. Appendix Tables F1 and F2 report effects on herd composition and education by baseline herd-size tercile, and Appendix Tables F3 and F4 report the same outcomes by gender of the household head.

We also repeat the main livestock and education analyses allowing the heterogeneity by country. The country-by-herd-group specifications additionally include a bottom-two-terciles indicator and its interaction with the Ethiopia indicator, allowing herd-group differences to vary by country. The full-sample models include two country-specific endogenous treatment terms, while the country-by-herd-group models include four. First-stage identification is weak. Indeed, the Kleibergen–Paap rk Wald F-statistics range from 0.36 to 2.36 for livestock and from 0.50 to 1.80 for education. We therefore interpret the country specific coefficients cautiously, and note that the Anderson–Rubin randomization-inference p-values we report throughout remain valid under weak identification.

We find no statistically significant evidence that the effects differ across Kenya and Ethiopia for any outcome or baseline-herd-size group; the p-values from tests of equality range from 0.486 to 0.990. Given the weak first stages, however, these equality tests have very little power, so the absence of a detectable difference should not be read as evidence of homogeneity. The estimated effects have the same sign across countries for every outcome that is individually significant in either country, and differ in sign only among estimates that are indistinguishable from zero in both. Where the two countries do differ in magnitude, the Ethiopian coefficients are typically the larger in proportional terms, reflecting Ethiopia's substantially lower control means. For example, column 6 of Appendix Table F5 indicates reductions in small livestock of 2.29 CMVE in Kenya and 2.86 CMVE in Ethiopia, approximately 55% and 126% of the respective country-specific control means; neither is statistically significant, with p-values ranging from 0.135 to 0.195 in Kenya and from 0.437 to 0.506 in Ethiopia across the three inference procedures. The full-sample education estimates are also more precisely estimated in Kenya. In the full sample, the estimated effects on total years of education are 7.32 years in Kenya and 6.99 years in Ethiopia, equivalent to approximately 50% and 219% of their respective control means, but the Kenyan estimate is the more precisely estimated of the two (p-values of 0.051 to 0.089, against 0.288 to 0.366 for Ethiopia). Ethiopia's much larger proportional magnitudes throughout reflect its lower control means, which follow in part from the narrower age range observed there: the Ethiopian education cohort is restricted to household members aged 15–17, against 15–29 in Kenya, so that most Ethiopian households contribute a single member and the maximum and total years measures nearly coincide. Together with the weak first-stage statistics, this reinforces the need for caution when interpreting cross-country differences.

The sensitivity of this split to the choice of cutoff is reported in Appendix Figure C1.

Table F1: Long-run effects of catastrophic drought insurance on herd composition, by baseline herd-size tercile

	Share in livestock (CMVE)		Number of animals (CMVE)	
	Large	Small	Large	Small
	(1)	(2)	(3)	(4)
Any insurance purchased × Bottom tercile	0.221	-0.221	-0.461	-1.351
	(0.169)	(0.169)	(0.942)	(0.448)
	[0.257]	[0.257]	[0.890]	[0.394]
	{0.191}	{0.191}	{0.883}	{0.328}
Any insurance purchased × Middle tercile	0.125	-0.125	-9.358	-7.858
	(0.751)	(0.751)	(0.586)	(0.161)
	[0.741]	[0.741]	[0.481]	[0.040]
	{0.711}	{0.711}	{0.432}	{0.029}
Any insurance purchased × Top tercile	0.241	-0.241	18.223	1.767
	(0.133)	(0.133)	(0.073)	(0.312)
	[0.170]	[0.170]	[0.045]	[0.652]
	{0.103}	{0.103}	{0.022}	{0.662}
p-value for equal treatment effects	0.960	0.960	0.160	0.102
Controls	✓	✓	✓	✓
Control mean, bottom tercile	0.434	0.566	7.653	3.513
Purchaser mean, bottom tercile	0.590	0.410	5.138	2.112
Control mean, middle tercile	0.608	0.392	15.400	4.357
Purchaser mean, middle tercile	0.607	0.393	7.631	2.364
Control mean, top tercile	0.548	0.452	7.511	2.827
Purchaser mean, top tercile	0.677	0.323	15.042	3.401
ITT coefficient (per coupon): bottom tercile	0.030	-0.030	-0.099	-0.224
ITT coefficient (per coupon): middle tercile	0.007	-0.007	-0.551	-0.488
ITT coefficient (per coupon): top tercile	0.032	-0.032	2.477	0.263
ITT equality *p*-value: bottom vs. middle	0.393	0.393	0.709	0.403
Sanderson-Windmeijer *F*-stat. (Bottom tercile)	21.19	21.19	22.79	22.74
Sanderson-Windmeijer *F*-stat. (Middle tercile)	3.19	3.19	5.20	5.26
Sanderson-Windmeijer *F*-stat. (Top tercile)	20.77	20.77	29.72	29.39
Observations	982	982	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition, separately by baseline herd-size tercile. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The three group-specific treatment effects are estimated jointly in the interaction model. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the baseline herd-size-tercile indicators. The first, second, and third terciles correspond to the bottom, middle, and top terciles of the community herd-size distribution, respectively. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The dependent variables in columns 1 and 2 are the shares of large and small animals in households' herded livestock, measured in CMVE. The dependent variables in columns 3 and 4 are the numbers of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All three coupon-by-tercile interactions enter the reduced form jointly and are reconstructed after every reassignment. Each reported *p*-value compares the absolute unstudentized coefficient for the corresponding tercile with its randomization distribution under the complete sharp null that coupon assignment affects no unit's outcome in any of the three terciles. All regressions control for the corresponding baseline outcome, the number of discount coupons received during the last three sales seasons, and the pre-specified household characteristics. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "*p*-value for equal treatment effects" reports the *p*-value from a test that the estimated treatment effects are equal across the three baseline herd-size terciles. The rows "Control mean" report average outcomes among households in the corresponding tercile that did not receive any coupons in the first three seasons. The rows "Purchaser mean" report average outcomes among households in the corresponding tercile that purchased insurance in the first three seasons. The rows "ITT coefficient (per coupon)" report the group-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. The row "ITT equality *p*-value: bottom vs. middle" reports the equality test that the bottom- and middle-tercile reduced-form coupon coefficients are equal. Each Sanderson–Windmeijer *F*-statistic measures the conditional first-stage strength of the corresponding endogenous purchase-by-tercile term, conditional on the other two endogenous purchase-by-tercile terms. Columns 1–2 include 982 households and exclude households that do not currently herd any livestock. Columns 3–4 include all 1,179 households in the long-run analysis sample.

Table F2: Long-run effects of catastrophic drought insurance on education, by baseline herd-size tercile

	Household-level education measures			Individual-level education measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Any insurance purchased × Bottom tercile	1.915	10.601	0.954	1.923	0.216
	(0.485)	(0.108)	(0.705)	(0.261)	(0.163)
	[0.416]	[0.087]	[0.647]	[0.248]	[0.166]
	{0.374}	{0.046}	{0.606}	{0.213}	{0.117}
Any insurance purchased × Middle tercile	9.914	19.055	8.901	6.359	0.453
	(0.027)	(0.040)	(0.021)	(0.049)	(0.099)
	[0.000]	[0.002]	[0.000]	[0.005]	[0.031]
	{0.001}	{0.001}	{0.000}	{0.001}	{0.022}
Any insurance purchased × Top tercile	-1.598	-6.017	-1.226	0.067	-0.111
	(0.529)	(0.259)	(0.545)	(0.963)	(0.426)
	[0.456]	[0.254]	[0.481]	[0.773]	[0.306]
	{0.409}	{0.203}	{0.420}	{0.772}	{0.256}
p-value for equal treatment effects	0.059	0.020	0.051	0.142	0.074
Controls	✓	✓	✓	✓	✓
Control mean, bottom tercile	7.476	12.952	5.992	6.182	0.636
Purchaser mean, bottom tercile	7.422	14.549	5.735	6.776	0.735
Control mean, middle tercile	5.929	9.214	3.751	4.031	0.469
Purchaser mean, middle tercile	7.045	12.402	5.593	5.936	0.654
Control mean, top tercile	8.154	18.462	6.277	7.742	0.742
Purchaser mean, top tercile	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon): bottom tercile	0.249	1.314	0.127	0.272	0.031
ITT coefficient (per coupon): middle tercile	0.974	1.923	0.879	0.592	0.043
ITT coefficient (per coupon): top tercile	-0.239	-0.787	-0.194	-0.068	-0.025
ITT equality *p*-value: bottom vs. middle	0.077	0.515	0.033	0.287	0.668
First-stage coefficient (per coupon): bottom tercile	0.113	0.114	0.111	0.138	0.139
p-value first-stage coefficient: bottom tercile	0.001	0.000	0.001	0.000	0.000
Sanderson-Windmeijer *F*-stat. (Bottom tercile)	13.79	14.10	12.69	15.37	15.45
First-stage coefficient (per coupon): middle tercile	0.096	0.097	0.098	0.091	0.091
p-value first-stage coefficient: middle tercile	0.005	0.005	0.004	0.025	0.026
Sanderson-Windmeijer *F*-stat. (Middle tercile)	8.56	8.48	8.70	5.11	5.06
First-stage coefficient (per coupon): top tercile	0.132	0.133	0.134	0.174	0.173
p-value first-stage coefficient: top tercile	0.000	0.000	0.000	0.000	0.000
Sanderson-Windmeijer *F*-stat. (Top tercile)	18.18	18.73	18.25	33.25	33.44
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The three group-specific treatment effects are estimated jointly in the interaction model. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. The model also includes indicators for the middle and top terciles. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during during at least part of the first three sales seasons.. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All three coupon-by-tercile interactions enter the reduced form jointly and are reconstructed after every reassignment. Each reported *p*-value compares the absolute unstudentized coefficient for the corresponding tercile with its randomization distribution under the complete sharp null that coupon assignment affects no unit's outcome in any of the three terciles. For individual-level outcomes, tests of equal treatment effects also use the household-clustered covariance matrix. All regressions control for the corresponding baseline education outcome and the number of discount coupons received during the last three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households. The rows "Control mean" report average outcomes among observations from households that did not receive any coupons in the first three seasons, calculated within the tercile reported in each row. The rows "Purchaser mean" report average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "*p*-value for equal treatment effects" reports the *p*-value from a test that the estimated treatment effects are equal across the three baseline herd-size terciles. The rows "ITT coefficient (per coupon)" report the group-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. The row "ITT equality *p*-value: bottom vs. middle" reports the equality test that the bottom- and middle-tercile reduced-form coupon coefficients are equal, estimated jointly using the same sample and controls as the corresponding IV specification. The test uses heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Each Sanderson–Windmeijer *F*-statistic measures the conditional first-stage strength of the corresponding endogenous purchase-by-tercile term, conditional on the other two endogenous purchase-by-tercile terms. The rows "First-stage coefficient (per coupon)" report, for each tercile, the coefficient on the corresponding coupon-by-tercile term in the first-stage equation for the matching insurance-purchase interaction. All three coupon-by-tercile terms and all included exogenous regressors enter each first-stage equation, using the same estimation sample as the corresponding IV specification. The separately reported *p*-values are based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5.

Table F3: Long-run effects of catastrophic drought insurance on herd composition, by gender of household head

	Share in livestock (CMVE)		Number of animals (CMVE)	
	Large	Small	Large	Small
	(1)	(2)	(3)	(4)
Any insurance purchased × Male-headed	0.194	-0.194	4.498	-1.732
	(0.185)	(0.185)	(0.549)	(0.286)
	[0.175]	[0.175]	[0.547]	[0.474]
	{0.114}	{0.114}	{0.477}	{0.439}
Any insurance purchased × Female-headed	0.272	-0.272	9.793	-0.043
	(0.132)	(0.132)	(0.178)	(0.980)
	[0.083]	[0.083]	[0.110]	[0.848]
	{0.056}	{0.056}	{0.078}	{0.838}
p-value for equal treatment effects	0.747	0.747	0.612	0.472
Controls	✓	✓	✓	✓
Control mean, male-headed	0.513	0.487	12.042	4.269
Purchaser mean, male-headed	0.644	0.356	11.084	3.009
Control mean, female-headed	0.522	0.478	3.125	1.346
Purchaser mean, female-headed	0.590	0.410	5.821	1.883
ITT coefficient (per coupon): male-headed	0.019	-0.019	0.467	-0.188
ITT coefficient (per coupon): female-headed	0.036	-0.036	1.081	-0.032
Sanderson-Windmeijer *F*-stat. (Male-headed)	25.57	25.57	37.60	37.67
Sanderson-Windmeijer *F*-stat. (Female-headed)	16.10	16.10	14.99	15.10
Observations	982	982	1179	1179

Notes:Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition, by gender of the household head. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The two group-specific treatment effects are estimated jointly in the interaction model. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the household-head-gender indicators. The indicator for a male household head, included among the pre-specified household characteristics, provides the group main effect. The dependent variables in columns 1 and 2 are the shares of total herded livestock, measured in CMVE, accounted for by large and small animals. Columns 3 and 4 report holdings of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. For individual-level outcomes, tests of equal treatment effects also use the household-clustered covariance matrix. All regressions control for the corresponding baseline outcome, the number of discount coupons received during the last three sales seasons, and the pre-specified household characteristics. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. Columns 1–2 exclude households that do not currently herd any livestock and include 982 households. Columns 3–4 include all 1,179 households in the long-run analysis sample. The rows "Control mean" report average outcomes among households that did not receive any coupons in the first three seasons, calculated within the household-head-gender group reported in each row. The rows "Purchaser mean" report average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "*p*-value for equal treatment effects" reports the *p*-value from a test that the estimated treatment effects are equal for male- and female-headed households. The rows "ITT coefficient (per coupon)" report the group-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table F4: Long-run effects of catastrophic drought insurance on education, by gender of household head

	Household-level education measures			Individual-level education measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Any insurance purchased × Male-headed	3.038	7.983	2.301	1.968	0.154
	(0.084)	(0.054)	(0.126)	(0.059)	(0.108)
	[0.123]	[0.062]	[0.164]	[0.088]	[0.140]
	{0.064}	{0.029}	{0.110}	{0.054}	{0.096}
Any insurance purchased × Female-headed	1.985	3.048	2.597	2.304	-0.006
	(0.617)	(0.714)	(0.440)	(0.403)	(0.979)
	[0.512]	[0.557]	[0.348]	[0.321]	[0.942]
	{0.479}	{0.520}	{0.316}	{0.290}	{0.937}
p-value for equal treatment effects	0.798	0.580	0.933	0.904	0.515
Controls	✓	✓	✓	✓	✓
Control mean, male-headed	6.897	13.026	5.247	5.907	0.605
Purchaser mean, male-headed	6.977	12.213	5.575	6.277	0.691
Control mean, female-headed	8.556	14.778	6.148	6.333	0.667
Purchaser mean, female-headed	7.391	12.682	5.853	6.200	0.667
ITT coefficient (per coupon): male-headed	0.351	0.959	0.254	0.275	0.023
ITT coefficient (per coupon): female-headed	0.220	0.446	0.258	0.244	0.002
Sanderson-Windmeijer *F*-stat. (Male-headed)	34.70	38.02	35.34	42.89	42.34
Sanderson-Windmeijer *F*-stat. (Female-headed)	5.87	6.69	6.08	6.08	6.26
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes, by gender of the household head. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The two group-specific treatment effects are estimated jointly in the interaction model. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the household-head-gender indicators. The indicator for a male household head, included among the pre-specified household characteristics, provides the group main effect. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All the coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline education outcome and the number of discount coupons received during the last three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The rows "Control mean" report average outcomes among observations from households that did not receive any coupons in the first three seasons, calculated within the household-head-gender group reported in each row. The rows "Purchaser mean" report average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding group. The row "*p*-value for equal treatment effects" reports the *p*-value from a test that the estimated treatment effects are equal for male- and female-headed households. The rows "ITT coefficient (per coupon)" report the group-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Table F5: Long-run effects of catastrophic drought insurance on herd composition by country

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Any insurance purchased × Kenya	0.218	-0.218	5.217	-0.679	-4.534	-2.290	17.164	1.825
	(0.103)	(0.103)	(0.441)	(0.587)	(0.536)	(0.195)	(0.167)	(0.320)
	[0.092]	[0.092]	[0.361]	[0.557]	[0.491]	[0.143]	[0.089]	[0.263]
	{0.053}	{0.053}	{0.344}	{0.541}	{0.466}	{0.135}	{0.089}	{0.224}
Any insurance purchased × Ethiopia	0.211	-0.211	9.109	-4.408	-0.942	-2.862	29.399	-7.530
	(0.293)	(0.293)	(0.356)	(0.408)	(0.932)	(0.506)	(0.296)	(0.573)
	[0.238]	[0.238]	[0.399]	[0.601]	[0.907]	[0.506]	[0.238]	[0.759]
	{0.163}	{0.163}	{0.323}	{0.550}	{0.898}	{0.437}	{0.129}	{0.754}
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
Control mean: Kenya	0.447	0.553	10.635	3.898	11.535	4.155	7.871	3.109
Purchaser mean: Kenya	0.541	0.459	8.404	2.360	5.984	2.253	13.798	2.596
Control mean: Ethiopia	0.742	0.258	6.833	2.133	7.125	2.280	6.250	1.840
Purchaser mean: Ethiopia	0.755	0.245	11.073	3.150	7.326	2.214	16.907	4.608
p-value: Kenya = Ethiopia	0.979	0.979	0.745	0.500	0.788	0.903	0.699	0.494
Kleibergen–Paap rk Wald F	2.27	2.27	2.35	2.36	0.36	0.37	0.36	0.37
ITT coefficient (per coupon): Kenya	0.029	-0.029	0.660	-0.085	-0.471	-0.253	2.918	0.311
ITT coefficient (per coupon): Ethiopia	0.015	-0.015	0.601	-0.289	-0.088	-0.201	1.893	-0.445
Sanderson-Windmeijer *F*-stat. (Kenya)	43.59	43.59	51.44	50.52	25.72	25.10	32.49	31.84
Sanderson-Windmeijer *F*-stat. (Ethiopia)	4.61	4.61	4.71	4.72	3.92	3.92	1.74	1.69
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition, separately for Kenya and Ethiopia. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The country-specific treatment effects are estimated jointly in the pooled sample. The country-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the country indicators. The dependent variables in columns 1 and 2 are the shares of total livestock, measured in CMVE. Columns 3–8 report holdings of large and small animals in CMVE. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The reduced form includes both country-specific coupon terms in columns 1–4 and all four country-by-herd-group coupon terms in columns 5–8. All included coupon terms are reconstructed after every reassignment. Each reported *p*-value uses the absolute unstudentized reduced-form coefficient corresponding to the displayed country and, where applicable, herd-size group, evaluated under the complete sharp null that coupon assignment affects no unit's outcome. All regressions control for the corresponding baseline outcome, the number of discount coupons received during the last three sales seasons, and the pre-specified household characteristics. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The models in columns 5–8 additionally include a bottom-two-terciles indicator and its interaction with the Ethiopia indicator, allowing herd-group differences to vary by country. Columns 1–4 report country-specific treatment effects for all households in the relevant estimation sample. Columns 5–8 report country-specific treatment effects by baseline herd-size group, estimated jointly in interaction models. Columns 5–6 report effects for households in the bottom two herd-size terciles, while columns 7–8 report effects for those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. In columns 5–8, the country- and herd-group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count, the country indicators, and the herd-size tercile indicators. The rows "Control mean: Kenya" and "Control mean: Ethiopia" report average outcomes among households in the corresponding country that did not receive any coupons in the first three seasons. The corresponding "Purchaser mean" rows report average outcomes among households that purchased insurance in the first three seasons. The row "*p*-value: Kenya = Ethiopia" reports the *p*-value from a test that the estimated treatment effects are equal in Kenya and Ethiopia. The rows "ITT coefficient (per coupon)" report the corresponding country-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. Each Sanderson–Windmeijer *F*-statistic measures the conditional first-stage strength of the corresponding endogenous term, conditional on all remaining endogenous regressors. Columns 1–2 exclude households that do not currently herd any livestock and include 982 households. Columns 3–8 include all 1,179 households.

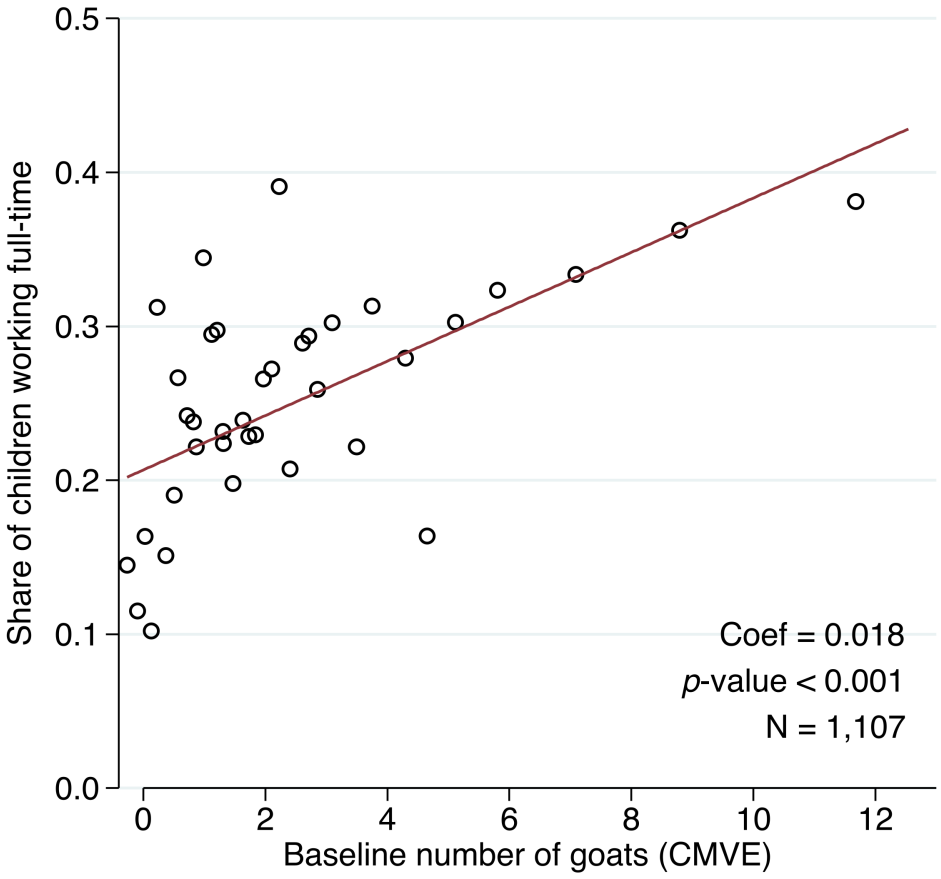
Table F6: Long-run effects of catastrophic drought insurance on education by country

	Household-level measures			Individual-level measures	
	Maximum years (1)	Total years (2)	Average years (3)	Completed years (4)	Any completed schooling (5)
Panel A: All households					
Any insurance purchased × Kenya	2.465	7.319	2.199	1.942	0.140
	(0.158)	(0.086)	(0.129)	(0.072)	(0.137)
	[0.174]	[0.089]	[0.136]	[0.064]	[0.163]
	{0.114}	{0.051}	{0.090}	{0.045}	{0.125}
Any insurance purchased × Ethiopia	5.494	6.994	3.296	2.941	-0.001
	(0.344)	(0.366)	(0.510)	(0.486)	(0.998)
	[0.305]	[0.360]	[0.500]	[0.454]	[0.989]
	{0.240}	{0.288}	{0.461}	{0.381}	{0.988}
Controls	✓	✓	✓	✓	✓
Control mean, Kenya	7.674	14.535	5.778	6.188	0.634
Purchaser mean, Kenya	7.891	14.527	6.182	6.645	0.702
Control mean, Ethiopia	3.200	3.200	2.300	2.667	0.333
Purchaser mean, Ethiopia	4.370	4.740	3.849	3.802	0.560
p-value for equal treatment effects	0.616	0.970	0.832	0.820	0.761
Kleibergen–Paap rk Wald F	1.42	1.41	1.42	1.80	1.78
ITT coefficient (per coupon): Kenya	0.288	0.871	0.254	0.263	0.019
ITT coefficient (per coupon): Ethiopia	0.439	0.550	0.258	0.291	0.001
Sanderson-Windmeijer *F*-stat. (Kenya)	28.76	30.76	29.07	33.83	33.76
Sanderson-Windmeijer *F*-stat. (Ethiopia)	3.14	2.88	3.09	3.73	3.67
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
Any insurance purchased × Kenya	4.684	14.388	4.189	3.485	0.301
	(0.046)	(0.016)	(0.043)	(0.025)	(0.028)
	[0.016]	[0.006]	[0.013]	[0.011]	[0.016]
	{0.013}	{0.003}	{0.011}	{0.005}	{0.013}
Any insurance purchased × Ethiopia	10.820	12.381	7.807	5.936	0.578
	(0.291)	(0.326)	(0.378)	(0.329)	(0.420)
	[0.057]	[0.072]	[0.145]	[0.116]	[0.202]
	{0.035}	{0.040}	{0.098}	{0.070}	{0.137}
Controls	✓	✓	✓	✓	✓
Control mean, Kenya	7.281	12.312	5.355	5.397	0.575
Purchaser mean, Kenya	8.006	15.561	6.202	6.730	0.713
Control mean, Ethiopia	2.333	2.333	2.333	2.333	0.333
Purchaser mean, Ethiopia	3.927	4.415	3.378	3.415	0.547
p-value for equal treatment effects	0.564	0.886	0.692	0.700	0.708
Kleibergen–Paap rk Wald F	0.53	0.52	0.52	0.51	0.50
ITT coefficient (per coupon): Kenya	0.565	1.702	0.487	0.429	0.037
ITT coefficient (per coupon): Ethiopia	1.015	1.222	0.736	0.723	0.075
Sanderson-Windmeijer *F*-stat. (Kenya)	20.93	20.63	19.50	17.48	17.19
Sanderson-Windmeijer *F*-stat. (Ethiopia)	2.98	2.75	2.87	3.42	3.53
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
Any insurance purchased × Kenya	-2.299	-6.812	-1.665	-0.334	-0.095
	(0.416)	(0.280)	(0.443)	(0.819)	(0.484)
	[0.411]	[0.278]	[0.409]	[0.677]	[0.381]
	{0.362}	{0.233}	{0.382}	{0.663}	{0.344}
Any insurance purchased × Ethiopia	-2.044	-3.518	-2.196	-0.415	-0.803
	(0.739)	(0.674)	(0.704)	(0.947)	(0.425)
	[0.774]	[0.694]	[0.698]	[0.869]	[0.322]
	{0.716}	{0.639}	{0.639}	{0.835}	{0.237}
Controls	✓	✓	✓	✓	✓
Control mean, Kenya	8.818	21.000	7.009	8.250	0.786
Purchaser mean, Kenya	7.659	12.424	6.143	6.439	0.677
Control mean, Ethiopia	4.500	4.500	2.250	3.000	0.333
Purchaser mean, Ethiopia	4.938	5.156	4.453	4.342	0.579
p-value for equal treatment effects	0.970	0.755	0.932	0.990	0.486
Kleibergen–Paap rk Wald F	0.53	0.52	0.52	0.51	0.50
ITT coefficient (per coupon): Kenya	-0.320	-0.941	-0.253	-0.108	-0.022
ITT coefficient (per coupon): Ethiopia	-0.217	-0.439	-0.253	-0.117	-0.085
Sanderson-Windmeijer *F*-stat. (Kenya)	14.32	14.49	14.55	28.68	29.29
Sanderson-Windmeijer *F*-stat. (Ethiopia)	2.88	2.81	2.99	1.88	1.86
Observations	736	736	736	1431	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes, separately for Kenya and Ethiopia. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The country-specific treatment effects are estimated jointly in the pooled sample. The country-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the country indicators. Panel A reports country-specific effects for all households in the education estimation sample. Panels B and C report country- and herd-group-specific treatment effects estimated jointly in interaction models. Panel B reports effects for households in the bottom two herd-size terciles, while Panel C reports effects for those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. In Panels B and C, the country- and herd-group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count, the country indicators, and the herd-size tercile indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The reduced form includes both country-specific coupon terms in Panel A and all four country-by-herd-group coupon terms in the joint model underlying Panels B and C. All included coupon terms are reconstructed after every reassignment. Each reported *p*-value uses the absolute unstudentized reduced-form coefficient corresponding to the displayed country and, where applicable, herd-size group, evaluated under the complete sharp null that coupon assignment affects no unit's outcome. All regressions control for the corresponding baseline education outcome and the number of discount coupons received during the last three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are included because randomization was stratified at the community level. The models in Panels B and C additionally include a bottom-two-terciles indicator and its interaction with the Ethiopia indicator, allowing herd-group differences to vary by country. The rows "Control mean, Kenya" and "Control mean, Ethiopia" report average outcomes among observations from households in the corresponding country that did not receive any coupons in the first three seasons, calculated within the group reported in each panel. The corresponding "Purchaser mean" rows report average outcomes among observations from households that purchased insurance in the first three seasons. The row "*p*-value for equal treatment effects" reports the *p*-value from a test that the estimated treatment effects are equal in Kenya and Ethiopia. For individual-level outcomes, tests of equal treatment effects also use the household-clustered covariance matrix. The Kleibergen–Paap rk Wald *F*-statistic is the weak-identification statistic for the joint first stage. Panel A uses the two country-interacted coupon instruments; Panels B and C additionally include the corresponding country-by-herd-group coupon interactions. The rows "ITT coefficient (per coupon)" report the corresponding country-specific reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated jointly by OLS. Each Sanderson–Windmeijer *F*-statistic measures the conditional first-stage strength of the corresponding endogenous term, conditional on all remaining endogenous regressors. In every panel, columns 1–3 include 736 households from the original sample of 1,179 households, excluding households without members in the relevant cohort. Columns 4–5 include 1,431 individual observations from these 736 households.

Appendix G: Mechanisms

Figure G1: Child time use and number of goats at baseline survey



Notes: This figure presents the relationship between baseline goat holdings in CMVE and the share of children working full-time. Share of children working full-time is the share of all the children in the household who are ages 7–17, work in either their primary or secondary activity, and do not study in either activity. Both variables are measured at baseline (2009 in Kenya and 2012 in Ethiopia) The points report bin means, with 40 quantile bins. The fitted line and reported coefficient are estimated by household-level OLS including country fixed effects. The reported *p*-value is based on heteroskedasticity-robust standard errors. The sample includes 1,107 households from the original sample of 1,179 households: 724 in Kenya and 383 in Ethiopia, excluding households with undefined child-working shares. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep.

Table G1: Long-run effects of catastrophic drought insurance on aggregated income

	Annual income (USD)		Positive income indicator	
	Total livestock income	Total crop income	Total livestock income	Total crop income
	(1)	(2)	(3)	(4)
Panel A: All households				
Any insurance purchased	43.271	36.573	0.065	0.141
	(0.825)	(0.008)	(0.582)	(0.122)
	[0.845]	[0.008]	[0.560]	[0.118]
	{0.813}	{0.003}	{0.540}	{0.097}
Controls	✓	✓	✓	✓
Control mean	671.200	5.148	0.797	0.116
Purchaser mean	477.344	15.677	0.801	0.141
Group households	1179	1179	1179	1179
ITT coefficient (per coupon)	4.774	4.035	0.007	0.016
Estimation observations	1179	1179	1179	1179
Panel B: Bottom 2/3				
Any insurance purchased × Bottom 2/3	-121.451	37.524	-0.023	0.041
	(0.631)	(0.049)	(0.886)	(0.738)
	[0.659]	[0.042]	[0.908]	[0.692]
	{0.605}	{0.038}	{0.896}	{0.688}
Controls	✓	✓	✓	✓
Control mean	640.408	6.965	0.804	0.157
Purchaser mean	418.372	15.992	0.784	0.149
Group households	790	790	790	790
ITT coefficient (per coupon)	-11.415	3.775	-0.002	0.005
p-value threshold interaction	0.287	0.947	0.347	0.137
Sanderson-Windmeijer *F*-stat.	28.64	28.64	28.64	28.64
Estimation observations	1179	1179	1179	1179
Panel C: Top 1/3				
Any insurance purchased × Top 1/3	277.559	35.744	0.188	0.301
	(0.350)	(0.062)	(0.250)	(0.018)
	[0.389]	[0.061]	[0.243]	[0.017]
	{0.280}	{0.036}	{0.207}	{0.005}
Controls	✓	✓	✓	✓
Control mean	758.444	0.000	0.778	0.000
Purchaser mean	592.928	15.059	0.834	0.126
Group households	389	389	389	389
ITT coefficient (per coupon)	37.682	4.600	0.025	0.040
p-value threshold interaction	0.287	0.947	0.347	0.137
Sanderson-Windmeijer *F*-stat.	28.60	28.60	28.60	28.60
Estimation observations	1179	1179	1179	1179

Notes: The table uses the same Local Average Treatment Effect specification, panel structure, 1,179-household estimation sample, controls, inference procedures, and row definitions as Appendix Table G2. Panel A reports the pooled effect, while Panels B and C report jointly estimated effects for households in the bottom two and top baseline herd-size terciles, respectively. Columns 1–2 report annual total livestock and crop income in USD. Columns 3–4 report indicators equal to one if the corresponding income outcome is positive. Total livestock income is the exact sum of columns 2–5 of Appendix Table G2, and total crop income is the exact sum of columns 6–7. Because the aggregate and component regressions use the same sample and right-hand side, these accounting identities also hold for the corresponding 2SLS coefficients before rounding. Parentheses report heteroskedasticity-robust *p*-values, brackets [ ] report season-wise randomization-inference *p*-values, and braces { } report cumulative-coupon randomization-inference *p*-values. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. The row "Group households" reports the number of households represented by each panel: 1,179 in Panel A, 790 in Panel B, and 389 in Panel C. Because the group-specific effects are estimated jointly using the full sample, the row "Estimation observations" reports 1,179 in every panel. The row "Sanderson–Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Income construction, component caps, missing-data procedures, and the sensitivity analysis excluding imputed crop totals are described in Appendix A.1.

Table G2: Long-run effects of catastrophic drought insurance on annual income (USD)

	Aggregate	Income components							
	Total household income	In-kind milk income	In-kind slaughter income	Livestock-product earnings	Animal birth income	Constructed in-kind crop income	Earnings from crop within selected total	Employment (food-for-work) income	Earnings from the rest
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: All households									
Any insurance purchased	150.863	-26.663	-0.561	51.750	18.745	23.925	12.647	0.653	70.366
	(0.592)	(0.592)	(0.977)	(0.679)	(0.743)	(0.023)	(0.126)	(0.694)	(0.674)
	[0.586]	[0.598]	[0.975]	[0.697]	[0.769]	[0.033]	[0.171]	[0.710]	[0.684]
	{0.567}	{0.547}	{0.973}	{0.661}	{0.720}	{0.021}	{0.129}	{0.669}	{0.637}
		⟨1.000⟩	⟨1.000⟩	⟨1.000⟩	⟨1.000⟩	⟨0.050⟩	⟨0.068⟩	⟨1.000⟩	⟨1.000⟩
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	1186.608	76.013	49.909	389.878	155.400	4.110	1.037	0.848	509.412
Purchaser mean	988.222	56.797	34.869	257.062	128.615	9.940	5.737	1.292	493.910
Group households	1179	1179	1179	1179	1179	1179	1179	1179	1179
ITT coefficient (per coupon)	16.643	-2.941	-0.062	5.709	2.068	2.639	1.395	0.072	7.763
Estimation observations	1179	1179	1179	1179	1179	1179	1179	1179	1179
Panel B: Bottom 2/3									
Any insurance purchased × Bottom 2/3	-145.356	-62.714	-20.246	34.294	-72.784	26.096	11.428	2.026	-63.456
	(0.698)	(0.318)	(0.410)	(0.830)	(0.324)	(0.067)	(0.331)	(0.345)	(0.777)
	[0.708]	[0.334]	[0.465]	[0.827]	[0.367]	[0.082]	[0.325]	[0.450]	[0.802]
	{0.691}	{0.274}	{0.405}	{0.814}	{0.292}	{0.049}	{0.301}	{0.375}	{0.777}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	1121.365	57.090	56.490	361.322	165.507	5.561	1.404	0.000	473.992
Purchaser mean	916.281	49.704	32.144	229.210	107.315	10.062	5.930	1.567	480.349
Group households	790	790	790	790	790	790	790	790	790
ITT coefficient (per coupon)	-13.193	-6.123	-1.940	3.523	-6.875	2.619	1.157	0.197	-5.750
p-value threshold interaction	0.185	0.335	0.172	0.887	0.056	0.817	0.858	0.269	0.328
Sanderson-Windmeijer *F*-stat.	28.64	28.64	28.64	28.64	28.64	28.64	28.64	28.64	28.64
Estimation observations	1179	1179	1179	1179	1179	1179	1179	1179	1179
Panel C: Top 1/3									
Any insurance purchased × Top 1/3	561.423	31.625	27.985	68.077	149.872	21.444	14.300	-1.333	249.454
	(0.169)	(0.691)	(0.327)	(0.715)	(0.112)	(0.154)	(0.185)	(0.576)	(0.304)
	[0.205]	[0.634]	[0.335]	[0.749]	[0.126]	[0.154]	[0.275]	[0.491]	[0.354]
	{0.131}	{0.608}	{0.267}	{0.701}	{0.072}	{0.130}	{0.216}	{0.429}	{0.292}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	1371.462	129.630	31.262	470.786	126.766	0.000	0.000	3.251	609.767
Purchaser mean	1129.228	70.700	40.211	311.653	170.364	9.702	5.357	0.751	520.489
Group households	389	389	389	389	389	389	389	389	389
ITT coefficient (per coupon)	75.744	4.526	3.837	8.938	20.381	2.743	1.857	-0.188	33.649
p-value threshold interaction	0.185	0.335	0.172	0.887	0.056	0.817	0.858	0.269	0.328
Sanderson-Windmeijer *F*-stat.	28.60	28.60	28.60	28.60	28.60	28.60	28.60	28.60	28.60
Estimation observations	1179	1179	1179	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in those seasons. All income outcomes are measured in USD. Panel A reports the pooled effect, Panel B examines households in the bottom two herd-size terciles, and Panel C focuses on those in the top herd-size tercile. Panels B and C are estimated jointly in an interaction model, with group-specific insurance-purchase terms instrumented by the corresponding coupon-count interactions. Column 1 is annual total household income, defined exactly as the sum of columns 2–9. Columns 2–5 are livestock-income components; column 4 combines the selected milk and other livestock-product receipts. Columns 6–7 split capped gross crop-production value into constructed in-kind crop income and crop earnings bounded above by that total, respectively. Columns 8–9 report food-for-work income and other earnings. Community fixed effects are included. All specifications also include the same seven reconciled baseline income components and the number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Parentheses report heteroskedasticity-robust *p*-values. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 season-wise re-randomizations, and braces { } report corresponding *p*-values from 2,000 permutations of the cumulative first-three-season coupon count. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. In Panel A, angle brackets report BKY sharpened FDR-adjusted *q*-values calculated separately within three economic-domain families: the four livestock-related outcomes in columns 2–5, the two crop-related outcomes in columns 6–7, and the two food-for-work and other-earnings outcomes in columns 8–9. Control and purchaser means are raw means for households receiving no first-three-season coupons and households purchasing any insurance in those seasons, respectively, calculated within the group reported in each panel. Income construction, component caps, missing-data procedures, and sensitivity analyses are described in Appendix A.1. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson–Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. All specifications use 1,179 households; the bottom-two-tercile and top-tercile groups contain 790 and 389 households, respectively.

Table G3: Effects on the number of young adults (18-25 years old)

	Number of young adults aged 18–25	
	(1)	(2)
Any insurance purchased	0.204	0.119
	(0.507)	(0.656)
	[0.528]	[0.685]
	{0.503}	{0.674}
Baseline N of young adults	0.040	-0.260
	(0.314)	(0.000)
Adult equivalent		0.290
		(0.000)
Herd size (CMVE)		-0.002
		(0.112)
Controls		✓
Control mean	0.912	0.912
Purchaser mean	0.864	0.864
ITT coefficient (per coupon)	0.026	0.015
Observations	781	781

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons, instrumented by the number of discount coupons received in the first three seasons on the number of young adults. The dependent variable is "number of young adults" (18-25 years old). Both columns include the baseline number of young adults, the number of coupons received during the final three seasons, and community fixed effects; randomization was blocked at the community level. Column (1) omits the pre-specified household characteristics, whereas column (2) includes them. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales season and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The row "Control Mean" reports the raw outcome mean among households receiving no coupons in the first three seasons. The data for the outcome is only available in Kenya which yields 781 observations. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS.

Table G4: Change in educational attainment outcomes and change in the small ruminants

		Subsample by reduction in small ruminants			Pairwise mean difference		
	Full sample	Sharp reduction (>0.75)	Moderate reduction ($(0, 0.75]$)	No reduction	(2)-(3)	(3)-(4)	(2)-(4)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Change in maximum years of education	3.49	4.13	3.74	2.71	0.40	1.03	1.43
	[4.55]	[4.23]	[4.78]	[4.53]	(0.398)	(0.030)	(0.001)
Change in total years of education	5.75	7.88	5.56	3.99	2.32	1.57	3.90
	[10.01]	[10.74]	[10.11]	[8.85]	(0.034)	(0.103)	(0.000)
Change in average years of education	3.61	4.10	3.73	3.08	0.37	0.65	1.02
	[3.62]	[3.46]	[3.70]	[3.64]	(0.320)	(0.084)	(0.004)
Observations	583	194	175	214	369	389	408

Notes: The table presents summary statistics for the changes in educational attainment among household members who were of school aged during at least part of the first three sales seasons, i.e., 15-29 years old in Kenya and 15-17 years old in Ethiopia (data in Ethiopia is limited to those up to 17 years old) by the change in small ruminants (goats and sheep) from baseline (2009 in Kenya, 2012 in Ethiopia) to endline survey (2020 in Kenya and 2022 in Ethiopia). Column 1 displays the mean and standard deviations for the full sample. Columns 2–4 group households by the proportional reduction in small-ruminant holdings, measured in CMVE as baseline holdings minus endline holdings, divided by baseline holdings: sharp reduction (more than 75 percent), moderate reduction (greater than zero and up to 75 percent), and no reduction (unchanged or increased holdings). Columns 5-7 illustrate the pairwise differences with statistical differences between categories for each outcome. The sample comprises 583 of the 736 households in Table 5. We exclude 75 households with missing baseline education measures and, among the remaining households, 78 with zero baseline small-ruminant holdings, for which the proportional reduction is undefined. All columns use this common sample or the indicated subgroups.

Table G5: Herd composition large versus small ruminants - short-run and long-run

	Share in livestock (CMVE)			
	Large		Small	
	End of experiment	10-year long-run	End of experiment	10-year long-run
	(1)	(2)	(3)	(4)
Any insurance purchased	0.062	0.217	-0.062	-0.217
	(0.348)	(0.056)	(0.348)	(0.056)
	[0.350]	[0.048]	[0.350]	[0.048]
	{0.305}	{0.023}	{0.305}	{0.023}
Controls	✓	✓	✓	✓
Control mean	0.618	0.514	0.382	0.486
Purchaser mean	0.709	0.627	0.291	0.373
ITT coefficient (per coupon)	0.007	0.024	-0.007	-0.024
p-value: short = long	0.193		0.193	
Observations	1069	982	1069	982

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on herd composition at two time points: the end of the experiment (the sixth sales season) and the 10-year follow-up. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variables are the shares of large and small animals in households' herded livestock, measured in CMVE. Columns 1 and 3 report outcomes at the end of the experiment, while columns 2 and 4 report outcomes at the 10-year follow-up. Columns 1–2 report the share of large animals, and columns 3–4 report the share of small animals. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value: short = long" reports equality tests of the short- and long-run IV effects within each outcome and reported group (SUEST of the reduced-form and first-stage equations). Columns 1 and 3 include 1,069 households that herded livestock at the end of the experiment, while columns 2 and 4 include 982 households that herded livestock at the 10-year follow-up. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep. the corresponding IV specification.

Table G6: Livestock holdings large versus small ruminants - short-run and long-run

	Number of animals (CMVE)			
	Large		Small	
	End of experiment	10-year long-run	End of experiment	10-year long-run
	(1)	(2)	(3)	(4)
Panel A: All households				
Any insurance purchased	-1.658	5.853	-0.935	-1.301
	(0.602)	(0.320)	(0.313)	(0.306)
	[0.619]	[0.255]	[0.366]	[0.442]
	{0.573}	{0.210}	{0.309}	{0.416}
Controls	✓	✓	✓	✓
Control mean	9.782	9.974	3.370	3.591
Purchaser mean	12.579	9.326	3.151	2.633
ITT coefficient (per coupon)	-0.188	0.643	-0.106	-0.143
p-value: short = long	0.229		0.803	
Observations	1151	1179	1151	1179
Panel B: Bottom 2/3				
Any insurance purchased × Bottom 2/3	-5.103	-3.475	-2.518	-3.584
	(0.177)	(0.596)	(0.047)	(0.052)
	[0.375]	[0.554]	[0.048]	[0.070]
	{0.308}	{0.514}	{0.018}	{0.048}
Controls	✓	✓	✓	✓
Control mean	8.566	10.843	3.272	3.861
Purchaser mean	9.707	6.410	2.796	2.241
ITT coefficient (per coupon)	-0.530	-0.307	-0.261	-0.347
p-value: short = long	0.812		0.585	
Sanderson-Windmeijer *F*-stat.	30.07	28.22	30.09	28.20
Observations	1151	1179	1151	1179
Panel C: Top 1/3				
Any insurance purchased × Top 1/3	2.381	18.395	1.377	1.888
	(0.682)	(0.069)	(0.367)	(0.272)
	[0.813]	[0.045]	[0.463]	[0.652]
	{0.778}	{0.022}	{0.428}	{0.660}
Controls	✓	✓	✓	✓
Control mean	12.756	7.511	3.611	2.827
Purchaser mean	18.076	15.042	3.829	3.401
ITT coefficient (per coupon)	0.323	2.478	0.185	0.264
p-value: short = long	0.124		0.805	
Sanderson-Windmeijer *F*-stat.	27.06	29.03	26.77	28.68
Observations	1151	1179	1151	1179

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on livestock holdings at two time points: the end of the experiment (the sixth sales season) and the 10-year follow-up. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the baseline-herd-size-group indicators. The dependent variables are the numbers of large and small animals in CMVE. Columns 1 and 3 report outcomes at the end of the experiment, while columns 2 and 4 report outcomes at the 10-year follow-up. Columns 1–2 report large-animal holdings, and columns 3–4 report small-animal holdings. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions control for the corresponding baseline outcome and the total number of discount coupons received during sales seasons 4–6. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row "Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the group reported in each panel. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The rows "ITT coefficient (per coupon)" report the reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value: short = long" reports equality tests of the short- and long-run IV effects within each outcome and reported group (SUEST of the reduced-form and first-stage equations). The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1 and 3 include 1,151 households, while columns 2 and 4 include all 1,179 households in the long-run analysis sample. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep.

Table G7: Education outcomes—short-run and long-run

	Household-level measures						Individual-level measures			
	Maximum years		Total years		Average years		Completed years		Any completed schooling	
	End of experiment	10-year long-run	End of experiment	10-year long-run	End of experiment	10-year long-run	End of experiment	10-year long-run	End of experiment	10-year long-run
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: All households										
Any insurance purchased	0.019	2.886	-1.279	7.276	0.068	2.345	0.340	2.018	-0.007	0.130
	(0.981)	(0.087)	(0.495)	(0.061)	(0.896)	(0.100)	(0.464)	(0.051)	(0.925)	(0.162)
	[0.983]	[0.096]	[0.456]	[0.059]	[0.897]	[0.101]	[0.474]	[0.045]	[0.928]	[0.186]
	{0.976}	{0.052}	{0.433}	{0.032}	{0.891}	{0.065}	{0.432}	{0.029}	{0.918}	{0.143}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	5.804	7.208	12.435	13.354	3.204	5.416	4.086	5.991	0.614	0.617
Purchaser mean	4.786	7.115	9.356	12.369	2.998	5.668	3.516	6.250	0.585	0.682
ITT coefficient (per coupon)	0.002	0.314	-0.166	0.816	0.009	0.255	0.047	0.266	-0.001	0.017
p-value: short = long	0.089		0.025		0.107		0.101		0.219	
Observations	910	736	910	736	910	736	2308	1431	2308	1431
Panel B: Bottom 2/3										
Any insurance purchased × Bottom 2/3	-0.022	5.284	0.493	14.154	0.198	4.383	0.456	3.537	0.027	0.303
	(0.983)	(0.021)	(0.833)	(0.009)	(0.780)	(0.032)	(0.480)	(0.016)	(0.789)	(0.023)
	[0.982]	[0.008]	[0.887]	[0.001]	[0.772]	[0.009]	[0.464]	[0.008]	[0.819]	[0.016]
	{0.979}	{0.002}	{0.886}	{0.001}	{0.756}	{0.004}	{0.430}	{0.004}	{0.796}	{0.006}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	5.182	6.857	9.242	11.457	2.858	5.096	3.427	5.276	0.562	0.566
Purchaser mean	4.868	7.224	9.879	13.425	3.120	5.661	3.682	6.342	0.598	0.693
ITT coefficient (per coupon)	-0.002	0.585	0.037	1.593	0.022	0.474	0.057	0.424	0.003	0.036
p-value: short = long	0.020		0.011		0.040		0.034		0.088	
Sanderson-Windmeijer *F*-stat.	28.56	22.03	28.97	22.65	27.94	20.99	23.71	19.79	23.59	19.64
Observations	910	736	910	736	910	736	2308	1431	2308	1431
Panel C: Top 1/3										
Any insurance purchased × Top 1/3	0.057	-1.948	-4.170	-6.307	-0.126	-1.483	0.171	-0.211	-0.052	-0.126
	(0.965)	(0.439)	(0.229)	(0.236)	(0.872)	(0.458)	(0.814)	(0.881)	(0.648)	(0.359)
	[0.961]	[0.446]	[0.167]	[0.255]	[0.873]	[0.473]	[0.806]	[0.768]	[0.606]	[0.303]
	{0.966}	{0.394}	{0.117}	{0.203}	{0.868}	{0.409}	{0.798}	{0.767}	{0.599}	{0.253}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	7.385	8.154	20.538	18.462	4.083	6.277	5.235	7.742	0.706	0.742
Purchaser mean	4.634	6.915	8.380	10.436	2.772	5.681	3.199	6.045	0.562	0.658
ITT coefficient (per coupon)	0.008	-0.246	-0.572	-0.785	-0.017	-0.198	0.027	-0.069	-0.008	-0.025
p-value: short = long	0.448		0.677		0.492		0.777		0.637	
Sanderson-Windmeijer *F*-stat.	21.61	17.25	21.70	17.66	21.95	17.66	23.71	31.78	23.84	31.94
Observations	910	736	910	736	910	736	2308	1431	2308	1431

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes at the end of the experiment (the sixth sales season) and at the 10-year follow-up. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the baseline-herd-size-group indicators. Columns 1–6 report household-level measures of maximum, total, and average completed years of education; columns 7–10 report individual completed years of education and an indicator for positive completed years of education. Within each outcome pair, the odd-numbered column reports the end-of-experiment outcome and the even-numbered column reports the 10-year follow-up outcome. The outcomes cover the same cohort at both horizons: household members ages 8–22 in Kenya and 8–10 in Ethiopia at the end of the experiment, corresponding to ages 15–29 and 15–17, respectively, at the 10-year follow-up. RReported in parentheses are *p*-values based on heteroskedasticity-robust standard errors in columns 1–6 and standard errors clustered at the household level in columns 7–10. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions use the same baseline-outcome controls, last-three-season coupon control, pre-specified household characteristics, community fixed effects, inference procedures, and definitions of the control and purchaser means as Table 5. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. The rows "ITT coefficient (per coupon)" report the reduced-form effects of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value: short = long" reports equality tests of the short- and long-run IV effects within each outcome and reported group (SUEST of the reduced-form and first-stage equations). The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table G8: Education outcomes at two horizons: common household sample

	Household-level measures						Individual-level measures			
	Maximum years		Total years		Average years		Completed years		Any completed schooling	
	Short run	10-year follow-up	Short run	10-year follow-up	Short run	10-year follow-up	Short run	10-year follow-up	Short run	10-year follow-up
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: All households										
Any insurance purchased	-0.090	1.709	-0.715	6.013	0.252	1.693	0.575	1.762	0.042	0.066
	(0.927)	(0.281)	(0.768)	(0.115)	(0.703)	(0.213)	(0.299)	(0.068)	(0.591)	(0.432)
	[0.922]	[0.282]	[0.759]	[0.119]	[0.708]	[0.214]	[0.314]	[0.072]	[0.600]	[0.466]
	{0.921}	{0.237}	{0.738}	{0.071}	{0.690}	{0.162}	{0.266}	{0.043}	{0.590}	{0.428}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	6.833	8.389	15.056	15.972	3.641	6.138	4.268	6.461	0.614	0.663
Purchaser mean	5.759	7.423	11.892	13.210	3.492	5.843	3.909	6.403	0.611	0.692
ITT coefficient (per coupon)	-0.011	0.208	-0.089	0.750	0.031	0.206	0.074	0.259	0.005	0.010
p-value: short = long	0.250		0.066		0.272		0.217		0.817	
Households	638	638	638	638	638	638	638	638	638	638
Observations	638	638	638	638	638	638	1846	1282	1846	1282
Panel B: Bottom 2/3										
Any insurance purchased × Bottom 2/3	0.040	3.720	1.715	11.728	0.436	3.775	0.678	3.316	0.113	0.226
	(0.971)	(0.056)	(0.528)	(0.016)	(0.596)	(0.039)	(0.366)	(0.011)	(0.294)	(0.050)
	[0.963]	[0.031]	[0.471]	[0.008]	[0.570]	[0.010]	[0.368]	[0.003]	[0.320]	[0.042]
	{0.956}	{0.018}	{0.432}	{0.003}	{0.552}	{0.004}	{0.334}	{0.002}	{0.275}	{0.024}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	6.192	7.538	11.269	12.885	3.345	5.360	3.663	5.403	0.550	0.581
Purchaser mean	5.946	7.584	12.632	14.303	3.707	5.893	4.129	6.501	0.634	0.703
ITT coefficient (per coupon)	0.008	0.495	0.254	1.556	0.056	0.492	0.080	0.468	0.013	0.032
p-value: short = long	0.049		0.028		0.061		0.040		0.430	
Households	638	638	638	638	638	638	638	638	638	638
Sanderson-Windmeijer *F*-stat.	23.85	23.85	24.63	24.63	22.99	22.99	16.75	22.46	16.56	22.36
Observations	638	638	638	638	638	638	1846	1282	1846	1282
Panel C: Top 1/3										
Any insurance purchased × Top 1/3	-0.451	-3.542	-6.970	-8.625	-0.162	-3.499	0.420	-1.052	-0.063	-0.220
	(0.813)	(0.281)	(0.211)	(0.225)	(0.885)	(0.201)	(0.630)	(0.530)	(0.623)	(0.156)
	[0.816]	[0.307]	[0.156]	[0.279]	[0.918]	[0.219]	[0.605]	[0.507]	[0.597]	[0.162]
	{0.825}	{0.271}	{0.113}	{0.239}	{0.914}	{0.172}	{0.578}	{0.482}	{0.598}	{0.126}
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Control mean	8.500	10.600	24.900	24.000	4.408	8.160	5.298	8.889	0.723	0.852
Purchaser mean	5.416	7.129	10.535	11.208	3.097	5.752	3.500	6.186	0.569	0.667
ITT coefficient (per coupon)	-0.050	-0.354	-0.761	-0.821	-0.014	-0.358	0.064	-0.166	-0.009	-0.035
p-value: short = long	0.360		0.806		0.197		0.357		0.355	
Households	638	638	638	638	638	638	638	638	638	638
Sanderson-Windmeijer *F*-stat.	10.13	10.13	10.27	10.27	10.20	10.20	16.47	22.90	16.43	22.75
Observations	638	638	638	638	638	638	1846	1282	1846	1282

Notes: This table presents estimated Local Average Treatment Effects of any insurance purchase in the first three sales seasons on education outcomes at the end of the experiment and at the ten-year follow-up, restricting both horizons to the same 638 households (522 in Kenya and 116 in Ethiopia) with eligible-cohort education outcomes observed at both horizons. Whereas Appendix Table G7 follows the same age cohort, whose households and members can differ across horizons, this table holds household identity fixed; the individuals observed within these households may still differ. Insurance purchase is instrumented by the number of discount coupons received in the first three sales seasons. Panel A reports the pooled effect. Panels B and C report group-specific treatment effects estimated jointly in the interaction model for households in the bottom two herd-size terciles and the top herd-size tercile, respectively. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the baseline herd-size-group indicators. All panels use the full common-household estimation sample. Columns (1)–(6) report household-level maximum, total, and average completed years of education; columns (7)–(10) report individual completed years and an indicator for positive completed years of education. Odd-numbered columns report experiment-end outcomes and even-numbered columns report ten-year follow-up outcomes. The age restrictions align the cohorts by construction: ages 8–22 in Kenya and 8–10 in Ethiopia at experiment end correspond to ages 15–29 and 15–17, respectively, at follow-up. The individual regressions include 1,846 observations at experiment end and 1,282 at follow-up, drawn from the same 638 households; they do not constitute a balanced panel of the same individuals. Parentheses report conventional *p*-values based on heteroskedasticity-robust standard errors in columns (1)–(6) and household-clustered standard errors in columns (7)–(10). Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and sum the assignments to reconstruct the cumulative instrument. Braces { } report the corresponding *p*-values from 2,000 replications that permute the cumulative coupon count. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. All regressions use the same baseline-outcome controls, last-three-season coupon control, prespecified household characteristics, community fixed effects, and baseline-imputation rules as Table 5; individual regressions additionally include country-by-age fixed effects and an indicator for the individual's sex. The baseline-imputation values are retained from the unrestricted analysis. Control and purchaser means are calculated within each regression's estimation sample and the group reported in each panel, among observations from households receiving no coupons and purchasing insurance during the first three seasons, respectively. The ITT row reports the corresponding reduced-form effect of an additional coupon, estimated by OLS with the same sample and controls. Household membership within the eligible cohorts may differ across horizons. The row "*p*-value: short = long" reports equality tests of the short- and long-run IV effects within each outcome and reported group (SUEST of the reduced-form and first-stage equations). The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction.

Table G9: Education – not yet school age during the experiment but school age at endline

	Household outcomes					Individual outcomes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Maximum years	Total years	Average years	Share with any completed schooling	Share currently enrolled	Completed years	Any completed schooling
Panel A: All households							
Any insurance purchased	0.975	0.543	0.411	0.261	0.217	0.313	0.197
	(0.235)	(0.686)	(0.461)	(0.033)	(0.071)	(0.495)	(0.066)
	[0.242]	[0.709]	[0.516]	[0.025]	[0.064]	[0.518]	[0.061]
	{0.197}	{0.688}	{0.482}	{0.017}	{0.049}	{0.481}	{0.040}
Controls	✓	✓	✓	✓	✓	✓	✓
Control mean	3.413	4.841	2.164	0.532	0.603	2.163	0.532
Purchaser mean	3.619	5.155	2.406	0.599	0.623	2.315	0.576
ITT coefficient (per coupon)	0.106	0.059	0.045	0.028	0.024	0.034	0.022
Observations	1,015	1,015	1,015	1,015	1,015	2,266	2,266
Panel B: Bottom 2/3							
Any insurance purchased × Bottom 2/3	0.799	-0.383	0.267	0.304	0.270	0.215	0.220
	(0.450)	(0.823)	(0.711)	(0.058)	(0.083)	(0.715)	(0.123)
	[0.477]	[0.876]	[0.738]	[0.054]	[0.083]	[0.719]	[0.115]
	{0.433}	{0.848}	{0.695}	{0.034}	{0.064}	{0.678}	{0.074}
Controls	✓	✓	✓	✓	✓	✓	✓
Control mean	3.362	5.085	2.142	0.539	0.599	2.153	0.550
Purchaser mean	3.621	5.232	2.459	0.606	0.640	2.333	0.580
ITT coefficient (per coupon)	0.081	-0.032	0.028	0.030	0.027	0.023	0.022
p-value threshold interaction	0.754	0.349	0.699	0.680	0.582	0.740	0.870
Sanderson-Windmeijer *F*-stat.	24.90	24.90	24.90	24.90	24.90	21.97	21.97
Observations	1,015	1,015	1,015	1,015	1,015	2,266	2,266
Panel C: Top 1/3							
Any insurance purchased × Top 1/3	1.309	2.110	0.682	0.208	0.144	0.553	0.184
	(0.306)	(0.318)	(0.418)	(0.251)	(0.420)	(0.495)	(0.276)
	[0.297]	[0.275]	[0.439]	[0.303]	[0.478]	[0.436]	[0.257]
	{0.271}	{0.237}	{0.383}	{0.256}	{0.448}	{0.408}	{0.231}
Controls	✓	✓	✓	✓	✓	✓	✓
Control mean	3.562	4.125	2.229	0.510	0.615	2.200	0.467
Purchaser mean	3.614	5.007	2.304	0.585	0.592	2.280	0.568
ITT coefficient (per coupon)	0.168	0.286	0.089	0.025	0.017	0.069	0.023
p-value threshold interaction	0.754	0.349	0.699	0.680	0.582	0.740	0.870
Sanderson-Windmeijer *F*-stat.	25.78	25.78	25.78	25.78	25.78	17.58	17.58
Observations	1,015	1,015	1,015	1,015	1,015	2,266	2,266

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on education outcomes for a younger cohort that had not yet reached school-entry age during the first three sales seasons but was school-aged at endline. This cohort comprises household members aged 6–14 in Kenya and 7–14 in Ethiopia at endline. These age ranges are defined using the timing of the first three sales seasons and include children who were not yet born during those seasons. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. Panel A reports the effect for all households. Panels B and C report group-specific treatment effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific insurance-purchase terms are instrumented by the corresponding interactions between the first-three-season coupon count and the herd-size tercile indicators. Columns 1–3 report household-level maximum, total, and average completed years of education among members of this cohort. Columns 4–5 report the household shares of cohort members with positive completed years of education and currently enrolled, respectively. Both shares use the same observed cohort members included in the analysis. Columns 6–7 report individual completed years of education and an indicator for positive completed years of education. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors for household-level regressions and standard errors clustered at the household level for individual-level regressions. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. For Panels B and C, both coupon-by-group terms enter the reduced form and are reconstructed in every draw. Each group's coefficient is evaluated against the sharp null of no coupon effect on any unit's outcome in either group. Because members of this cohort were below school-entry age or not yet born during the first three sales seasons, the regressions do not include a corresponding baseline education outcome. All regressions include the number of discount coupons received during the last three sales seasons, the pre-specified household characteristics presented in Table 2, and community fixed effects. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. The rows "Control mean" and "Purchaser mean" report average outcomes among observations from households that received no coupons and households that purchased insurance, respectively, in the first three seasons, calculated within the group reported in each panel. The row "ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. The row "*p*-value threshold interaction" reports the *p*-value from a test that the estimated treatment effects are equal for households in the bottom two terciles and the top tercile of the community herd-size distribution. The row "Sanderson-Windmeijer *F*-stat." reports the conditional first-stage *F*-statistic for each reported insurance interaction, conditional on the other endogenous insurance interaction. Columns 1–5 include 1,015 households of the 1,179 households retained at endline that have at least one eligible cohort member; columns 6–7 include 2,266 individual observations from these households.

Table G10: Long-run effects of catastrophic drought insurance on migration and sedentary

	Settlement and mobility		Crop cultivation	
	Fully settled	Any satellite camp to feed livestock currently	Crops planted during Gana	Crops planted during Hagaiya
	(1)	(2)	(3)	(4)
Any insurance purchased	0.014	-0.167	0.243	-0.144
	(0.902)	(0.423)	(0.519)	(0.641)
	[0.902]	[0.335]	[0.482]	[0.597]
	{0.885}	{0.260}	{0.402}	{0.527}
Controls	✓	✓	✓	✓
Control mean	0.507	0.083	0.250	0.167
Purchaser mean	0.589	0.039	0.196	0.089
ITT coefficient (per coupon)	0.001	-0.011	0.017	-0.010
Observations	1179	398	398	398

Notes: The table presents estimated Local Average Treatment Effects of any insurance purchase in the first three seasons on settlement, mobility, and crop cultivation. Insurance purchase is instrumented by the number of discount coupons received in the first three seasons. The dependent variable in column 1 is an indicator for whether the household is fully settled. Column 2 reports an indicator for whether the household currently uses a satellite camp for livestock. Columns 3–4 report indicators for whether the household planted crops during the Gana and Hagaiya seasons, respectively. Reported in parentheses are *p*-values based on heteroskedasticity-robust standard errors. Brackets [ ] report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific coupon assignments to reconstruct the cumulative coupon instrument. Braces { } report Anderson–Rubin randomization-inference *p*-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. All regressions control for the corresponding baseline outcome, an indicator for a missing baseline outcome, and the number of discount coupons received during the last three sales seasons. Our control variables are the pre-specified household characteristics presented in Table 2 and are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are included because randomization was stratified at the community level. The row 'Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons. The row 'Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons. The row 'ITT coefficient (per coupon)" reports the reduced-form effect of one additional discount coupon received during the first three sales seasons, estimated by OLS. Column 1 includes all 1,179 households in the long-run analysis sample. Columns 2–4 include the 398 households in the Ethiopian subsample.

G.1 Insurance coverage versus indemnity payments

If insurance coverage reduced the need for precautionary savings among households with smaller baseline herds, and incentivized investment in larger, riskier, but higher-return animals among households with larger baseline herds, then the long-run outcomes we estimate should be driven by *ex ante* (of drought) insurance coverage not by *ex post* indemnity payments triggered by (exogenous) low NDVI readings during droughts. The indemnity payments from insurance provided households a lump sum cash transfer, that could have incentivized purchase of lumpy assets, or investments in education. This would parallel prior studies on the effects of cash transfer interventions (Angelucci, Attanasio, and Di Maro 2012; Haushofer and Shapiro 2016; Blattman et al. 2016; Baird, McIntosh, and Özler 2019).

Only 102 households in our sample (60 in Kenya and 42 in Ethiopia) reported receiving an indemnity payment on coverage purchased in the first three sales seasons. This implies that we have limited statistical power to distinguish effects of insurance coverage from the effect of indemnity payments so our results should be interpreted as suggestive only.

We do, however, modify the prior regression specification to interact the predicted probability of any insurance purchase in the first three sales seasons with the number of local index triggers in the household's index unit during the coverage periods of the first three sales seasons, controlling for the number of triggers itself. We estimate the following second-stage equation:

$$y_{ijT} = \gamma_1 \widehat{I_{ij}} + \gamma_2 \widehat{I_{ij}} \times R_j + \gamma_3 R_j + \gamma_4 y_{ij0} + \gamma_5 X_{ij0} + \gamma_6 \sum_{t=4}^{6} D_{ijt} + \alpha_{c(j)} + \varepsilon_{ijT} \tag{12}$$

where R_j is the number of local index triggeres in the household's index unit during the coverage periods associated with the first three sales seasons. The coefficient γ_2 on the interaction between predicted insurance purchase and R_j captures how the estimated insurance effect varies with one additional local index trigger. $\alpha_{c(j)}$ denotes country fixed effects.

The coefficient γ_1 captures the effect of (predicted) insurance uptake on the outcome in the absence of a payout, which we can think of as the "peace-of-mind" (*ex ante*) effect of insurance (Tafere, Barrett, and Lentz 2019). The estimated contrast associated with predicted insurance purchase is $\gamma_1 + r\gamma_2$ when local index-trigger exposure equals r. Thus, $\gamma_1 + \gamma_2$ and $\gamma_1 + 2\gamma_2$ represent the purchase contrasts in locations experiencing one and two index triggers, respectively, during the relevant coverage periods. We include country rather than community fixed effects so that the direct effect of trigger exposure (γ_3), which varies across index units, remains identified. Households assigned to the same baseline index unit share the same trigger exposure, but actual indemnity

receipt also depends on their insurance contracts; with few such units, these estimates should be read with caution.

Appendix Tables G11 and G12 show the results of estimating Equation (12) for the herd composition and education outcomes. The number of shocks substantially reduces the number of large and small animals that respondents own, as expected. The estimated insurance effect at one index trigger ($\gamma_1 + \gamma_2$) appear in the first row of the bottom part of each panel, its *p*-value in the second row. In Appendix Table G11, several of the estimates on the interaction effect and the combined effect appear large, with large standard errors, suggesting a lack of power. It should be noted, however, that the interaction between predicted insurance purchase and the number of shocks is positive and significant for the effect on the number of small animals in Panel B ($p = 0.071$). This effect offsets the direct effect of the number of shocks ($p = 0.403$). This points to insurance payouts helping households to avoid de-capitalization of their assets after a shock (Boucher et al. 2024). The *ex ante* effect of insurance coverage on all outcomes as observed in Table 4, including on the reduction in the number of small animals remains, however, robust to controlling for this effect of insurance payouts.

In Appendix Table G12, the estimated insurance effects at a shock count of zero remain positive across all education outcomes for households in the bottom two-thirds, consistent with the direction and magnitude of the main results in Table 5, although some estimates are imprecise. None of the interactions between predicted insurance purchase and local index-trigger exposure is statistically significant at the 10 percent level. Among households in the bottom two herd-size terciles, the purchase contrasts at one trigger, $\gamma_1 + \gamma_2$, are positive and significant at the 1 percent level for all five education outcomes. At two triggers, $\gamma_1 + 2\gamma_2$, only total household years of education remains statistically significant ($p = 0.009$); the other four contrasts are imprecisely estimated.

These results provide no evidence that a cash liquidity injection from indemnity payments drives our long-run results, although the interaction estimates are imprecise and do not rule out payout effects. This is consistent with broader findings in the literature that cash transfers' short-run effects often do not persist to generate long-term effects (Araujo, Bosch, and Schady 2019; Baird, McIntosh, and Özler 2019; Blattman, Dercon, and Franklin 2022; Blattman, Fiala, and Martinez 2020). The positive insurance effects among households that experienced no payout-triggering drought suggest that insurance coverage mainly drives the results. Our evidence is thus most consistent with an interpretation that reduced *ex ante* risk exposure and the behavioral changes it induces, not the cash transfers resulting from the indemnity payment, generate the long-run effects we observe. This accords with prior findings of subjective well-being gains from insurance coverage even in the absence of payouts (Tafere, Barrett, and Lentz 2019), as well as *ex ante* effects of insurance on increases in productive investments, irrespective of indemnity payments (Karlan, Osei, Osei-Akoto,

and Udry 2014; Cole and Xiong 2017; Jensen, Barrett, and Mude 2017; Hill et al. 2019; Matsuda, Takahashi, and Ikegami 2019; Janzen, Carter, and Ikegami 2021; Boucher et al. 2024; Son 2025).

Table G11: Payout effect on livestock holdings

	Share in livestock (CMVE)		Livestock holdings (CMVE)	
	Large (1)	Small (2)	Large (3)	Small (4)
Panel A: All households				
Predicted insurance purchase (γ_1)	0.058	-0.058	2.815	-4.825
	(0.681)	(0.681)	(0.725)	(0.081)
Predicted insurance purchase × Local index triggers (γ_2)	0.158	-0.158	3.707	3.237
	(0.319)	(0.319)	(0.641)	(0.050)
Local index triggers (γ_3)	-0.064	0.064	-1.421	-2.525
	(0.405)	(0.405)	(0.690)	(0.002)
Coef: $\gamma_1 + \gamma_2$	0.216	-0.216	6.522	-1.587
p-value: $\gamma_1 + \gamma_2$	0.083	0.083	0.302	0.302
Coef: $\gamma_1 + 2\gamma_2$	0.374	-0.374	10.229	1.650
p-value: $\gamma_1 + 2\gamma_2$	0.130	0.130	0.391	0.302
Coef: $\gamma_2 + \gamma_3$	0.094	-0.094	2.286	0.712
p-value: $\gamma_2 + \gamma_3$	0.291	0.291	0.627	0.446
Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Control mean	0.514	0.486	9.974	3.591
Purchaser mean	0.627	0.373	9.326	2.633
Mean local triggers	0.946	0.946	1.010	1.010
Observations in panel	982	982	1179	1179
Observations in regression	982	982	1179	1179
Panel B: Bottom 2/3				
Predicted insurance purchase (γ_1)	0.008	-0.008	-8.288	-6.427
	(0.965)	(0.965)	(0.363)	(0.023)
Predicted insurance purchase × Local index triggers (γ_2)	0.172	-0.172	2.027	2.975
	(0.364)	(0.364)	(0.794)	(0.071)
Local index triggers (γ_3)	-0.084	0.084	-1.434	-2.140
	(0.355)	(0.355)	(0.705)	(0.005)
Coef: $\gamma_1 + \gamma_2$	0.179	-0.179	-6.261	-3.451
p-value: $\gamma_1 + \gamma_2$	0.221	0.221	0.316	0.042
Coef: $\gamma_1 + 2\gamma_2$	0.351	-0.351	-4.233	-0.476
p-value: $\gamma_1 + 2\gamma_2$	0.229	0.229	0.693	0.790
Coef: $\gamma_2 + \gamma_3$	0.088	-0.088	0.593	0.835
p-value: $\gamma_2 + \gamma_3$	0.406	0.406	0.887	0.403
Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Control mean	0.504	0.496	10.843	3.861
Purchaser mean	0.599	0.401	6.410	2.241
Mean local triggers	0.974	0.974	1.039	1.039
Observations in panel	646	646	790	790
Observations in regression	982	982	1179	1179
Panel C: Top 1/3				
Predicted insurance purchase (γ_1)	0.151	-0.151	21.748	-2.220
	(0.541)	(0.541)	(0.154)	(0.694)
Predicted insurance purchase × Local index triggers (γ_2)	0.133	-0.133	10.126	4.571
	(0.659)	(0.659)	(0.591)	(0.207)
Local index triggers (γ_3)	-0.026	0.026	-2.473	-3.639
	(0.854)	(0.854)	(0.748)	(0.079)
Coef: $\gamma_1 + \gamma_2$	0.284	-0.284	31.875	2.352
p-value: $\gamma_1 + \gamma_2$	0.216	0.216	0.025	0.417
Coef: $\gamma_1 + 2\gamma_2$	0.417	-0.417	42.001	6.923
p-value: $\gamma_1 + 2\gamma_2$	0.380	0.380	0.157	0.039
Coef: $\gamma_2 + \gamma_3$	0.107	-0.107	7.654	0.932
p-value: $\gamma_2 + \gamma_3$	0.523	0.523	0.507	0.585
Controls	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Control mean	0.548	0.452	7.511	2.827
Purchaser mean	0.677	0.323	15.042	3.401
Mean local triggers	0.893	0.893	0.951	0.951
Observations in panel	336	336	389	389
Observations in regression	982	982	1179	1179

Notes: The table presents estimated effects of any insurance purchase in the first three seasons on herd composition and examines whether these effects differ according to local index-trigger exposure. Insurance purchase is predicted using the number of discount coupons assigned in the first three seasons. Heterogeneity by index-trigger exposure is captured using the interaction between predicted insurance purchase and the number of times the index was triggered within the household's baseline index unit during the coverage periods associated with the first three sales seasons. Predicted insurance purchase is the fitted probability from a probit regression of any insurance purchase in the first three seasons on the number of discount coupons assigned in those seasons. The shock measure equals this local trigger count for all households, regardless of insurance purchase or indemnity receipt. Each specification includes predicted insurance purchase (γ_1), its interaction with the shock measure (γ_2), and the shock measure (γ_3). Panel A reports the effects for all households. Panels B and C report group-specific effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The dependent variables in columns 1 and 2 are the shares of large and small animals in households' herded livestock, measured in CMVE. Columns 3 and 4 report the numbers of large and small animals in CMVE. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. The row "Coef: $\gamma_1 + \gamma_2$" reports the estimated insurance-purchase effect when the shock measure equals one; the following row reports the corresponding p-value. The row "Coef: $\gamma_1 + 2\gamma_2$" reports the corresponding effect when the shock measure equals two; the following row reports the corresponding p-value. The row "Coef: $\gamma_2 + \gamma_3$" reports the estimated effect of an additional index trigger when predicted insurance purchase equals one; the following row reports the corresponding p-value. All regressions control for the corresponding baseline outcome, the number of discount coupons assigned during the last three sales seasons, country fixed effects, and the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. These specifications do not include community fixed effects. The row "Control mean" reports average outcomes among households that were not assigned any coupons in the first three seasons, calculated within the estimation sample and group reported in each panel. The row "Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding estimation sample and group. Columns 1–2 exclude households that do not herd any livestock, while columns 3–4 include the full long-run analysis sample. "Observations in panel" reports the number of households in the relevant group, while "Observations in regression" reports the full estimation sample used for the joint estimation. In Kenya, 1 CMVE equals 0.625 camel, 1 cattle, or 10 goats/sheep; in Ethiopia, 1 CMVE equals 0.4 camel, 1 cattle, or 6.25 goats/sheep.

Table G12: Payout effect on education outcomes

	Household-level measures			Individual-level measures	
	Maximum years (1)	Total years (2)	Average years (3)	Completed years (4)	Any completed schooling (5)
Panel A: All households					
Predicted insurance purchase (γ_1)	3.614	1.528	4.100	5.955	0.332
	(0.341)	(0.824)	(0.217)	(0.051)	(0.291)
Predicted insurance purchase × Local index triggers (γ_2)	-0.786	4.841	-1.746	-2.781	-0.145
	(0.770)	(0.393)	(0.468)	(0.219)	(0.503)
Local index triggers (γ_3)	0.370	-2.006	1.250	1.843	0.123
	(0.761)	(0.428)	(0.250)	(0.066)	(0.196)
Coef: $\gamma_1 + \gamma_2$	2.828	6.369	2.354	3.175	0.187
p-value: $\gamma_1 + \gamma_2$	0.140	0.113	0.147	0.032	0.208
Coef: $\gamma_1 + 2\gamma_2$	2.043	11.209	0.608	0.394	0.042
p-value: $\gamma_1 + 2\gamma_2$	0.450	0.109	0.801	0.864	0.834
Coef: $\gamma_2 + \gamma_3$	-0.415	2.835	-0.496	-0.938	-0.022
p-value: $\gamma_2 + \gamma_3$	0.789	0.397	0.722	0.477	0.862
Controls	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
Mean local triggers	1.145	1.145	1.145	1.241	1.241
Observations in panel	736	736	736	1431	1431
Observations in regression	736	736	736	1431	1431
Panel B: Bottom 2/3					
Predicted insurance purchase (γ_1)	7.718	8.474	8.508	9.345	0.752
	(0.080)	(0.322)	(0.033)	(0.010)	(0.045)
Predicted insurance purchase × Local index triggers (γ_2)	-1.627	6.634	-3.071	-3.745	-0.277
	(0.609)	(0.327)	(0.294)	(0.158)	(0.292)
Local index triggers (γ_3)	0.967	-2.158	2.073	2.485	0.201
	(0.509)	(0.469)	(0.121)	(0.036)	(0.090)
Coef: $\gamma_1 + \gamma_2$	6.091	15.108	5.438	5.600	0.475
p-value: $\gamma_1 + \gamma_2$	0.006	0.003	0.005	0.001	0.006
Coef: $\gamma_1 + 2\gamma_2$	4.464	21.742	2.367	1.855	0.198
p-value: $\gamma_1 + 2\gamma_2$	0.176	0.009	0.424	0.482	0.407
Coef: $\gamma_2 + \gamma_3$	-0.660	4.476	-0.997	-1.260	-0.076
p-value: $\gamma_2 + \gamma_3$	0.716	0.265	0.550	0.411	0.613
Controls	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
Mean local triggers	1.186	1.186	1.186	1.289	1.289
Observations in panel	479	479	479	947	947
Observations in regression	736	736	736	1431	1431
Panel C: Top 1/3					
Predicted insurance purchase (γ_1)	-1.918	-6.289	-1.828	1.507	-0.275
	(0.769)	(0.562)	(0.732)	(0.765)	(0.606)
Predicted insurance purchase × Local index triggers (γ_2)	-1.095	-3.822	-1.156	-3.005	-0.099
	(0.807)	(0.668)	(0.766)	(0.457)	(0.790)
Local index triggers (γ_3)	0.064	0.612	0.514	1.372	0.048
	(0.975)	(0.884)	(0.768)	(0.450)	(0.765)
Coef: $\gamma_1 + \gamma_2$	-3.013	-10.111	-2.984	-1.498	-0.374
p-value: $\gamma_1 + \gamma_2$	0.380	0.123	0.280	0.561	0.155
Coef: $\gamma_1 + 2\gamma_2$	-4.108	-13.932	-4.140	-4.503	-0.472
p-value: $\gamma_1 + 2\gamma_2$	0.372	0.216	0.317	0.321	0.189
Coef: $\gamma_2 + \gamma_3$	-1.031	-3.210	-0.642	-1.634	-0.051
p-value: $\gamma_2 + \gamma_3$	0.688	0.513	0.774	0.477	0.816
Controls	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
Mean local triggers	1.070	1.070	1.070	1.147	1.147
Observations in panel	257	257	257	484	484
Observations in regression	736	736	736	1431	1431

Notes: The table presents estimated effects of any insurance purchase in the first three seasons on education outcomes and examines whether these effects differ according to local index-trigger exposure. Insurance purchase is predicted using the number of discount coupons assigned in the first three seasons. Heterogeneity by index-trigger exposure is captured using the interaction between predicted insurance purchase and the number of times the index was triggered within the household's baseline index unit during the coverage periods associated with the first three sales seasons. Predicted insurance purchase is the fitted probability from a probit regression of any insurance purchase in the first three seasons on the number of discount coupons assigned in those seasons. The shock measure equals this local trigger count for all households, regardless of insurance purchase or indemnity receipt. Each specification includes predicted insurance purchase (γ_1), its interaction with the shock measure (γ_2), and the shock measure (γ_3). Panel A reports the effects for all households. Panels B and C report group-specific effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. The row "Coef: $\gamma_1 + \gamma_2$" reports the estimated insurance-purchase effect when the shock measure equals one; the following row reports the corresponding p-value. The row "Coef: $\gamma_1 + 2\gamma_2$" reports the corresponding effect when the shock measure equals two. The row "Coef: $\gamma_2 + \gamma_3$" reports the estimated effect of an additional index trigger when predicted insurance purchase equals one; the following row reports the corresponding p-value. All regressions control for the corresponding baseline education outcome, the number of discount coupons assigned during the last three sales seasons, country fixed effects, and the pre-specified household characteristics presented in Table 2: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects, which absorb country fixed effects, and an indicator for the individual's gender. These specifications do not include community fixed effects. The row "Control mean" reports average outcomes among observations from households that were not assigned any coupons in the first three seasons, calculated within the estimation sample and group reported in each panel. The row "Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding estimation sample and group. Columns 1–3 include 736 households, excluding households without members in the relevant cohort; columns 4–5 include 1,431 individual observations from those households. "Observations in panel" reports the number of observations in the relevant group, while "Observations in regression" reports the full estimation sample used for the joint estimation.

Appendix H: Robustness to interpersonal spillovers

We also consider the possibility that interpersonal spillovers violate the assumptions on which causal identification depends in our design. Because randomization occurred at the household level, within communities, such household spillovers could imply that the take-up or outcomes measured in control households are influenced by the discount coupons received, insurance take-up or outcomes of treated households. Evidence of informal risk-sharing and informal transfers makes such spillovers plausible (Mobarak and Rosenzweig 2013; Riley 2018; Anderberg and Morsink 2020; Takahashi, Barrett, and Ikegami 2019; Berg, Blake, and Morsink 2022).

Let D_{ij} denote discount coupon receipt by herder i residing in community j, I_{ij} represent insurance purchase, and Y_{ij} denote the long-run outcome of this herder. Note that there exists a group of other herders, $-i$, whom we refer to as "peers," also from community j. We define peers based on co-residence in the same community (sublocation in Kenya, kebele in Ethiopia) rather than on social network ties, since we did not collect data on households' social networks in this study. We use D_{-ij}, I_{-ij}, and Y_{-ij} to denote peers' coupon receipt, insurance purchase, and long-run outcomes in general, as they enter the conceptual spillover pathways discussed below. In our empirical analysis, we cannot trace effects between individual peers and instead use aggregate measures across all sampled peers in the community, which we denote with a bar: $\overline{D}_{-ij}$ is the total number of discount coupons received by peers during the first three sales seasons, and $\overline{I}_{-ij}$ is the number of peer households that purchased insurance at least once during those seasons. Those measures exclude household i itself. For this analysis, we assume that no inter-community spillovers exist.

The original experiment randomized households within communities, each season, to either receive discount coupons or not. At the level of households within a community this creates random variation in the intensity of encouragement received by peers. One challenge, given that our research was not designed to measure spillovers, is that the randomization within communities implies that coupon receipt by the recipient and their peers' are mechanically negatively correlated. Given the fixed pool of coupons assigned to a community, if one respondent received a coupon, their peers were mechanically (slightly) less likely to receive one. Let S_j denote the total number of coupons received by sample households in community j during the first three sales seasons. Then $\overline{D}_{-ij} = S_j - D_{ij}$, so within a community own and peer coupon counts move one-for-one in opposite directions (Guryan, Kroft, and Notowidigdo 2009; Caeyers and Fafchamps 2026). Own and peer coupon counts therefore provide no independent within-community variation, and we cannot include the community fixed effects of our main specification (Fruehwirth, Iyer, and Zhang 2019; Rahman 2023). Instead, we pool households across communities and leverage across-community variation in the intensity of the instrument of both the recipient and their peers. Identification is

correspondingly weaker than that of our main specification. We can only check if our main results are robust to potential spillovers, but we cannot quantify or even reliably sign the direction of spillovers, given that they are not separately identifiable from the mechanical correlation. We therefore read this analysis as a test of whether SUTVA is violated rather than as a source of estimates in its own right. We investigate these potential spillovers in the first stage – so from peers' discount coupons received on recipients' insurance purchase and vice versa – and in the second stage – from recipients' insurance purchase on peers' outcomes and vice versa.

To explore whether spillovers confound our main results, we first distinguish the main specification and individual spillover pathways in Appendix Figures H1–H3. We then combine these pathways in Appendix Figure H4 to clarify their joint implications for identification.

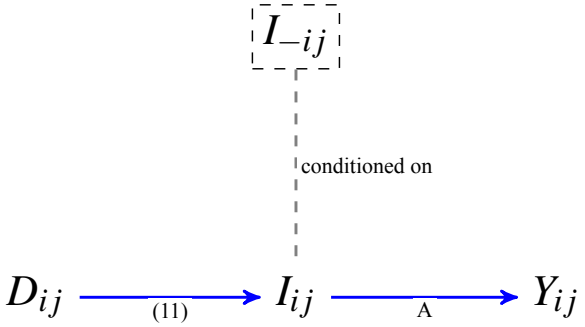
Appendix Figure H1 shows our main specification: the causal effect of interest, labeled A, is the LATE of i's insurance purchase I_{ij} on i's long-run outcome Y_{ij}, instrumented by the randomized discount coupons D_{ij} (pathway (11)). In the robustness specification below, we additionally condition on peers' insurance purchase I_{-ij}; because conditioning is not itself a causal pathway, we show it as a dashed, undirected relationship rather than an arrow. Appendix Figure H2 shows the potential first-stage spillover pathways – whether a herder's coupon receipt affects their peers' insurance purchase (pathway (1)), and vice versa (pathway (2)) – alongside each herder's own first stage ((10) and (11)) for reference. Appendix Figure H3 shows the potential second-stage and outcome spillover pathways: purchase-to-purchase spillovers ((3) and (4)), a herder's purchase directly affecting a peer's outcome ((5) and (6)), and outcome-to-outcome spillovers ((7) and (8)), alongside each herder's own second stage (A and B) for reference. As discussed above, coupon receipt by a herder and their peers is mechanically negatively correlated by design; because this is not a causal pathway, we do not depict it in these figures.

The following examples illustrate what these pathways could look like in our context.

- Pathway (1) and (2): The receipt of a discount coupon by a herder affects the likelihood that their peers take-up insurance, and vice versa. In our context, examples of this might be that herder i, upon receiving the discount coupon, also receives *information* about insurance that they communicate to $-i$, which makes $-i$, irrespective of their own coupon receipt, more likely to purchase insurance. Alternatively, receiving a discount coupon by i could lead to *status concerns* that (dis)incentivize $-i$ to purchase insurance, irrespective of their own coupon receipt.

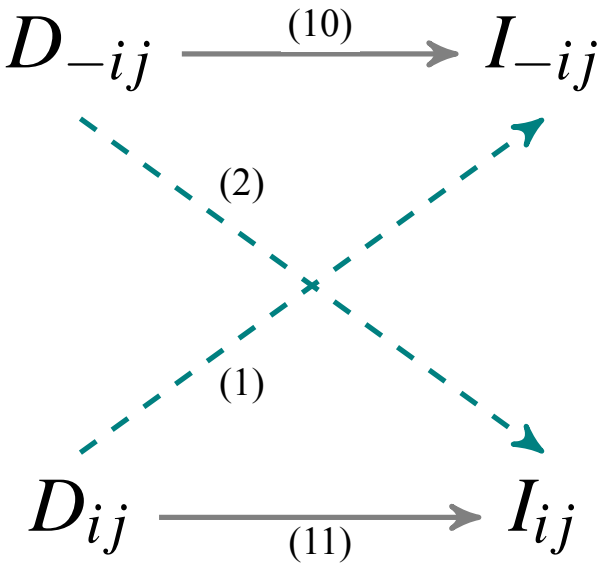
- Pathway (5) and (6): The insurance purchase by herder i changes the outcomes of a peer (Y_{-ij}) directly, not through the outcomes of i (see pathway (7) and (8) below). An example

Figure H1: DAG: Main specification



Notes: Solid blue arrows show our main specification: the LATE of insurance purchase I_{ij} on long-run outcome Y_{ij} (A), instrumented by discount coupon receipt D_{ij} (11). In our robustness specification controlling for peer spillovers (Appendix Tables H3–H5), we additionally condition on peers' insurance purchase I_{-ij}, shown in the dashed box; this is a conditioning relationship, not a causal pathway, and is drawn undirected accordingly. See Appendix Figures H2 and H3 for the spillover pathways this conditioning addresses.

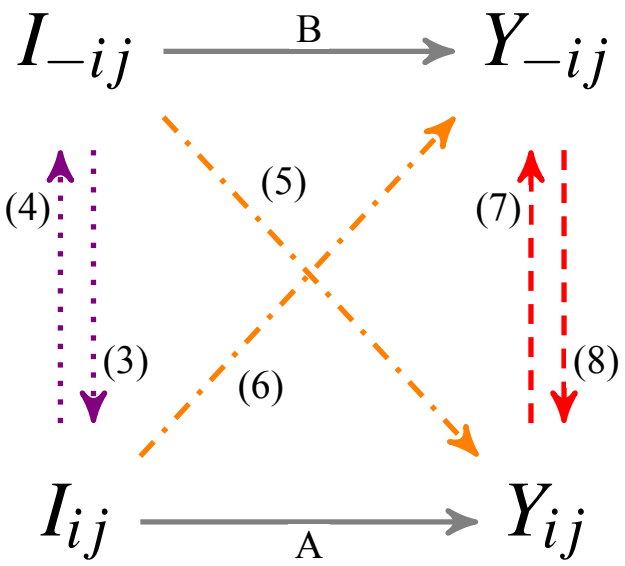
Figure H2: DAG: First-stage spillovers



Notes: Solid gray arrows show each herder's own first stage (10, 11), reproduced for reference and not themselves a spillover concern. Dashed teal arrows show the first-stage spillover pathways we test directly in Appendix Table H2: whether a herder's coupon receipt predicts their peers' insurance purchase (1), and vice versa (2).

would be a case where the willingness to share risk through informal transfers by either i or $-i$ is changed as a result of their insurance status. For example, Takahashi, Barrett, and Ikegami (2019) shows that a herder's insurance uptake has no effect on her willingness to transfer to peers, but insurance purchase by peers does increase herder i's willingness to transfer.

Figure H3: DAG: Second-stage and outcome spillovers



Notes: Solid gray arrows (A, B) show each herder's own second stage, reproduced for reference. Dotted violet arrows (3, 4) show purchase-to-purchase spillovers, e.g. through social learning or free-riding. Dash-dot orange arrows (5, 6) show a herder's insurance purchase directly affecting a peer's outcome other than through the peer's own purchase decision. Dashed red arrows (7, 8) show outcome-to-outcome spillovers. Pathways (3)-(8) are the indirect exclusion-restriction and SUTVA violations we test in Appendix Tables H3–H5. The mechanical negative correlation between D_{ij} and D_{-ij}, arising because the number of coupons distributed per community is approximately fixed, is not a causal pathway and is discussed in the text rather than depicted here.

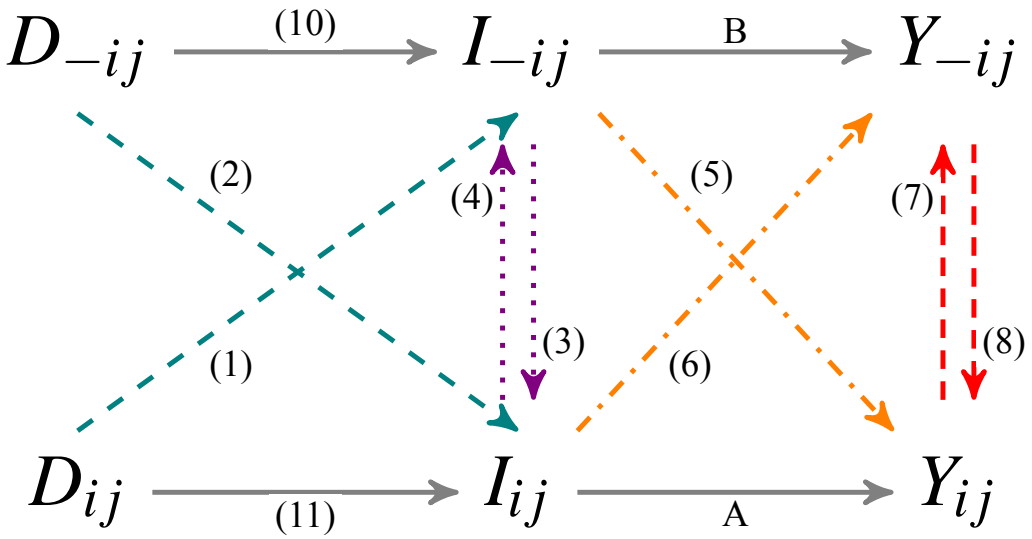
Alternatively, if formal insurance is available, and i purchases insurance but $-i$ does not, i may become less willing to transfer to $-i$ because $-i$ refrained from protecting themselves by purchasing insurance and instead decided to free-ride on i's insurance purchase (Anderberg and Morsink 2020).

- Pathway (7) and (8): The outcomes of herder i affect the outcomes of their peers, or vice versa. This is empirically difficult to distinguish from the mechanisms discussed in pathways (5) and (6). Examples would be where claim payments received by i increase i's income, and as a result, i increases transfer to $-i$.

Appendix Figure H4 combines the first-stage and outcome pathways to clarify their joint implications for identification. Peers' insurance purchase may affect the recipient's outcome directly through pathway (5), or indirectly through peers' outcomes along B $\rightarrow$ (8). If the recipient's coupon receipt also affects peers' insurance purchase through pathway (1), these channels generate the routes $D_{ij} \rightarrow I_{-ij} \rightarrow Y_{ij}$, combining (1) and (5), and $D_{ij} \rightarrow I_{-ij} \rightarrow Y_{-ij} \rightarrow Y_{ij}$, combining (1), B,

and (8). Both routes reach Y_{ij} without passing through I_{ij} and can therefore violate the exclusion restriction for own coupon receipt as an instrument for own insurance purchase. The route (1) $\rightarrow$ (3) $\rightarrow$ A passes through the recipient's own purchase and does not by itself illustrate such a bypass. The robustness analysis below examines the sensitivity of our estimates to jointly instrumenting own and peer insurance purchase; it does not separately identify these mechanisms or establish that spillovers are absent.

Figure H4: DAG: Combined first-stage and outcome spillovers



Notes: This figure combines the pathways shown separately in Appendix Figures H2 and H3. Solid gray arrows (10, 11, A, B) show own first-stage and purchase–outcome links. Dashed teal arrows (1, 2) show first-stage spillovers. Dotted violet arrows (3, 4) show purchase-to-purchase spillovers; dash-dot orange arrows (5, 6) show purchase-to-peer-outcome spillovers; dashed red arrows (7, 8) show outcome-to-outcome spillovers. D_{ij}, I_{ij}, and Y_{ij} denote household i's coupon receipt, insurance purchase, and long-run outcome in community j. Subscript $-ij$ denotes the corresponding peer measure, excluding household i. Numbers, colors, and line styles match those in the separate figures.

Appendix Table D3 reports community-level balance of randomized encouragement intensity against the eight prespecified household characteristics averaged to the community, community scale, and long-run attrition. No row is individually significant and no panel is jointly significant, which addresses the concern that cross-community variation in encouragement intensity might reflect differences in community size rather than randomization. Appendix Table H1 shows that, across sampled households, peers received between 28 and 160 discount coupons over the first three sales seasons, with a mean of 87.53. The number of peers who purchased insurance at least once during those seasons ranged from 0 to 50, with a mean of 19.02. The ratio of sample peer purchasers to the community household-count denominator defined in the table note ranged from 0 to 0.35.

Table H1: Summary statistics of the spillover variables

	Kenya			Ethiopia			Pooled		
	Mean [SD]	Min	Max	Mean [SD]	Min	Max	Mean [SD]	Min	Max
D_{ij}: No. of coupons received	1.78 [0.87]	0.00	3.00	2.36 [0.77]	0.00	3.00	1.97 [0.88]	0.00	3.00
I_{ij}: Any insurance purchase	0.43 [0.50]	0.00	1.00	0.45 [0.50]	0.00	1.00	0.44 [0.50]	0.00	1.00
$\overline{D}_{-ij}$: Total coupons received by peers	100.88 [41.15]	44.00	160.00	61.32 [18.72]	28.00	103.00	87.53 [39.87]	28.00	160.00
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	22.83 [10.32]	8.00	50.00	11.55 [4.83]	0.00	19.00	19.02 [10.34]	0.00	50.00
Sample peer purchasers relative to community size	0.04 [0.03]	0.01	0.20	0.13 [0.08]	0.00	0.35	0.07 [0.07]	0.00	0.35

Notes: N=781 for Kenya, 398 for Ethiopia, and 1,179 for the pooled sample. Peers are other sample households within the same community. $\overline{D}_{-ij}$ is the total number of discount coupons received by peers during the first three sales seasons. $\overline{I}_{-ij}$ is the number of peers who purchased insurance at least once during those seasons. The final row divides this peer-purchaser count by a community household-count denominator. See Appendix H for details.

Using the peer coupon and insurance-purchase measures defined above, we estimate the first-stage relationships with own and peer coupon receipt. We control for household i's prespecified baseline characteristics and the leave-one-out community averages of the same characteristics among its sampled peers. Appendix Table H2 shows the results of the first-stage estimates. Columns 1-3 show that the effect of the number of discount coupons received by the recipient on their insurance purchase is unaffected in magnitude and significance by inclusion of the peers' discount coupons' receipt. Columns 4-6 show that the effect of the number of discount coupons received by peers on peers' insurance purchase is unaffected in sign and significance by the discount coupons received by the recipient. Together, these findings provide no evidence that discount coupons received by peers meaningfully affect coupon recipients' insurance purchase, or vice versa. Because peers' coupons strongly predict peers' insurance purchase, we use them to instrument peer purchase in the second-stage robustness check below.

We test for the robustness of our main results by including the total number of discount coupons received by peers during the first three sales seasons as an additional instrument, and the number of peers who purchased insurance at least once during those seasons as an additional endogenous regressor in our main specifications in equations (1) and (2). Appendix Tables H3, H4, and H5 present the second-stage results. The main results are all qualitatively similar after inclusion of these additional peer variables, although for some effects we lose statistical power due to the addition of another instrument and endogenous regressor and the omission of community fixed effects. The effects on herd composition remain negative at a 38.2 percentage points reduction in the share of small animals herded, significant at the five percent level (versus a 21.7 percentage points de-

crease when not controlling for potential interpersonal spillovers and including community fixed effects). The heterogeneous effects by baseline herd size also remain qualitatively similar, with a decrease of 4.1 CMVE in small animals among households in the bottom two baseline herd-size terciles, and an increase of 20.6 CMVE in large animals among the one-third of households with a large herd size at baseline (versus 3.6 and 18.4 CMVE, respectively, when not controlling for potential interpersonal spillovers and including community fixed effects). The estimated effects for maximum, total and average years of education are now 3.1, 7.4, and 3.0 years respectively, and are not different from our main results, neither for our full sample, nor for our two sub-samples. The estimated effects on the share of children working and the share studying full-time are directionally unchanged but no longer statistically significant using heteroskedasticity-robust inference. Overall, these robustness checks reinforce our central findings.[28]

[28]The results are robust to different combinations of own and peers' control variables (Appendix Tables H6-H9).

Table H2: Spillover effects: First stage

	Outcome: Any insurance purchase - first three seasons					
	I_{ij}: Recipient's			$\bar{I}_{-ij}$: Peers'		
	(1)	(2)	(3)	(4)	(5)	(6)
D_{ij}: Recipient's number of coupons received	0.098		0.093	-1.458		-0.775
	(0.000)		(0.000)	(0.000)		(0.001)
	[0.000]		[0.000]	[0.003]		[0.039]
	{0.000}		{0.000}	{0.000}		{0.003}
$\overline{D}_{-ij}$: Total coupons received by peers		-0.002	-0.001		0.180	0.178
		(0.000)	(0.002)		(0.000)	(0.000)
		[0.030]	[0.962]		[0.880]	[0.907]
		{0.062}	{0.932}		{0.848}	{0.891}
Pathway (DAG)	(11)	(2)	(2);(11)	(1)	(10)	(1);(10)
Recipient controls (i)	✓	✓	✓	✓	✓	✓
Peers' controls (-i)	✓	✓	✓	✓	✓	✓
Community FE						
(Control) mean outcomes	0.203	.	0.203	21.913	.	.
Observations	1179	1179	1179	1179	1179	1179

Notes: The table presents first-stage estimates of the effects of randomized coupon receipt on insurance purchase by each sample household and by its peers in the same community. Let D_{ij} denote the number of discount coupons received by household i in community j during the first three sales seasons, and let $\overline{D}_{-ij}$ denote the total number of coupons received during those seasons by all other sample households in the same community. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\bar{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. Columns 1–3 use I_{ij} as the dependent variable and include, respectively, D_{ij}, $\overline{D}_{-ij}$, and both coupon variables. Columns 4–6 analogously use $\bar{I}_{-ij}$ as the dependent variable. The row 'Pathway (DAG)" identifies the potential first-stage spillover pathways corresponding to the numbering in Appendix Figure H2. All specifications include the pre-specified baseline characteristics of household i and the leave-one-out community averages of the same characteristics among its peers. These characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each of the first three sales seasons and then sum the re-randomized season-specific assignments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. In both procedures, assignments are permuted within community. For each draw, peer exposure is reconstructed by summing reassigned coupons among the households in the same community and excluding household i. The coupon total among these retained households may change across draws. Peer exposure is constructed before restricting to an outcome-specific estimation sample or expanding households into individual records. The row '(Control) mean outcomes" reports the raw outcome mean among households with $D_{ij} = 0$ in columns 1, 3, and 4 and among households with $\overline{D}_{-ij} = 0$ in columns 2, 5, and 6. A dot indicates that no estimation-sample household satisfies the corresponding zero-coupon condition. All columns include the full long-run analysis sample of 1,179 households.

Table H3: Spillover effects on livestock holdings

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large	Small	Large	Small	Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\widehat{I}_{ij}$: Any insurance purchase	0.382	-0.382	4.674	-1.664	-7.417	-4.060	20.572	1.707
	(0.018)	(0.018)	(0.511)	(0.304)	(0.390)	(0.073)	(0.094)	(0.478)
	[0.019]	[0.019]	[0.374]	[0.394]	[0.357]	[0.073]	[0.057]	[0.689]
	{0.008}	{0.008}	{0.320}	{0.387}	{0.318}	{0.056}	{0.029}	{0.700}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	-0.001	0.001	-0.056	-0.013	-0.051	0.009	0.281	-0.010
	(0.809)	(0.809)	(0.546)	(0.632)	(0.547)	(0.694)	(0.398)	(0.919)
	[0.965]	[0.965]	[0.986]	[0.939]	[0.174]	[0.096]	[0.991]	[0.567]
	{0.953}	{0.953}	{0.978}	{0.931}	{0.174}	{0.136}	{0.994}	{0.608}
Recipient controls (i)	✓	✓	✓	✓	✓	✓	✓	✓
Peers' controls (-i)	✓	✓	✓	✓	✓	✓	✓	✓
Community FE								
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
ITT coefficient (per coupon): own	0.037	-0.037	0.484	-0.149	-0.470	-0.336	2.378	0.233
ITT coefficient (per coupon): peers	-0.001	0.001	-0.016	-0.000	-0.011	0.003	-0.021	-0.007
Sanderson-Windmeijer F-stat. (Own)	22.11	22.11	27.92	28.46	16.69	17.02	16.46	16.21
Sanderson-Windmeijer F-stat. (Peers)	36.55	36.55	54.65	57.02	68.63	68.69	18.45	18.69
Observations	982	982	1179	1179	1179	1179	1179	1179

*Notes:*The table presents estimated Local Average Treatment Effects of insurance purchase by household i in community j and insurance purchase by its peers during the first three seasons on herd composition. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\overline{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. The two endogenous variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number of coupons received by all other sample households in the same community, $\overline{D}_{-ij}$, during the first three seasons. The dependent variables in columns 1 and 2 are the shares of large and small animals in households' herded livestock, measured in CMVE. Columns 3–8 report the numbers of large and small animals in CMVE. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments to reconstruct the cumulative coupon instruments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. The reduced form includes own and peer coupon counts jointly in columns 1–4 and all four interactions of own and peer coupon counts with the bottom- and top-herd-group indicators in columns 5–8. Own assignments, peer counts, and all included group interactions are reconstructed after every reassignment. Each reported p-value uses the absolute unstudentized reduced-form coefficient corresponding to the displayed own or peer effect and herd-size group, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. All regressions control for the corresponding baseline outcome, the number of discount coupons received by household i during the last three sales seasons, the pre-specified baseline characteristics of household i, and the leave-one-out community averages of the same characteristics among its peers. The pre-specified household characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. Columns 1–2 exclude households that do not herd any livestock. Columns 3–4 report effects for the full sample. Columns 5–8 report group-specific effects estimated jointly in the interaction model. Columns 5–6 examine households in the bottom two herd-size terciles, while columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific recipient- and peer-insurance-purchase terms are instrumented by the corresponding interactions between the recipient and peer coupon counts and the baseline herd-size-group indicators. The row 'Control mean" reports average outcomes among households that did not receive any coupons in the first three seasons, calculated within the group reported in each column. The row 'Purchaser mean" reports average outcomes among households that purchased insurance in the first three seasons, also calculated within the corresponding group. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional discount coupon received during the first three sales seasons by household i and by its peers, respectively, estimated jointly by OLS. Each Sanderson–Windmeijer F-statistic measures the conditional first-stage strength of the reported endogenous term, conditional on all remaining endogenous regressors.

Table H4: Spillover effects on education outcomes

	Household-level measures			Individual-level measures	
	Maximum years (1)	Total years (2)	Average years (3)	Completed years (4)	Any completed schooling (5)
Panel A: All households					
$\widehat{I}_{ij}$: Any insurance purchase	3.064	7.377	3.003	1.951	0.131
	(0.146)	(0.123)	(0.102)	(0.078)	(0.202)
	[0.258]	[0.274]	[0.112]	[0.044]	[0.158]
	{0.195}	{0.193}	{0.074}	{0.032}	{0.110}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	0.128	0.346	0.092	0.137	0.015
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
	[0.707]	[0.821]	[0.624]	[0.961]	[0.983]
	{0.705}	{0.815}	{0.631}	{0.952}	{0.970}
Recipient controls (i)	✓	✓	✓	✓	✓
Peers' controls (-i)	✓	✓	✓	✓	✓
Community FE					
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon): own	0.226	0.553	0.238	0.271	0.019
ITT coefficient (per coupon): peers	0.019	0.052	0.012	0.016	0.002
Sanderson-Windmeijer F-stat. (Own)	18.49	19.90	18.51	30.14	29.93
Sanderson-Windmeijer F-stat. (Peers)	33.81	35.61	32.90	66.12	65.07
Observations	736	736	736	1431	1431
Panel B: Bottom 2/3					
$\widehat{I}_{ij}$: Any insurance purchase	6.356	16.680	5.599	3.737	0.331
	(0.047)	(0.026)	(0.053)	(0.029)	(0.040)
	[0.031]	[0.013]	[0.014]	[0.007]	[0.015]
	{0.014}	{0.005}	{0.005}	{0.003}	{0.011}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	0.132	0.345	0.087	0.126	0.013
	(0.002)	(0.000)	(0.015)	(0.000)	(0.000)
	[0.002]	[0.006]	[0.001]	[0.231]	[0.440]
	{0.003}	{0.011}	{0.002}	{0.229}	{0.442}
Recipient controls (i)	✓	✓	✓	✓	✓
Peers' controls (-i)	✓	✓	✓	✓	✓
Community FE					
Control mean	6.857	11.457	5.096	5.276	0.566
Purchaser mean	7.224	13.425	5.661	6.342	0.693
ITT coefficient (per coupon): own	0.497	1.334	0.445	0.422	0.037
ITT coefficient (per coupon): peers	0.020	0.054	0.012	0.016	0.002
Sanderson-Windmeijer F-stat. (Own)	11.40	11.83	10.95	16.68	16.95
Sanderson-Windmeijer F-stat. (Peers)	31.93	33.65	31.11	71.38	72.73
Observations	736	736	736	1431	1431
Panel C: Top 1/3					
$\widehat{I}_{ij}$: Any insurance purchase	-2.581	-8.571	-1.396	-0.690	-0.163
	(0.397)	(0.179)	(0.553)	(0.626)	(0.239)
	[0.350]	[0.208]	[0.477]	[0.848]	[0.414]
	{0.301}	{0.147}	{0.428}	{0.837}	{0.354}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	0.028	0.086	0.034	0.118	0.012
	(0.749)	(0.664)	(0.627)	(0.083)	(0.074)
	[0.999]	[0.998]	[0.998]	[1.000]	[1.000]
	{0.997}	{0.997}	{0.999}	{0.999}	{1.000}
Recipient controls (i)	✓	✓	✓	✓	✓
Peers' controls (-i)	✓	✓	✓	✓	✓
Community FE					
Control mean	8.154	18.462	6.277	7.742	0.742
Purchaser mean	6.915	10.436	5.681	6.045	0.658
ITT coefficient (per coupon): own	-0.315	-1.023	-0.189	-0.046	-0.021
ITT coefficient (per coupon): peers	0.018	0.052	0.013	0.016	0.002
Sanderson-Windmeijer F-stat. (Own)	10.63	10.93	11.03	25.73	25.35
Sanderson-Windmeijer F-stat. (Peers)	17.37	16.96	16.70	32.87	32.46
Observations	736	736	736	1431	1431

Notes: The table presents estimated Local Average Treatment Effects of insurance purchase by household i in community j and insurance purchase by its peers during the first three seasons on education outcomes. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\overline{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. The two endogenous variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number of coupons received by all other sample households in the same community, $\overline{D}_{-ij}$, during the first three seasons. Panel A reports the effects for the full education sample. Panels B and C report group-specific effects estimated jointly in the interaction model. Panel B examines households in the bottom two herd-size terciles, while Panel C focuses on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific recipient- and peer-insurance-purchase terms are instrumented by the corresponding interactions between the recipient and peer coupon counts and the baseline herd-size-group indicators. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments to reconstruct the cumulative coupon instruments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons within community. The reduced form includes own and peer coupon counts jointly in Panel A and all four interactions of own and peer coupon counts with the bottom- and top-herd-group indicators in the joint model underlying Panels B and C. Own assignments, peer counts, and all included group interactions are reconstructed after every reassignment. Each reported p-value uses the absolute unstudentized reduced-form coefficient corresponding to the displayed own or peer effect and herd-size group, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. All regressions control for the corresponding baseline education outcome, the number of discount coupons received by household i during the last three sales seasons, the pre-specified baseline characteristics of household i, and the leave-one-out community averages of the same characteristics among its peers. The pre-specified household characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Individual-level regressions additionally include age-by-country fixed effects and an indicator for the individual's gender. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. The row 'Control mean" reports average outcomes among observations from households that did not receive any coupons in the first three seasons, calculated within the group reported in each panel. The row 'Purchaser mean" reports average outcomes among observations from households that purchased insurance in the first three seasons, also calculated within the corresponding group. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional discount coupon received during the first three sales seasons by household i and by its peers, respectively, estimated jointly by OLS. Each Sanderson–Windmeijer F-statistic measures the conditional first-stage strength of the reported endogenous term, conditional on all remaining endogenous regressors. Columns 1–3 include 736 households, excluding households without members in the relevant cohort; columns 4–5 include 1,431 individual observations from those households. Because Panels B and C report group-specific effects from a joint interaction model, their observation counts report the common estimation sample.

Table H5: Spillover effects on child time use

	Share of children in the household		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
$\widehat{I}_{ij}$: Any insurance purchase	-0.856	0.504	0.281
	(0.212)	(0.257)	(0.051)
	[0.045]	[0.161]	[0.047]
	{0.009}	{0.088}	{0.035}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	-0.113	0.092	0.005
	(0.177)	(0.111)	(0.035)
	[0.001]	[0.000]	[0.032]
	{0.001}	{0.000}	{0.044}
Recipient controls (i)	✓	✓	✓
Peers' controls (-i)	✓	✓	✓
Community FE			
Control mean	0.657	0.025	0.582
Purchaser mean	0.440	0.214	0.620
ITT coefficient (per coupon): own	-0.047	0.027	0.023
ITT coefficient (per coupon): peers	-0.002	0.003	0.001
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of insurance purchase by household i in community j and insurance purchase by its peers during the first three seasons on child time-use outcomes. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\overline{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. The two endogenous variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number of coupons received by all other sample households in the same community, $\overline{D}_{-ij}$, during the first three seasons. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two outcomes are available only for Ethiopia. Each activity regression controls for its corresponding observed baseline share. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments to reconstruct the cumulative coupon instruments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. In both procedures, assignments are permuted within community. For each draw, peer exposure is reconstructed by summing reassigned coupons among the households in the same community and excluding household i. The coupon total among these retained households may change across draws. Peer exposure is constructed before restricting to an outcome-specific estimation sample or expanding households into individual records. Own and peer coupon counts enter the reduced form jointly. Each reported p-value uses the absolute unstudentized coefficient on the corresponding own or peer coupon count, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. These are not tests of an isolated own or peer effect that leave the other effect unrestricted. All regressions additionally control for the number of discount coupons received by household i during the last three sales seasons, the pre-specified baseline characteristics of household i, and the leave-one-out community averages of the same characteristics among its peers. The pre-specified household characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. The row 'Control mean" reports the raw outcome mean among households that did not receive any coupons in the first three seasons. The row 'Purchaser mean" reports the raw outcome mean among households that purchased insurance in those seasons. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional discount coupon received during the first three sales seasons by household i and by its peers, respectively, estimated jointly by OLS. The activity columns include 362 Ethiopian households, while the attendance column includes 1,073 households from Kenya and Ethiopia.

Table H6: Spillover effects: First stage with control variables

	Outcome: Any insurance purchase - first three seasons					
	I_{ij}: Recipient's			$\bar{I}_{-ij}$: Peers'		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: With peers' control variables						
D_{ij}: Recipient's number of coupons received	0.100		0.094	-1.451		-0.777
	(0.000)		(0.000)	(0.000)		(0.001)
	[0.000]		[0.000]	[0.004]		[0.038]
	{0.000}		{0.000}	{0.000}		{0.003}
$\overline{D}_{-ij}$: Total coupons received by peers		-0.002	-0.001		0.180	0.178
		(0.000)	(0.002)		(0.000)	(0.000)
		[0.023]	[0.946]		[0.881]	[0.907]
		{0.054}	{0.916}		{0.849}	{0.892}
Pathway (DAG)	(11)	(2)	(2);(11)	(1)	(10)	(1);(10)
Recipient controls (i)						
Peers' controls (-i)	✓	✓	✓	✓	✓	✓
Community FE						
(Control) mean outcomes	0.203	.	0.203	21.913	.	.
Observations	1179	1179	1179	1179	1179	1179
Panel B: With own control variables						
D_{ij}: Recipient's number of coupons received	0.097		0.090	-2.025		-0.881
	(0.000)		(0.000)	(0.000)		(0.001)
	[0.000]		[0.000]	[0.001]		[0.058]
	{0.000}		{0.000}	{0.000}		{0.009}
$\overline{D}_{-ij}$: Total coupons received by peers		-0.001	-0.001		0.172	0.169
		(0.000)	(0.003)		(0.000)	(0.000)
		[0.085]	[1.000]		[0.907]	[0.940]
		{0.121}	{0.999}		{0.886}	{0.931}
Pathway (DAG)	(11)	(2)	(2);(11)	(1)	(10)	(1);(10)
Recipient controls (i)	✓	✓	✓	✓	✓	✓
Peers' controls (-i)						
Community FE						
(Control) mean outcomes	0.203	.	0.203	21.913	.	.
Observations	1179	1179	1179	1179	1179	1179

Notes: The table presents first-stage estimates of the effects of randomized coupon receipt on insurance purchase by each sample household and by its peers in the same community under alternative sets of baseline controls. Let D_{ij} denote the number of discount coupons received by household i in community j during the first three sales seasons, and let $\overline{D}_{-ij}$ denote the total number of coupons received during those seasons by all other sample households in the same community. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\bar{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. Columns 1–3 use I_{ij} as the dependent variable and include, respectively, D_{ij}, $\overline{D}_{-ij}$, and both coupon variables. Columns 4–6 analogously use $\bar{I}_{-ij}$ as the dependent variable. Panel A includes the leave-one-out community averages of the pre-specified household characteristics among household i's peers. Panel B instead includes the corresponding characteristics of household i. These characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. The row 'Pathway (DAG)" identifies the potential first-stage spillover pathways corresponding to the numbering in Appendix Figure H2. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. In both procedures, assignments are permuted within community. For each draw, peer exposure is reconstructed by summing reassigned coupons among the households in the same community and excluding household i. The coupon total among these retained households may change across draws. Peer exposure is constructed before restricting to an outcome-specific estimation sample or expanding households into individual records. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. The row '(Control) mean outcomes" reports the raw outcome mean among households with $D_{ij} = 0$ in columns 1, 3, and 4 and among households with $\overline{D}_{-ij} = 0$ in columns 2, 5, and 6. A dot indicates that no estimation-sample household satisfies the corresponding zero-coupon condition. All columns include the full long-run analysis sample of 1,179 households.

Table H7: Spillover effects on livestock holdings with control variables

	Share in livestock (CMVE)		Number of animals (CMVE)					
	Large (1)	Small (2)	Large (3)	Small (4)	Large (5)	Small (6)	Large (7)	Small (8)
Panel A: With peers' control variables								
$\widehat{I}_{ij}$: Any insurance purchase	0.414	-0.414	4.546	-2.011	-6.685	-4.286	19.228	1.369
	(0.015)	(0.015)	(0.509)	(0.217)	(0.428)	(0.056)	(0.122)	(0.583)
	[0.015]	[0.015]	[0.391]	[0.316]	[0.413]	[0.051]	[0.082]	[0.745]
	{0.004}	{0.004}	{0.338}	{0.293}	{0.373}	{0.038}	{0.053}	{0.749}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	0.001	-0.001	-0.050	-0.024	-0.045	0.006	0.270	-0.034
	(0.858)	(0.858)	(0.587)	(0.417)	(0.581)	(0.801)	(0.428)	(0.754)
	[0.971]	[0.971]	[0.980]	[0.887]	[0.167]	[0.147]	[0.992]	[0.523]
	{0.961}	{0.961}	{0.969}	{0.871}	{0.178}	{0.188}	{0.995}	{0.579}
Recipient controls (i)								
Peers' controls (-i)	✓	✓	✓	✓	✓	✓	✓	✓
Community FE								
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
ITT coefficient (per coupon): own	0.039	-0.039	0.477	-0.179	-0.413	-0.361	2.182	0.191
ITT coefficient (per coupon): peers	-0.001	0.001	-0.015	-0.002	-0.010	0.003	-0.021	-0.009
Sanderson-Windmeijer F-stat. (Own)	21.30	21.30	29.18	29.46	17.92	18.32	14.62	14.48
Sanderson-Windmeijer F-stat. (Peers)	34.50	34.50	57.80	59.57	72.44	72.57	18.28	18.17
Observations	982	982	1179	1179	1179	1179	1179	1179
Panel B: With own control variables								
$\widehat{I}_{ij}$: Any insurance purchase	0.501	-0.501	6.139	-0.986	-6.901	-3.669	25.032	3.089
	(0.007)	(0.007)	(0.410)	(0.536)	(0.439)	(0.111)	(0.058)	(0.207)
	[0.047]	[0.047]	[0.247]	[0.601]	[0.305]	[0.109]	[0.027]	[0.516]
	{0.013}	{0.013}	{0.209}	{0.596}	{0.278}	{0.078}	{0.009}	{0.511}
$\overline{I}_{-ij}$: No. of peers who purchased any insurance	0.000	-0.000	-0.047	-0.002	-0.068	0.014	0.338	0.022
	(0.966)	(0.966)	(0.627)	(0.951)	(0.410)	(0.551)	(0.331)	(0.839)
	[0.637]	[0.637]	[0.951]	[0.343]	[0.244]	[0.102]	[0.986]	[0.737]
	{0.690}	{0.690}	{0.950}	{0.371}	{0.268}	{0.132}	{0.992}	{0.759}
Recipient controls (i)	✓	✓	✓	✓	✓	✓	✓	✓
Peers' controls (-i)								
Community FE								
Control mean	0.514	0.486	9.974	3.591	10.843	3.861	7.511	2.827
Purchaser mean	0.627	0.373	9.326	2.633	6.410	2.241	15.042	3.401
Estimate for group	All	All	All	All	Bottom 2/3	Bottom 2/3	Top 1/3	Top 1/3
ITT coefficient (per coupon): own	0.046	-0.046	0.606	-0.090	-0.497	-0.309	2.842	0.367
ITT coefficient (per coupon): peers	-0.001	0.001	-0.015	0.001	-0.010	0.004	-0.019	-0.006
Sanderson-Windmeijer F-stat. (Own)	20.08	20.08	27.15	27.64	15.42	15.56	15.29	15.25
Sanderson-Windmeijer F-stat. (Peers)	30.76	30.76	51.11	54.18	52.16	52.76	22.58	23.05
Observations	982	982	1179	1179	1179	1179	1179	1179

Notes: The table presents estimated Local Average Treatment Effects of insurance purchase by household i and by its peers during the first three seasons on herd composition. Let I_{ij} indicate whether household i purchased insurance during the first three seasons, and let $\overline{I}_{-ij}$ denote the number of other sampled households in the same community that purchased insurance during those seasons. These variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number received by the other sampled households in its community, $\overline{D}_{-ij}$, during the first three seasons. The dependent variables in columns 1–2 are the shares of large and small animals in households' herded livestock, measured in CMVE. Columns 3–8 report the numbers of large and small animals in CMVE. Panel A includes the leave-one-out community averages of the pre-specified household characteristics among household i's peers, while Panel B includes the corresponding characteristics of household i. These characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All regressions additionally control for the corresponding baseline outcome and the number of discount coupons received by household i during the last three sales seasons. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] and braces { } report unstudentized randomization-inference p-values from 2,000 replications using, respectively, season-wise re-randomization of coupon receipt within communities and permutation of the cumulative first-three-season coupon count. In each panel, the reduced form includes own and peer coupon counts jointly in columns 1–4 and all four interactions of own and peer coupon counts with the bottom- and top-herd-group indicators in columns 5–8. Own assignments, peer counts, and all included group interactions are reconstructed after every reassignment. Each reported p-value uses the absolute unstudentized reduced-form coefficient corresponding to the displayed own or peer effect and herd-size group, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. Within each panel, columns 1–2 exclude households that do not herd livestock, and columns 3–4 report effects for the full sample. Columns 5–8 report group-specific effects estimated jointly in the interaction model: columns 5–6 examine households in the bottom two herd-size terciles, while columns 7–8 focus on those in the top herd-size tercile. Herd-size terciles were assigned before the baseline survey from the herd-size distribution recorded in each community's roster, and roughly correspond to below 10, 10–20, and above 20 TLU; one third of the sample was drawn from each tercile in every community. The group-specific recipient- and peer-purchase terms are instrumented by the corresponding interactions between the coupon counts and the baseline herd-size-group indicators. The rows 'Control mean" and 'Purchaser mean" report average outcomes among households that received no coupons and households that purchased insurance, respectively, during the first three seasons, calculated within the group reported in each column. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional coupon received by household i and by its peers, respectively, estimated jointly by OLS. Each Sanderson–Windmeijer F-statistic measures the conditional first-stage strength of the reported endogenous term, conditional on all remaining endogenous regressors.

Table H8: Spillover effects on education outcomes with control variables

	Household-level measures			Individual-level measures	
	Maximum years	Total years	Average years	Completed years	Any completed schooling
	(1)	(2)	(3)	(4)	(5)
Panel A: With peers' control variables					
$\widehat{I}_{ij}$: Any insurance purchase	3.615	8.187	3.103	1.683	0.114
	(0.076)	(0.080)	(0.081)	(0.112)	(0.258)
	[0.123]	[0.164]	[0.078]	[0.089]	[0.206]
	{0.077}	{0.101}	{0.056}	{0.051}	{0.149}
$\bar{I}_{-ij}$: No. of peers who purchased any insurance	0.129	0.340	0.088	0.121	0.014
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)
	[0.647]	[0.754]	[0.633]	[0.986]	[0.991]
	{0.646}	{0.745}	{0.624}	{0.980}	{0.983}
Recipient controls (i)					
Peers' controls (-i)	✓	✓	✓	✓	✓
Community FE					
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon): own	0.306	0.687	0.266	0.241	0.017
ITT coefficient (per coupon): peers	0.018	0.050	0.011	0.014	0.002
Observations	736	736	736	1431	1431
Panel B: With own control variables					
$\widehat{I}_{ij}$: Any insurance purchase	1.731	4.925	2.171	2.239	0.159
	(0.395)	(0.285)	(0.215)	(0.063)	(0.150)
	[0.783]	[0.681]	[0.259]	[0.032]	[0.128]
	{0.729}	{0.624}	{0.199}	{0.023}	{0.091}
$\bar{I}_{-ij}$: No. of peers who purchased any insurance	0.121	0.344	0.078	0.083	0.010
	(0.000)	(0.000)	(0.003)	(0.002)	(0.000)
	[0.230]	[0.342]	[0.406]	[0.656]	[0.835]
	{0.291}	{0.402}	{0.436}	{0.669}	{0.833}
Recipient controls (i)	✓	✓	✓	✓	✓
Peers' controls (-i)					
Community FE					
Control mean	7.208	13.354	5.416	5.991	0.617
Purchaser mean	7.115	12.369	5.668	6.250	0.682
ITT coefficient (per coupon): own	0.112	0.353	0.175	0.298	0.021
ITT coefficient (per coupon): peers	0.018	0.052	0.010	0.009	0.001
Observations	736	736	736	1431	1431

Notes: The table presents estimated Local Average Treatment Effects of insurance purchase by household i in community j and insurance purchase by its peers during the first three seasons on education outcomes. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\bar{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. The two endogenous variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number of coupons received by all other sample households in the same community, $\overline{D}_{-ij}$, during the first three seasons. The dependent variables in columns 1–3 are household-level measures of the maximum, total, and average completed years of education among household members who were school-aged during at least part of the first three sales seasons. These outcomes cover household members who are currently 15–29 years old in Kenya and 15–17 years old in Ethiopia, where data are available only through age 17. Columns 4–5 report individual-level outcomes for the same cohort: completed years of education and an indicator for positive completed years of education. Panel A includes the leave-one-out community averages of the pre-specified household characteristics among household i's peers. Panel B instead includes the corresponding characteristics of household i. These characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All regressions additionally control for the corresponding baseline education outcome and the number of discount coupons received by household i during the last three sales seasons. Individual-level regressions also include age-by-country fixed effects and an indicator for the individual's gender. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors in columns 1–3 and standard errors clustered at the household level in columns 4–5. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments to reconstruct the cumulative coupon instruments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Own and peer coupon counts enter the reduced form jointly in both panels. Peer counts are reconstructed from the common reassigned household coupon histories in every draw. Each reported p-value uses the absolute unstudentized coefficient on the corresponding own or peer coupon count, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. Community fixed effects are not included because D_{ij} and $\overline{D}_{-ij}$ are mechanically related within communities. The row 'Control mean" reports average outcomes among observations from households that did not receive any coupons in the first three seasons. The row 'Purchaser mean" reports average outcomes among observations from households that purchased insurance in those seasons. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional discount coupon received during the first three sales seasons by household i and by its peers, respectively, estimated jointly by OLS. Columns 1–3 include 736 households, excluding households without members in the relevant cohort; columns 4–5 include 1,431 individual observations from those households.

Table H9: Spillover effects on child time use with control variables

	Share of children in the household		
	Working	Studying full-time	Attending school
	(1)	(2)	(3)
Panel A: With peers' control variables			
$\widehat{I_{ij}}$: Any insurance purchase	-0.710	0.510	0.254
	(0.271)	(0.305)	(0.075)
	[0.105]	[0.165]	[0.085]
	{0.055}	{0.093}	{0.063}
$\bar{I}_{-ij}$: No. of peers who purchased any insurance	-0.095	0.084	0.005
	(0.214)	(0.167)	(0.045)
	[0.001]	[0.001]	[0.027]
	{0.004}	{0.001}	{0.037}
Recipient controls (i)			
Peers' controls (-i)	✓	✓	✓
Community FE			
Control mean	0.657	0.025	0.582
Purchaser mean	0.440	0.214	0.620
ITT coefficient (per coupon): own	-0.037	0.026	0.020
ITT coefficient (per coupon): peers	-0.002	0.002	0.000
Observations	362	362	1073
Panel B: With own control variables			
$\widehat{I_{ij}}$: Any insurance purchase	-0.540	0.364	0.245
	(0.187)	(0.218)	(0.096)
	[0.123]	[0.166]	[0.091]
	{0.062}	{0.092}	{0.073}
$\bar{I}_{-ij}$: No. of peers who purchased any insurance	0.002	0.011	0.004
	(0.856)	(0.069)	(0.090)
	[0.889]	[0.488]	[0.001]
	{0.870}	{0.484}	{0.001}
Recipient controls (i)	✓	✓	✓
Peers' controls (-i)			
Community FE			
Control mean	0.657	0.025	0.582
Purchaser mean	0.440	0.214	0.620
ITT coefficient (per coupon): own	-0.040	0.026	0.020
ITT coefficient (per coupon): peers	0.001	0.001	0.000
Observations	362	362	1073

Notes: The table presents estimated Local Average Treatment Effects of insurance purchase by household i in community j and insurance purchase by its peers during the first three seasons on child time-use outcomes. Let I_{ij} indicate whether household i purchased insurance in the first three seasons, and let $\bar{I}_{-ij}$ denote the number of other sample households in the same community that purchased insurance during those seasons. The two endogenous variables are instrumented by the number of discount coupons received by household i, D_{ij}, and the total number of coupons received by all other sample households in the same community, $\bar{D}_{-ij}$, during the first three seasons. Share of children working is the share of all children in the household who are ages 7–17 and work. Share of children studying full-time is the share of all children in the household who are ages 7–17, study, and do not work. These two outcomes are available only for Ethiopia. Share of children attending school is mean observed school attendance among children aged 6–17 in Kenya at the 2020 follow-up and 7–17 in Ethiopia at the 2022 follow-up. Its baseline control is the corresponding household mean. Panel A includes the leave-one-out community averages of the pre-specified household characteristics among household i's peers. Panel B instead includes the corresponding characteristics of household i. These characteristics, presented in Table 2, are: age of the household head, an indicator for a male household head, the household head's completed years of education, household size in adult equivalents, the dependency ratio, baseline herd size in CMVE, monthly household income per capita, and agricultural land size. All regressions additionally control for the number of discount coupons received by household i during the last three sales seasons. Reported in parentheses are p-values based on heteroskedasticity-robust standard errors. Brackets [ ] report unstudentized randomization-inference p-values from 2,000 replications that re-randomize coupon receipt separately within each community in each of the first three sales seasons and then sum the re-randomized season-specific assignments to reconstruct the cumulative coupon instruments. Braces { } report corresponding p-values from 2,000 replications that permute the cumulative number of coupons received during the first three sales seasons. Own and peer coupon counts enter the reduced form jointly. Each reported p-value uses the absolute unstudentized coefficient on the corresponding own or peer coupon count, evaluated under the complete sharp null that coupon assignments affect no unit's outcome. These are not tests of an isolated own or peer effect that leave the other effect unrestricted. Community fixed effects are not included because D_{ij} and $\bar{D}_{-ij}$ are mechanically related within communities. The row 'Control mean" reports the raw outcome mean among households that did not receive any coupons in the first three seasons. The row 'Purchaser mean" reports the raw outcome mean among households that purchased insurance in those seasons. The rows 'ITT coefficient (per coupon): own" and 'ITT coefficient (per coupon): peers" report the reduced-form effects of one additional discount coupon received during the first three sales seasons by household i and by its peers, respectively, estimated jointly by OLS. The activity columns include 362 Ethiopian households, while the attendance column includes 1,073 households from Kenya and Ethiopia.