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Evidence from India

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Agriculture

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About this report

Insuring farmers against weather shocks: evidence from India

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Summary

With weather risk a key source of income vulnerability for many of the 2.5 billion people around the world who derive their income from smallholder agriculture, rainfall insurance represents a potentially important product innovation.

This study performs a rigorous evaluation of the long-term impacts of rainfall insurance access and coverage on agricultural investment and outcomes, consumption and well-being proxies using a randomised controlled trial design.

Main findings

We find no systematic, long-term effect of insurance access or adoption on agricultural investment decisions. There is also little to no statistical difference in reported agricultural revenues and profits. This is true even though (randomly assigned) subsidies caused households that purchased insurance policies to experience greater financial income from insurance payouts than financial costs from insurance premiums. These findings suggest that the insurance products studied were not sufficient to induce farmers to adopt theoretically promising alternative investments, such as high-yielding variety crops.

Demand for rainfall insurance among study households was moderate. Depending on the year and marketing treatment, between 25% and 60% of treated households elected to purchase rainfall insurance. Demand was also shallow, as the typical buyer purchased only a single policy unless offered a discount on a bundle of policies. These results are consistent with fragile prospects for voluntary private markets for rainfall risk management.

Analyses of impacts on consumption and well-being proxies reveal that insurance payouts often act as a substitute for informal transfers; however, this does not translate into an impact on consumption or savings. We also see weak results on our proxies for well-being, which is consistent with the impact we see on investment and further supports our conclusion that the insurance product offered in this case had, at best, 'moderate' effects.

Methodology

Inspired by the theoretical view that risk management can improve production outcomes, as well as a substantial body of evidence suggesting that rainfall risk is important to farmers, this eight-year-long study evaluates the impact of a new financial product, rainfall index insurance, on farmer investment behaviour in Gujarat, India. The Self Employed Women's Association, a local non-profit organisation, introduced rainfall insurance to 52 randomly selected villages in the Ahmedabad, Anand and Patan districts. A control group, consisting of 48 villages in the same districts, was not offered rainfall insurance. Within the treatment villages, information and incentives affecting insurance take-up were randomly varied at the household level.

Annual household surveys measured many variables that could have been impacted by access to or adoption of rainfall index insurance. This report focuses on effects on agricultural production decisions. Specifically, we estimate the effect of each additional

unit of insurance coverage on total area cultivated, expenditures on agricultural inputs, the fraction of cultivated land devoted to high-yielding variety crops, the fraction of cultivated land devoted to cash crops, total agricultural revenues and agricultural profits.

Among the differences between this study and other research, two are especially important. First, rather than providing free insurance coverage, we examine the effects on households who are close to the margin of insurance adoption. Given scarce public funds for agricultural risk management, these are the farmers most likely to be affected by modest, broad-based subsidies. The household-level random variation helps us understand the prospects for private index rainfall insurance markets. Second, insurance is sometimes described as 'the most misunderstood industry', and this project's length provides an opportunity for the measurement of impacts after farmers have had a chance to achieve a greater understanding of its ramifications.

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Abbreviations and acronyms

2SLS	two-stage least squares
AICI	Agriculture Insurance Company of India
BDM	Becker–DeGroot–Marschak
CDF	cumulative distribution function
CMF	Centre for Micro Finance
GSDMA	Gujarat State Disaster Management Agency
HYV	high-yielding variety
IMD	Indian Meteorological Department
INR	Indian rupee
LATE	local average treatment effect
MFI	microfinance institution
NCMSL	National Collateral Management Services Limited
NGO	non-governmental organisation
OLS	ordinary least squares
SEWA	Self Employed Women's Association
USD	United States dollar

1. Introduction

> 'I also withheld the rain from you when there were yet three months to the harvest; I would send rain on one city, and send no rain on another city; one field would have rain, and the field on which it did not rain would wither.' (Amos 4:7)

For at least the past 10,000 years, risks associated with poor rainfall have been an important concern of much of humanity. For the past 250 years, humankind has attempted to mitigate these risks through the design of financial instruments, an effort that perhaps began with the creation of small mutual companies to cover hail damage in Germany in the late 1700s. But despite the fact that over half of the world's poor are engaged in agricultural activity (World Bank 2007), only six per cent of the global population working in agriculture is covered by agricultural insurance. There are many reasons why traditional, indemnity-based crop insurance is difficult to provide to the poor. Chief among them may be transaction costs; revenues accruing to insurance companies are a function of the amount of insurance provided, but distribution costs are relatively fixed (such as reaching the household, claims adjustment, servicing the claim, and so on), so it is difficult to offer profitable products. In fact, we are not aware of a single successful, large-scale, indemnity-based agricultural insurance product that reaches smallholder farmers without government subsidy. For the past eight years, we have studied the systematic introduction of a new agricultural insurance product, rainfall index insurance, in three districts in the state of Gujarat, India. This paper uses the results of this study to understand whether the sale of insurance to farmers and agricultural labourers affected agricultural investment decisions, and in turn agricultural outputs, and ultimately consumption and welfare.

Rainfall index insurance is an important product innovation for several reasons. First, weather risk is a key source of income vulnerability for many of the 2.5 billion people around the world who derive income from smallholder agriculture (International Fund for Agricultural Development 2013). While evidence suggests that risk-sharing arrangements among the poor may be effective in smoothing idiosyncratic risk, rural households are much less able to smooth aggregate shocks (see, for example, Townsend 1994), and instead may choose to make less profitable, but safer, agricultural investments (see, for example, Rosenzweig and Binswanger 1993). Second, index insurance, described in greater detail below, has the potential to be sold profitably even to smallholder farmers in developed countries (Skees, Black and Barnett 1997; Barnett, Barrett and Skees 2008). This stands in contrast to indemnification-based products, which have only achieved meaningful scale through subsidies. Insurance offers an attractive alternative to post-disaster relief, which may be insufficient or tied to political goals (Kunreuther and Pauly 2006; Cole, Healy and Werker 2012).

To measure the effects of insurance, we worked in close cooperation with the Self Employed Women's Association (SEWA), a well-known non-profit organisation in Gujarat, to introduce rainfall insurance to 52 villages chosen at random from an initial set of 99 villages. Following a baseline survey, rollout of insurance to these 52 villages occurred over two years. In its fourth year, the study was expanded by eight villages, all of which experienced insurance rollout following a baseline survey. A range of marketing treatments, designed to test barriers to adoption and measure price elasticities, resulted in additional variation in insurance take-up.

Our main findings may be summarised as follows. Insurance demand is widespread, as 25–60% of visited households (depending on the year and individual-level marketing) elected to purchase insurance. Demand is also relatively shallow, as the typical buyer purchased a single policy designed to cover a relatively small plot of land (roughly 0.2 acres), unless offered a discount on a bundle of policies. We measured financial income and expenditures precisely, and on average households purchasing policies were paid more in claims than they paid in premiums (in part due to discounts, in part due to random variation in weather over our eight-year period). However, we did not observe systematic, long-term changes in agricultural investment decisions: the point estimates from a wide range of specifications suggest no increases in the share of land allocated to cash crops or high-yielding variety (HYV) crops. In some specifications, we estimate insignificant negative impacts of insurance on agricultural costs, revenues and profits. When looking at impacts on non-agricultural financial activity and consumption, we find overall insignificant effects on income and consumption, but do find some marginal evidence that receiving insurance payouts leads to decreases in amounts held in savings. Results on well-being proxies are not significant overall, and go against the common assumptions when they are: insurance coverage and payouts would lead to worsened assessment of one's own financial situation. Finally, and perhaps most interestingly, we find significant evidence of decreases in informal transfers received from peers, which would suggest that weather insurance is a substitute for informal insurance mechanisms.

Our paper contributes to a growing literature that seeks to understand the limitations and potential of weather index microinsurance. Early papers examined adoption decisions (Giné *et al*. 2010) and barriers to adoption (Cole *et al*. 2013), and found that trust, price reductions, and, to a lesser extent, financial education (Gaurav, Cole and Tobacman 2011; Dercon *et al*. 2014; Cai and Song 2013) can drive adoption. Robust demand-side complementarities with other financial products have not been found. To the contrary, Giné and Yang (2009) documented that bundling loans with weather-linked insurance contracts reduced demand for credit, while Stein and Tobacman (2015) found especially low demand for weather insurance bundled with savings. The dynamics of insurance demand appear powerful, in the sense that people are more likely to purchase when they and their neighbours have received recent payouts (Cole, Stein and Tobacman 2014; Stein 2014). Recent work has examined the importance of social networks on insurance adoption (Cai, De Janvry and Sadoulet 2015), finding substantial peer effects. Despite these sources of variation in demand, rainfall insurance overall has been characterised by modest take-up at market prices.

Several field and natural experiments have previously investigated the links between insurance and investment, following up on the theoretical prediction that the introduction of insurance should lead to reductions in informal ex-ante risk-management strategies and therefore encourage productive investment. Mobarak and Rosenzweig (2013) focused on the interaction between informal risk sharing and formal weather insurance, showing that weather insurance was particularly attractive for sub-castes that were unable to informally insure rainfall risks, and that insured farmers shifted production towards riskier varieties of rice. Cole, Giné and Vickery (2013) demonstrated that individual-level grants of large amounts of rainfall insurance in Andhra Pradesh caused modest increases in the share of farmers planting cash crops. Karlan *et al*. (2014), in a

three-year study in Ghana, found that a simple policy based on the number of consecutive days without rainfall led to statistically and economically large increases in agricultural input investments. In addition to these field experiments, Cai *et al.* (2015) exploited the variation resulting from the introduction of a heavily subsidised, compulsory multi-peril crop insurance scheme for tobacco in rural China; their paper found insurance increased crop production by about 16 per cent. Elabed and Carter (2014) found that provision of insurance increased the area planted and seed expenditure by cotton farmers in Mali.

As described by deNicola (2015), we would also expect the introduction of insurance to lead to reductions in ex-post risk-coping strategies, or in other words to reduce the need for households to smooth consumption or sell assets after a shock occurs. Previous evaluations of the impacts of micro health insurance policies have described effects along these lines: De Bock and Ontiveros (2013), in their review of the impact of microinsurance, highlighted that most studies on health insurance have found significant decreases in out-of-pocket expenses of subscribers. Levine and Polimeni (2012) and Aggarwal (2010) (among others) also found that insured households were less likely to sell assets or take up informal loans after a health shock. We know of only one other study on the effects of index insurance on ex-post risk-coping strategies: Janzen and Carter (2013) found that in a drought-affected region of Kenya, pastoralists who subscribed to an index-based insurance policy were significantly less likely to report anticipating having to sell livestock or reduce consumption as a response to weather shocks.

Relative to existing work, this project distinguishes itself by the richness of the panel data collected, and the unusually long period of study – eight years – which enables us to measure the effects of longer-term exposure to weather insurance markets. The time horizon may matter for several reasons. First, since index products are new, initial adoption and response may not be representative of long-term behaviour. Second, as rainfall is often spatially correlated, examining only one or two years of outcomes may not yield a representative set of outcomes.

Another important difference between this paper and much of the other work on rainfall insurance is our marketing and delivery channel. Most poor households around the world have never purchased formal insurance products before. The examples from microcredit and micro life insurance suggest that the sale and outreach of insurance will typically be handled by local non-governmental organisations (NGOs) or microfinance institutions (MFIs). Our insurance policies were developed, marketed and sold by SEWA, whose employees had relatively low levels of education. This stands in contrast to Cole, Giné and Vickery (2013) and other studies, which used (relatively) highly skilled survey enumerators, or agricultural research staff, to conduct the sale and marketing of policies. Our study therefore offers a potentially more realistic market representation of the environment in which index-based rainfall insurance might be sold. A closely related point is that our policies, while often sold at a discount, were never given away for free. A scale-up of index insurance is unlikely to involve free distribution in the first year, though it may involve discounts.

This paper proceeds next by explaining the context, study design and empirical strategy. We then report our main results and review their robustness. Finally, we discuss interpretations and conclude.

2. Rainfall insurance

We studied a new formal insurance product, index rainfall insurance. A rainfall insurance contract generally specifies a mapping from rainfall, measured at a pre-specified weather station over a pre-specified period of time, to financial payouts. Farmers pay premiums before the growing season begins, and if the realised rainfall is bad, the policy pays the farmer an amount of money specified in the contract.

Because these products are tied to local rainfall, they avoid adverse selection and asymmetric information problems as well as agency costs associated with claims adjustment. The products also dramatically reduce transaction costs, because payouts are based on data collected for other purposes (for example, government meteorological monitoring) and do not require a claims assessment visit to the policyholder's farm. Index insurance has other important practical advantages. The rapid observability of rainfall means disbursement of payouts can occur quickly, and perhaps even before the agricultural season concludes. This potentially allows farmers to purchase additional inputs and attempt a second planting. The wide availability of historic rainfall data makes these products easier to price than yield-based policies, facilitating underwriting on international risk markets.

Rainfall insurance also carries with it three notable shortcomings. The first is basis risk, that is, the possibility that crops may fail even when measured rainfall is 'normal'. Basis risk can arise for a number of reasons: rainfall on a farmer's land may differ from rainfall at the weather station (though policies are typically only sold if there is in fact a nearby weather station); the functional form of the insurance policy may not precisely match agricultural yield, particularly if a farmer grows multiple crops; and farmers may experience crop loss for reasons unrelated to weather, such as pests. (Pilot attempts to link payouts to area yields measured by satellite may overcome some of these problems; if the measurement area includes enough farmers, farmer moral hazard would not be a concern.)

A second shortcoming is that index rainfall insurance policies are often priced at large mark-ups over actuarially fair premiums. In part, this is due to the transaction costs associated with selling any product in rural areas, but it is also due to the novelty of the product from the perspective of underwriters, who account for model risk and parameter uncertainty. Modest adoption rates also mean underwriters must spread the fixed costs of policy issuance over fewer accounts. For this reason, most studies of index insurance, including this one, have involved significant subsidies (Mobarak and Rosenzweig 2013; Karlan *et al.* 2014).

Third, learning in this setting may be particularly difficult because of the foregoing barriers to adoption and the complicated nature of the products. Farmers observe only the realised amount of rain, rather than the entire distribution of potential realisations. In settings with significant risk, individual realisations may not be particularly informative about optimal behaviour. This, combined with the other challenges farmers face when

making technological decisions (Foster and Rosenzweig 1995; Duflo, Kremer and Robinson 2011), may limit the ability of insurance to affect agricultural investment decisions, consumption and well-being.

Challenges notwithstanding, index weather insurance has received significant attention from governments, aid agencies and academics in recent years. Indeed, Hazell *et al.* (2010) reported product introductions in more than 20 countries. In India, the location of our study, the government has introduced index insurance as an alternative to area-based yield insurance, and the Agricultural Insurance Company of India (AICI) sold policies to over five million farmers in 2011.

Our field partner for this study, SEWA, chose rainfall insurance products to offer to its members each year, with technical advice from the Centre for Micro Finance (CMF). The policies were underwritten by ICICI Lombard in 2006 and 2008, IFFCO Tokio in 2007 and AICI in 2009–2013, and they provided some coverage against both drought and flood during several discrete phases of the growing season.

3. Experimental design

Our study began in early 2006 with a baseline survey of 15 households in each of 100 villages. For operational reasons, SEWA preferred to roll out the insurance product over time. These villages were divided randomly into three groups. The first treatment group of 32 villages was introduced to rainfall insurance with village meetings and door-to-door visits in April–May 2006 and given the opportunity to purchase the product. A second treatment group of 20 additional villages, randomly drawn from the remaining 68, was offered the insurance for the first time the following year. A control group, consisting of the remaining 48 villages, was not exposed to rainfall insurance by SEWA. The two treatment groups received insurance marketing prior to the summer growing season every year from 2006 to 2013. All 'village-level' analysis below exploits only the random variation across these three groups of villages. At baseline, no other insurer was selling rainfall insurance in the three districts where our study villages are located. Additionally, households in control villages were asked every year whether they had access to rainfall insurance and we saw no evidence indicating availability of rainfall insurance in these villages.

Insurance payouts were determined purely as a function of observed rainfall at the reference weather stations for a village. Payouts were reconciled between SEWA, the insurance underwriter and the research team, and then they were disbursed by the SEWA staff members who had undertaken insurance marketing several months before. No action (such as 'filing a claim') was required of the policyholders in order to receive the payouts they were entitled to. Payout disbursal usually occurred one or two months after the end of the time period specified in the insurance contract.

One challenge in studying index rainfall insurance is that the payout per policy is constant across wide swathes of territory that correspond to the same weather station. In 2009, we expanded the study population, adding two villages close to each of four new weather stations, to increase the expected number of payout events. We call this third treatment group the treatment expansion group. SEWA marketed rainfall insurance in all eight of these villages, randomising individual-level marketing within them. Data from

these villages are used below only when we rely on individual-level variation, and only when we examine outcomes that can be affected by payouts. The map presented in Figure 1 shows the location of each village, its treatment assignment and the location of the reference weather station.

Household-level marketing experiments were conducted in all 60 treatment villages during treatment years; these included randomly assigned information and incentives for households considering purchasing the insurance. The marketing experiments are described in Appendix B1. The effects of some of these manipulations on insurance demand have been analysed separately (Cole *et al*. 2013b; Cole, Stein and Tobacman 2014). All years included a price reduction among the manipulations, either in the form of a fixed discount or a price offered in the context of an incentive-compatible willingness-to-pay elicitation (a Becker–DeGroot–Marschak, or BDM, mechanism). All manipulations in all years are included as instruments in the first-stage (take-up) regressions that we use below to estimate the impacts of insurance coverage. In this paper, the local average treatment effects we estimate should be viewed as the response of a typical farmer close to the take-up margin.

Figure 1: Study area
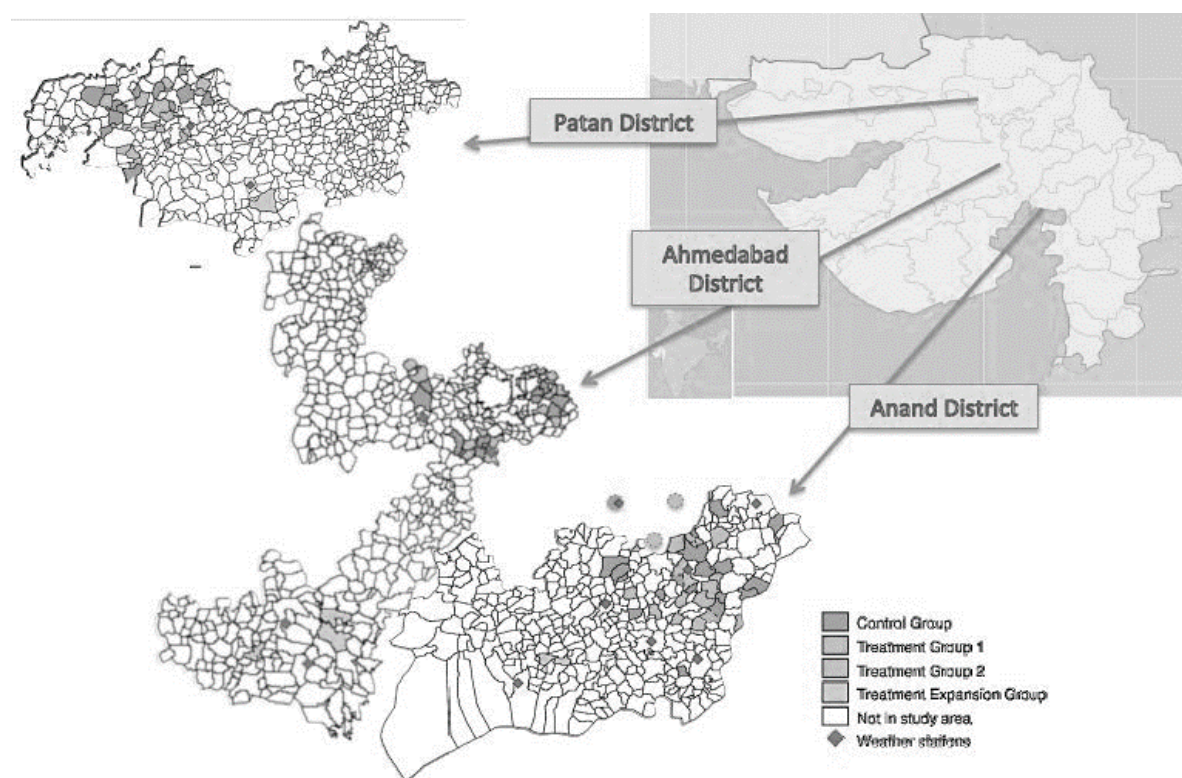
Note: this figure maps the three districts in which the study was conducted, including villages added to the sample as part of the treatment expansion group. Study villages are indicated by treatment group, and weather stations are marked as diamonds. Village border boundaries were obtained from the Survey of India. Dashed lines are used to represent that, in some cases, several study villages are included in a single geographical unit. Circles represent the three study villages located in Kheda district; their locations are approximate. The colours of the circles correspond to the villages' treatment status.

Table 1: Baseline summary statistics and tests for village-level balance

Sample used to study agricultural investments and outcomes

Dependent variable	Full sample	Control group	Treatment group 1	Treatment group 2	Test for pair-wise equality
	Mean (s.d.) (1)	Mean (s.d.) (2)	Mean (s.d.) (3)	Mean (s.d.) (4)	p-value (5)
Agricultural revenues (INR)	3757.98	4237.93	3997.48	2128.30	0.33
(from cultivation of own plot)	(12987.41)	(13802.40)	(11883.93)	(12288.36)	
Agricultural costs (INR)	1989.96	2438.19	1749.94	1163.53	0.16
	(6441.65)	(7832.18)	(4830.35)	(3915.11)	
Irrigation costs (INR)	391.30	527.84	279.10	198.16	0.17
	(1647.77)	(2115.90)	(889.75)	(925.25)	
Hired labour costs(INR)	981.98	1161.29	910.88	613.97	0.31
	(3157.17)	(3821.51)	(2224.15)	(2259.77)	
Other input costs (INR)	616.69	749.06	559.96	351.40	0.41
	(3149.05)	(3700.65)	(2682.06)	(1997.00)	
Total labour days	72.05	83.62	72.83	40.26	0.20
	(166.67)	(175.89)	(170.87)	(127.61)	
Hired labour days	23.99	28.46	21.50	15.87	0.44
	(68.94)	(76.36)	(61.94)	(56.58)	
Family labour days	42.14	48.08	45.64	21.18	0.10
	(103.30)	(107.61)	(113.67)	(66.90)	
Agricultural profit (INR)	1768.02	1799.74	2247.54	964.77	0.63
(from cultivation of own plot)	(12364.22)	(13210.62)	(10787.16)	(12307.61)	
Fraction of high-yielding variety crops grown	0.12	0.13	0.12	0.08	0.53
	(0.31)	(0.32)	(0.31)	(0.26)	
Fraction of cash crops grown	0.02	0.02	0.02	0.01	0.66
	(0.10)	(0.11)	(0.11)	(0.06)	
Area cultivated (ha)	0.33	0.40	0.30	0.16	0.22
	(1.71)	(2.28)	(0.79)	(0.55)	
N	700	360	204	136	

Note: this table reports baseline summary statistics by treatment group and tests for village-level balance for the sample of households used to study agricultural outcomes and investment decisions. The sample includes households who were surveyed and reported outcome data each year (700 unique households). treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The control group was never offered weather insurance. Total agricultural costs, revenues, profits and labour days are winsorised at the top (one per cent). All variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' consumer price index (CPI). INR1 = USD0.016. The symbols *, **, *** denote significance at the 10%, 5% and 1% level, respectively.

4. Effects on investment and agricultural outcomes

4.1 Data

In this section, we focus on the effects of rainfall insurance on agricultural investment decisions, risk taking and agricultural outcomes. Data on household characteristics and farm outcomes are taken from nine waves of household surveys, conducted between 2006 and 2014. For the analysis below we focus on the households who were introduced to the study in 2006, and who do not attrite or have missing values for any of the key outcome variables. Among the initial sample of 1,500 households, 700 meet these criteria and form our 'balanced sample'. Figures A1a and A1b report the year-by-year sample size and cumulative attrition by treatment group. They distinguish between households who were surveyed all years but did not report key outcomes in one or more years, and households who completed full surveys in all years. Attrition does not vary systematically by village-level treatment. Table A1a compares baseline characteristics of households that remain in the balanced sample with those households that did not. Attritors were on average older, less educated and with a higher income than the sample that remained in the balanced panel. This appears to be true across all treatment groups though, implying no differences in the composition of attritors. Overall, this suggests that there was no differential attrition according to treatment assignment, and therefore no reason to worry about attrition bias.

Table 1 shows summary statistics for outcome variables in the balanced panel used in the analysis, and indicates good balance across the treatment groups. All outcome variables in this section pertain to the year's main kharif agricultural growing season. The average household cultivated 0.33 hectares of land, of which two per cent was cultivated with cash crops. In the baseline survey, the average household reported kharif agricultural revenues of INR3,758 (≈USD75), agricultural expenses of INR1,990 and agricultural profits of INR1,768. Table A1a additionally reports some basic socio-demographic characteristics describing the average household in our sample, and shows that households have low levels of education, the average head of household having attended school for approximately four years, and low levels of financial literacy, averaging 50 per cent of correct answers on an adapted version of the questions pioneered by Lusardi and Mitchell (2007).

Table 2 reports summary statistics on assignment to treatment, insurance take-up rates and average payouts across years for all households in this sample. Insurance take-up rates varied from 18% in 2008 to 58% in 2010. From 2006–2008, most purchasers bought no more than one policy. After 2008, this average increased to around two policies per purchaser, mostly due to the introduction of a special discount offer (randomly allocated via the BDM mechanism) to households for a package of four policies. In 2010, the average number of policies held increased to over four as a result of government subsidies that resulted in double the coverage for each policy purchased. The fraction of households receiving insurance payouts was highest in 2012, with about 61 per cent of households receiving some payout. The average payout varied by year, with no payouts in 2006, 2007 and 2013, and a peak payout of INR367 per policy in 2012.

Table 2: Sample composition – treatment groups, insurance take-up and payouts

Sample used to study agricultural investments and outcomes

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of villages (balanced sample)									
Control group	99	67	48	48	48	48	48	48	48
Treatment group	-	32	51	51	51	51	51	51	51
Total	99	99	99	99	99	99	99	99	99
Number of households (balanced sample)									
Control group	700	496	360	360	360	360	360	360	360
Treatment 1 group	-	204	204	204	204	204	204	204	204
Treatment 2 group	-	-	136	136	136	136	136	136	136
Total	700	700	700	700	700	700	700	700	700
Take-up									
Intended marketing sample	-	204	340	340	340	340	340	340	340
Purchased (yes/no)	-	42	117	62	67	198	146	145	182
Average number of policies purchased	-	1.14	1.01	1.00	2.19	4.56	1.97	1.81	1.89
Standard deviation	-	0.42	0.09	0.00	1.49	2.99	1.40	1.33	1.36
Repurchasers (bought insurance in year y as well as y-1)	-	-	17	40	31	53	107	84	90
Fraction of repurchasers			0.40	0.34	0.50	0.79	0.54	0.58	0.62
Payouts									
Payout (yes/no)	-	0	0	22	43	86	50	89	0
Average payout (if purchased)	-	-	-	202	127	194	52	367	-
Average payout per policy (INR) (if purchased)	-	-	-	202	54	50	32	185	-
Average payout (if payout >= INR 1.00)	-	-	-	570	198	447	152	597	-
Average payout per policy (INR) (if payout >= INR 1.00)	-	-	-	570	83	116	92	302	-

Note: this table reports summary statistics for the number of villages and households in each treatment group, insurance take-up and repurchase rates and observed payouts by year. The sample is restricted to households who were used to study agricultural outcomes and investment decisions, and were surveyed and reported outcome data each year (700 unique households). Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. No insurance was offered in 2005. Three households in 2007, belonging to the control group, purchased one weather insurance policy each. INR1 = USD0.016.

4.2 Empirical strategy

4.2.1 Overview and first stage

We seek to measure the effect of weather insurance coverage on agricultural investments and outputs. Specifically, in this section we look at the effect of each extra unit of insurance purchased on the total area cultivated and expenses on agricultural inputs (both overall and more precisely on irrigation, hired labour, own labour and other input costs). We study impacts on risk taking through the effects of insurance coverage on the fraction of cultivated land devoted to HYV crops and the fraction devoted to cash

crops (cotton, castor and groundnut). Agricultural revenue data allow us to measure impacts on agricultural income. Finally, we also report impacts on financial costs and revenues (namely, insurance premiums and payouts) to compute the impact on overall expenses and income from agricultural activities. Appendix B2 defines all outcome variables and Appendix B1 all marketing treatment instruments in greater detail. Moreover, we present in Table A6 the results from panel regressions of these outcomes on a proxy for productivity shocks (we use the continuous amounts an insurance policy would have paid out). These show that productivity shocks lead to significant increases in agricultural costs and decreases in profits, suggesting that these rainfall shocks are not successfully insured against among control households, or in other words that there exists a margin for rainfall insurance to have significant effects on production choices and outcomes.

Our empirical strategy exploits both village-level and individual-level variation. The village-level analysis makes use of the random allocation of villages to one of the three treatment groups described above. Since insurance coverage, conditional on access, presumably depends on unobservable individual characteristics that are correlated with outcomes of interest, we instrument for the number of policy units purchased by a household with the treatment status of the village where this household resides. For individual-level effects, the same endogenous variable is instrumented by a vector of individual-level marketing experiment indicators, equal to one in a particular year if a household was offered to purchase insurance using that marketing treatment. The first-stage regressions for both the village- and individual-level analyses are reported in Tables A3a–g; they show highly significant first-stage coefficients, and interestingly suggest that the main predictor of take-up among the various marketing treatments used along the years was the purchase price.

Under plausible assumptions, our instrumental variable (IV) method identifies the local average treatment effect (LATE) of the experiment, that is, the effect of insurance on those who purchased insurance because of the variation we induced (Imbens 2010). For regressions run at the village level, this represents the effect of insurance sales with voluntary take-up. The individual discounts may have a compositional effect on take-up, and as such yield a more specific LATE. Nevertheless, we view our sample as representative of the types of individuals who would receive marketing. Our estimates may be usefully compared with the growing body of work, done in different settings with different populations, on the effects of index insurance, and we engage these comparisons after reporting our findings.

For each outcome variable, we also present specifications with and without individual fixed effects. These have substantively different, and complementary, interpretations. When individual fixed effects are included, the impact of insurance coverage is identified using year-to-year within-individual variation in purchasing decisions. To the extent that the fixed effects absorb unobserved heterogeneity, this specification may increase power. However, between-individual comparisons usefully allow comparisons between treatment and control villages in each year. Finally, the standard errors in all specifications are clustered at the village level to account for intra-village correlation, which might arise due to both the nature of village interactions in this context, and the fact that some of our treatments were conducted at the village level. We formally describe these specifications next.

4.2.2 Village-level variation

When reporting regression results below, we first present specifications exploiting only the village-level variation in access to rainfall insurance. Formally, they are obtained from two-stage least squares (2SLS) estimates, with the following second stage where β is the coefficient of interest:

(1) $\quad y_{ivt} = \alpha + \beta PolicyUnits_{it} + \gamma_t + \eta X_{it} + \epsilon_{ivt}$

Here *y_ivt* refers successively to total, agricultural and financial revenues, total or disaggregated costs (total agricultural costs, irrigation, labour or other input costs and financial costs), total and agricultural profits and finally the total area cultivated, and fraction of this area cultivated with HYV seeds, or cash crops. These outcome variables pertain to individual *i*, who lives in village *v*, in year *t*'s kharif season. We denote year fixed effects by γ_t, and X_{it} is a vector of dummies controlling for year-individual-specific disturbances to the normal surveying process.

The key right-hand side variable *PolicyUnits_it* equals the number of insurance policy units purchased by individual *i* in year *t* and thus corresponds to the amount of insurance coverage owned by that household for the contemporaneous kharif season. Since *PolicyUnits_it* is most likely endogenous to unobserved individual characteristics, we instrument for it using an indicator that equals 1 if the village of individual *i* was treated in year *t*. The first stage of the IV specification in equation (1) is the following, where *Tvillage_vt* is an indicator for village *v* having been treated in year *t*:

(2) $\quad PolicyUnits_{it} = \alpha + \delta Tvillage_{vt} + \gamma_t + \eta X_{it} + u_{it}$

We also present results of specifications where individual fixed effects λ_i are introduced into equation (1) (and into the associated first-stage regression):

(3) $\quad y_{ivt} = \alpha + \beta PolicyUnits_{it} + \gamma_t + \lambda_i + \eta X_{it} + \epsilon_{ivt}$

4.2.3 Individual-level variation

We use a similar instrumental variable specification to that used for village-level effects, exploiting now the individual-level variation induced by the random assignment of individuals, within treatment villages, to various marketing treatments. We estimate equation (1) again, but instrumenting this time for the endogenous variable *PolicyUnits_it* by the same indicator for one's village being in the treatment group and a series of variables characterising the marketing interventions received in year *t*. The first stage of the individual-level effects specification is thus:

(4) $\quad PolicyUnits_{it} = \alpha + \delta Tvillage_{vt} + \gamma_t + \theta MarketingDummies_{it} + \eta X_{it} + u_{it}$

As above, we also present results from specifications including individual fixed effects *λi*. The regressions exploiting individual-level variation have the advantage of increased power, but the potential disadvantage is that, if within-village spillover effects are present, the treatment estimate will be downward biased. Conversely, if the estimate of treatment effects exploiting only village-level variation is higher than the estimate exploiting individual-level variation, this is evidence of spillover effects.

4.3 Results

4.3.1 Descriptive figures and benchmark specifications

Using the data, experimental manipulations and estimation strategy explained above, we next report our impact estimates. Figure 2 presents the time path for each outcome variable for the control, treatment 1 and treatment 2 groups. None of these groups had access to weather insurance during the 2005 kharif growing season; the treatment 1 villages gained access for the 2006 season; and the treatment 2 villages gained access for the 2007 season. Insurance costs remain equal to 0 until these group-specific initial access years. Insurance payouts were first observed in some villages in 2008, with the largest payouts occurring in 2012.

Figure 2: Mean outcome variables by village-year treatment status

Sample used to study agricultural investments and outcomes
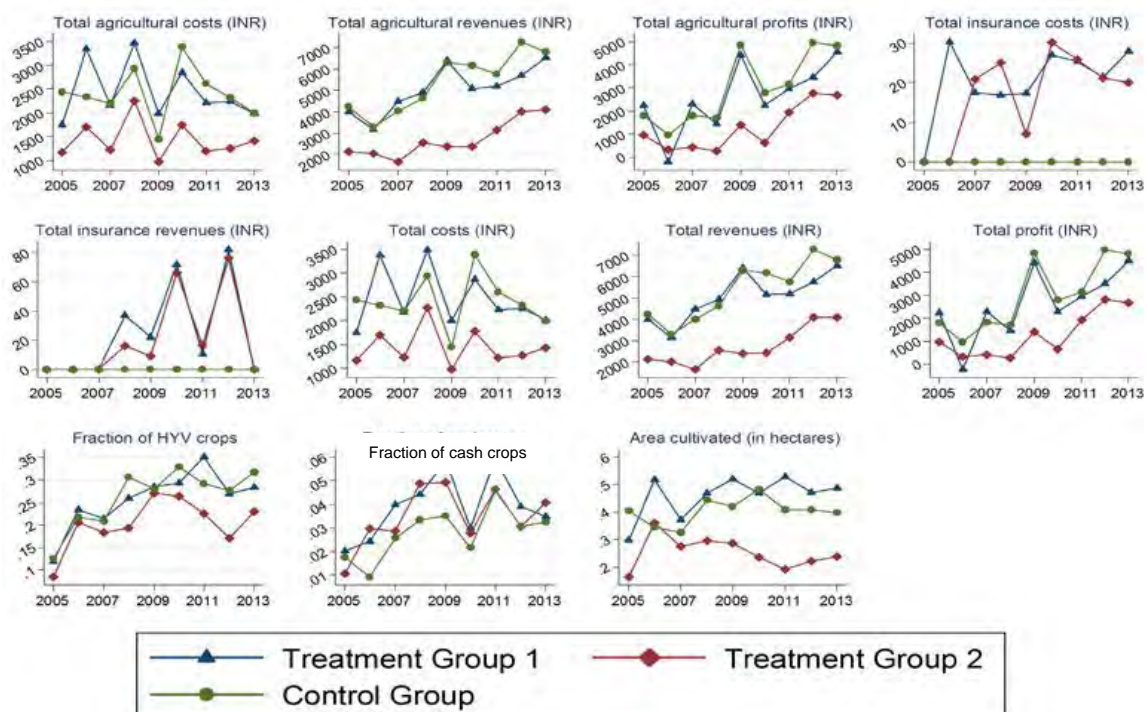
Note: this figure plots mean outcome variables by village-year treatment status for the sample of households who were surveyed and reported outcome data each year (700 unique households). Treatment group 1 is the set of villages offered to purchase insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The control group was never offered weather insurance. Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

In accord with the tests of balance in Table 1, the three groups appear quite similar in 2005 in Figure 2. Most variables follow an upward trend in all three groups. Our village-level empirical analysis below tests for breaks in level in these figures for treatment group 1 villages between 2005 and 2006, and breaks in level for treatment group 2 villages between 2006 and 2007. Aside from the obvious effects on insurance costs and revenues (namely, premiums and payouts), such breaks are not easy to discern in Figure 2.

One possible reason for difficulty in seeing treatment effects in Figure 2 is that not everyone in treatment village years ended up with insurance coverage. Figure 3 addresses this by comparing household years with insurance coverage (necessarily in treatment group 1 or 2 villages in the years after coverage became available), household years without coverage but in village years where coverage was available, and all household years in control group villages. In this figure, assignment to the control group (as opposed to either treatment group) is random, while assignment between the two treatment groups depends on randomly assigned variation in marketing and non-random selection into insurance purchasing. The random portion of that assignment is exploited in the instrumental variables regressions below. Again, among the 11 panels of Figure 3, the only obvious differences are in insurance costs and revenues.

Figure 3: Mean outcome variables by village-year insurance coverage

Sample used to study agricultural investments and outcomes
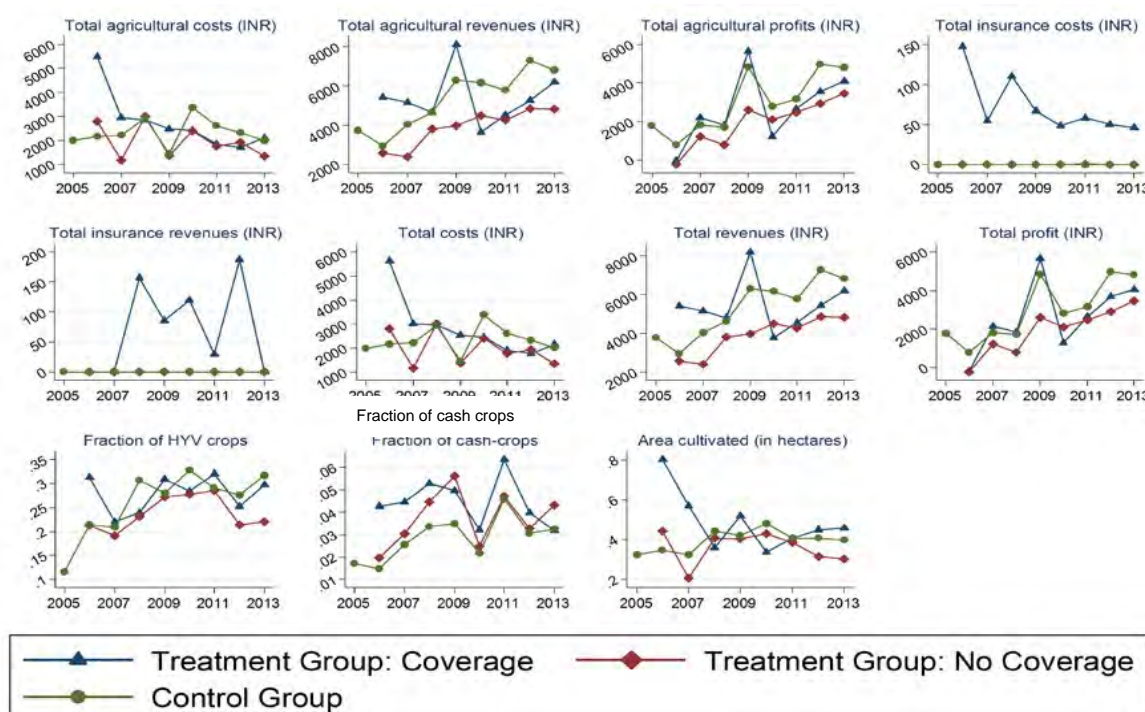
Note: this figure plots mean outcome variables by village-year insurance coverage status for the sample of households who were surveyed and reported outcome data each year (700 unique households). Treatment group: Coverage corresponds to the group of households having purchased insurance in the year preceding the survey; Treatment group: No coverage is the group of people offered weather insurance the year before but who did not purchase; and the control group includes the people who were never offered weather insurance. We started marketing insurance in 2006, which is why the 2005 data cannot be plotted for the treatment groups when defined this way. Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

We move beyond the qualitative patterns in these figures with the regression analyses described above. Table 3 presents our benchmark results. Each cell in that table comes from a separate instrumental variables panel regression. The outcome variables from

Table 1 are listed in the rows, while each column reports results using the different sources of variation described in the previous section. The endogenous right-hand side variable is the number of weather insurance policies an individual purchased in a given year.

Table 3: Impact of insurance coverage

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-568.38	-1089.45	-98.27	-215.58
	(1798.86)	(784.24)	(544.54)	(187.05)
Agricultural revenues (INR)	-600.96	-1119.65	-123.60	-238.10
(from cultivation of own plot)	(1798.77)	(782.93)	(544.81)	(186.90)
Financial revenues (INR)	32.58***	30.21***	25.33***	22.52***
	(3.59)	(3.28)	(5.07)	(5.95)
Total costs (INR)	159.16	581.20	11.20	-136.37
	(747.89)	(445.39)	(235.57)	(104.24)
Agricultural costs (INR)	130.79	550.21	0.74	-142.12
	(747.80)	(445.28)	(235.61)	(104.42)
Irrigation costs (INR)	38.39	354.43***	17.30	12.95
	(114.24)	(103.91)	(32.12)	(18.82)
Hired labour costs (INR)	146.17	89.05	8.09	-103.28*
	(403.51)	(242.58)	(121.08)	(61.98)
Other input costs (INR)	-53.76	106.73	-24.65	-51.79
	(287.25)	(296.30)	(97.61)	(50.97)
Total labour days	10.15	22.18	4.67	1.32
	(10.62)	(14.50)	(2.87)	(1.89)
Hired labour days	2.68	7.81	0.64	-0.50
	(3.45)	(7.09)	(0.87)	(1.01)
Family labour days	8.00	11.64	4.06*	1.54
	(7.38)	(8.21)	(2.22)	(1.26)
Financial costs (INR)	28.37***	30.99***	10.46***	5.75***
	(1.57)	(2.52)	(0.74)	(0.89)
Total profit (INR)	-727.54	-1670.65*	-109.47	-79.20
	(1102.61)	(887.73)	(343.72)	(180.69)
Agricultural profit (INR)	-731.75	-1669.87*	-124.34	-95.98
(from cultivation of own plot)	(1102.69)	(886.33)	(343.97)	(180.21)
Fraction of high-yielding variety crops grown	-0.01	-0.03	0.00	-0.01
	(0.05)	(0.03)	(0.02)	(0.01)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.02)	(0.01)	(0.00)	(0.00)
Area cultivated (ha)	0.06	0.05	0.02	-0.01
	(0.15)	(0.11)	(0.04)	(0.01)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-stat.	726.37	129.97	118.93	91.35
N	6,300	6,300	6,300	6,300

The first estimated coefficient in the upper left of Table 3 implies that each unit of insurance coverage that was purchased caused a reduction of INR568 in total revenues from agriculture in the associated kharif season, inclusive of revenues from weather insurance payouts. The standard error on this coefficient is INR1,799, so despite its economic significance, it is not statistically different from zero. The range of point estimates in the first row is also economically large, but we are agnostic about which specification to emphasise. For example, the specifications with only village-level variation (columns 1 and 2) reflect effects net of spillovers; negative point estimates could be the result of decisions by uninsured residents of treatment villages free-riding off the coverage of their insured neighbours.

Column 2, which uses village-level variation and individual fixed effects, stands out. The estimates in column 2 are identified by the introduction of insurance into the treatment villages (in 2006 for treatment group 1 and 2007 for treatment group 2), while all other specifications take advantage of variation in treatment each year. Therefore, one way to interpret these results is as the initial effect of being exposed to insurance. It is possible that initial exposure to insurance caused changes in agricultural production choices, but this effect diminished over time, which is why the other specifications do not show significant results. The production changes, however, served to decrease profits.

In column 2 of Table 3, and in some other estimates below, we find that insurance coverage caused an increase in irrigation expenditures. Initially, this may seem surprising, since irrigation is a different risk management technology, and as such, most models would predict that it would be a substitute for insurance. If the effect is not spurious, perhaps it arises because insurance coverage increases attention to weather-related risks. The effect generally appears most strongly in column 2, which exploits village-level variation; in principle, the irrigation expenditures could be undertaken by the villagers who could have purchased insurance but did not, and who ex post use irrigation instead to mitigate risk. Regardless, these column 2 effects are economically large: the point estimates suggest that insurance provision increases irrigation spending by around 83 per cent (compared to the baseline value), and decreases profit by more than 100 per cent. Policymakers and other readers concerned about risk may find little reassurance in these point estimates.

Corrections for multiple hypothesis testing might ordinarily be expected when examining many outcome variables, as in Table 3. We omit such tests for two main reasons. First, most theoretical models of agricultural production choices would predict high correlation between changes in the variables we are examining here. If the correlation is perfect, then even the very conservative Bonferroni correction would require no modification to the standard errors or p-values. Second, most of our results (aside from financial revenues and costs) are statistically insignificant, so we face a lower risk of spuriously asserting rejections of null hypotheses.

While Table 3 examined average effects of rainfall insurance coverage, we next investigate possible heterogeneity in two ways. First, Figures 4, 5 and 6 plot cumulative distribution functions (CDFs) of outcome variables, controlling for year effects and then pooling across years. Figures 4 and 5, analogous to Figure 2, reflect the village-year random variation in access. Figure 6, analogous to Figure 3, reflects differences between individuals with coverage and individuals without coverage. Long tails render few

patterns discernible in Figures 5 and 6. In Figure 4, the modest negative effects seen in the Table 3 regressions seem to obtain across the entire distribution of village averages.

Figure 4: Distribution of mean village outcomes by village-year treatment status (OLS regressions)

Sample used to study agricultural investments and outcomes
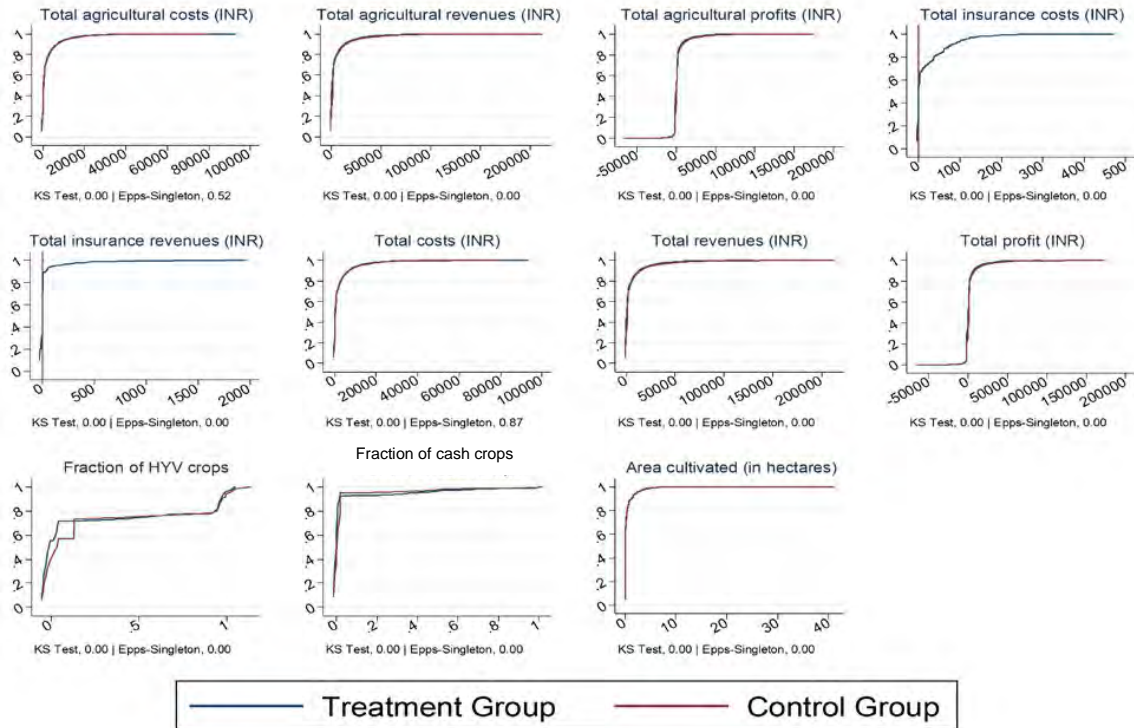
Note: this figure plots the CDF of the coefficient estimates of village-level ordinary least squares (OLS) regressions of outcome variables on the village-level treatment dummy. Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year (700 unique households). Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Figure 5: Distribution of individual outcomes by village-year treatment status (OLS regressions)

Sample used to study agricultural investments and outcomes
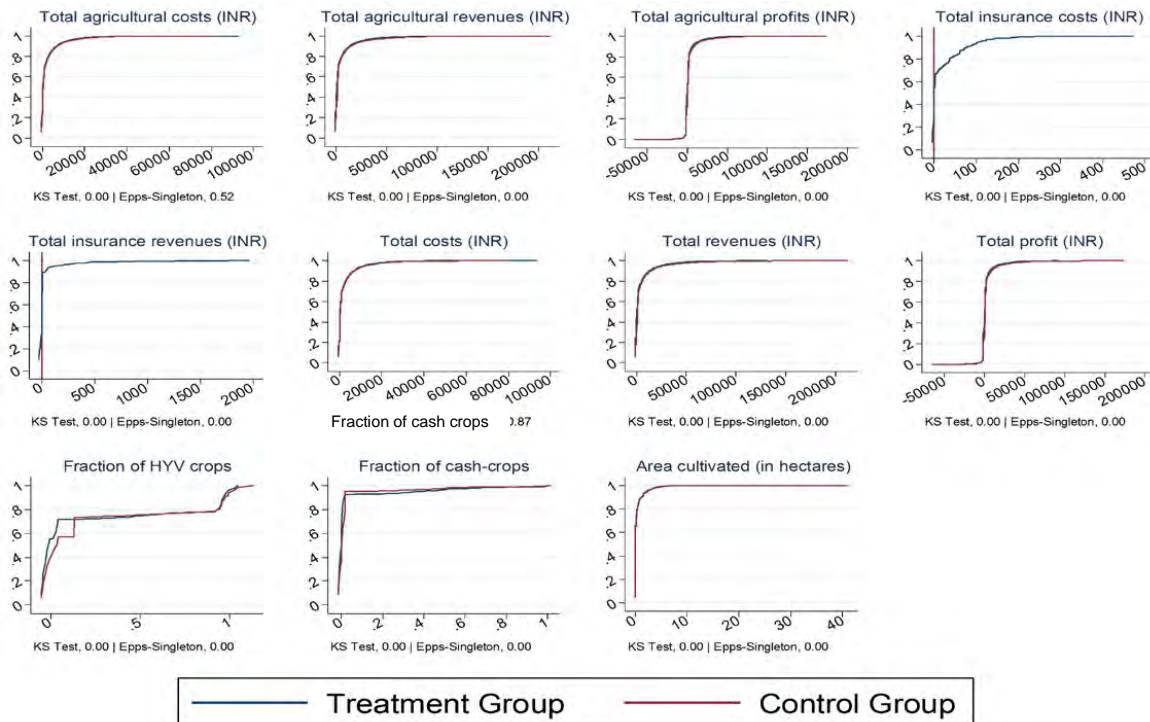
Note: this figure plots the CDF of the coefficient estimates of individual-level OLS regressions of outcome variables on the village-level treatment dummy. Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year (700 unique households). Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Figure 6: Distribution of individual outcomes by insurance take-up status (OLS regressions)
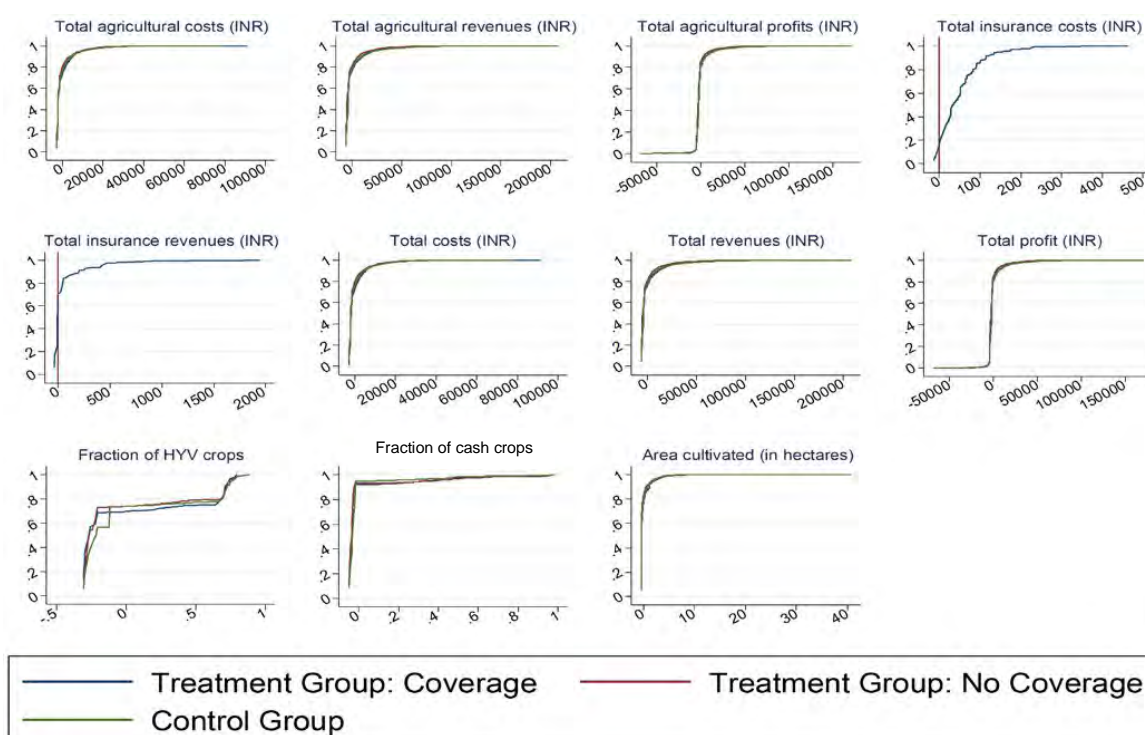
Sample used to study agricultural investments and outcomes

Note: this figure plots the CDF of the coefficients obtained from OLS regressions of main outcome variables on insurance coverage status (individual level). Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year (700 unique households). Treatment group: Coverage refers to the people who were offered insurance and purchased it; Treatment group: No coverage refers to those who were offered insurance but did not purchase it; and the Control Group was never offered insurance. Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

In addition, Table 4 tests for heterogeneous treatment effects by splitting the sample according to four different binary variables collected in the first survey wave. We successively distinguish between households with: (i) an above- or below-median financial literacy score in the baseline survey; (ii) above- or below-median education level of the head of household; (iii) households who cultivated their own plot or landless labourers (at baseline again); and (iv) households whose wealth index is either above or below median. Throughout the table, we focus on the IV specification using all instruments and individual fixed effects, analogous to column 4 of Table 3. Average effects differ in some cases across these binary characteristics, but not in ways that conclusively resolve outstanding questions about mechanisms. Most effects remain statistically insignificant. When point estimates are economically large, they tend to be negative (for example, on agricultural revenues in Table 4's top row), and this occurs for the groups that typical human capital models would predict to be best suited to capitalise on access to a new technology. Revenues declined for participants with high financial literacy, high education, at least one plot of land and high wealth (when each of these characteristics are studied one by one).

4.3.2 Robustness

We include a diverse array of robustness checks in subsequent tables. Table A4a is exactly analogous to Table 3, except that the endogenous variable is an indicator for insurance purchase rather than the discrete number of policies purchased. Effects are still generally insignificant.

Table A4b normalises by area cultivated. The sample, which includes only household years with land under cultivation, is reduced by one-third. Not surprisingly, the effects on the remaining households are larger than in the benchmark Table 3 regressions, both because the cultivators are higher income and because they have a larger share of household economic activity in the measured categories. The restricted sample in this table approximately (overlap 70 per cent) corresponds to the sample of 2,304 household, in column 5 of Table 4, that reported having at least one plot in the baseline survey.

Table 4: Heterogeneous effects of insurance coverage

Sample used to study agricultural investments and outcomes

Dependent variable	FinLit-low	FinLit-high	Educ-low	Educ-high	HasPlot-yes	HasPlot-no	Wealth-low	Wealth-high
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total revenues (INR)	34.67	-831.28	-51.46	-575.65	-731.57	187.98	152.84	-504.07*
	(152.55)	(374.88)	(197.86)	(304.67)	(415.47)	(115.16)	(188.57)	-282.05
Agricultural revenues (INR)	11.32	-850.32**	-72.79	-598.14*	-757.95*	168.08	138.54	-532.71*
(from cultivation of own plot)	(152.40)	(373.49)	(196.96)	(305.26)	(416.13)	(114.75)	(188.57)	-282.32
Financial revenues (INR)	23.35	19.04*	21.32***	22.49**	26.38**	19.90***	14.31***	28.64***
	(7.21)	(11.23)	(7.31)	(8.78)	(11.97)	(5.84)	(3.73)	-9.85
Total costs (INR)	-201.30**	-193.51	-29.52	-254.43*	-224.20	-51.16	-147.79*	-89.19
	(86.45)	(209.99)	(138.93)	(138.20)	(206.36)	(56.50)	(77.13)	-155.02
Agricultural costs (INR)	-207.70**	-198.55	-34.83	-261.30*	-228.91	-57.96	-155.03**	-94.02
	(86.76)	(210.04)	(139.32)	(138.03)	(206.55)	(56.50)	(77.25)	-155.10
Irrigation costs (INR)	-4.57	10.68	11.77	18.20	37.03	-5.78	-1.85	25.74
	(15.55)	(35.75)	(23.73)	(29.10)	(40.07)	(9.63)	(14.07)	-28.55
Hired labour costs (INR)	-140.39***	-80.20	-47.14	-161.51**	-214.54	-24.20	-94.29**	-99.33
	(52.69)	(135.08)		(75.41)	(132.82)	(37.46)	(47.62)	-96.10
Other input costs (INR)	-62.74*	-129.03	0.55	-117.98	-51.41	-27.98	-58.89*	-20.43
	(37.60)	(98.03)	(55.46)	(75.29)	(99.52)	(18.91)	(34.67)	-75.89
Total labour days	-0.73	4.50	2.33	-0.45	1.90	0.26	-0.49	3.20
	(1.81)	(3.11)	(1.81)	(3.35)	(4.43)	(0.69)	(2.23)	-2.56
Hired labour days	-0.68	0.22	-0.48	-0.16	-1.26	-0.33	-0.87	0.16
	(0.77)	(1.51)	(1.11)	(1.55)	(2.20)	(0.31)	(0.81)	-1.49

Family labour days	-0.17*	3.72	2.66*	-0.94	2.39	0.63	0.10	2.75
	(1.26)	(2.06)	(1.42)	(1.99)	(3.12)	(0.42)	(1.50)	-1.86
Financial costs (INR)	6.40***	5.03***	5.30***	6.87	4.71	6.79	7.24	4.83
	(1.13)	(1.41)	(1.16)	(1.34)	(1.20)	(1.05)	(0.98)	-1.03
Total profit (INR)	235.97	-637.77	-21.94	-321.22	-507.37	239.14	300.63	-414.88
	(170.51)	(306.67)	(205.18)	(249.02)	(418.65)	(118.74)	(199.18)	-260.93
Agricultural profit (INR)	219.02	-651.77	-37.96	-336.85	-529.04	226.04	293.56	-438.69
(from cultivation of own plot)	(169.12)	(306.60)	(204.97)	(248.91)	(418.02)	(118.03)	(199.27)	-260.72
Fraction of high-yielding variety crops grown	-0.01	0.00	0.00	-0.02	-0.01	0.00	0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	-0.01
Fraction of cash crops grown	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	0.00
Area cultivated (ha)	-0.02	-0.01	-0.02	-0.01	-0.02	-0.01	-0.02	-0.01
	(0.01)	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)	(0.02)	-0.02
N	3,816	2,115	3,474	2,826	2,304	3,996	3,150	3,150

Tables A4c–e replicate Table 3 while excluding the treatment group 2 villages, the treatment group 1 villages and the control group villages respectively. Qualitatively, the results are unchanged. We find reliably statistically significant impacts on nothing besides financial costs and revenues.

Agricultural labour markets could be affected more broadly by the introduction of formal insurance, and many SEWA members – and study participants – are landless labourers. Table A5 investigates the impacts of insurance on agricultural wage income, as well as the impact on total profit when wage income is included.

The top panel of Table A5 shows the impacts on wage income and profits inclusive of that income for the full balanced panel. The qualitative impacts are similar to those found exclusive of the wage income. When focusing only on landless labourers, in the bottom panel of the same table, almost all of the effects on total profits are accounted for (not surprisingly) by impacts on wage labour. In that panel, again nothing is statistically significant, and the point estimates take varying signs across the columns.

One important further hypothesis is that short- and long-run impacts of weather insurance may differ. A mechanism that could give rise to such differences is that short-run investments (in learning about the insurance, in investing in new production technologies) may take time to pay off. Another, contrary, possible mechanism is that initial enthusiasm wears off. The length of this project offers an unusual opportunity to study such dynamics.

In Table 5, the endogenous variable is not the number of insurance policy units in the current year, but rather the *cumulative* number of insurance policy units purchased in the current year and all previous years. Correspondingly, previous years' marketing treatments are turned on in the current year. Table 5 tends to have point estimates that are smaller in absolute value, with little change in the pattern of statistical significance.

Figure 7 provides an additional tantalising insight. It reports year-by-year estimates of treatment effects, exploiting individual-level and village-level variation in coverage like column 3 of Table 3. If the project had been short, we might have focused on the positive effects of insurance coverage on agricultural revenues and profits in 2007. Studying averages over the longer term, these 2007 impacts were evidently washed out by noise and contrary effects in other years. Since as a generic matter, year, age and cohort effects are not separately identified, we are agnostic about whether the positive 2007 estimates reflect statistical noise or true short-run effects that dissipated.

Figure 7: Year-by-year effects of individual-level insurance coverage (IV regressions)

Sample used to study agricultural investments and outcomes
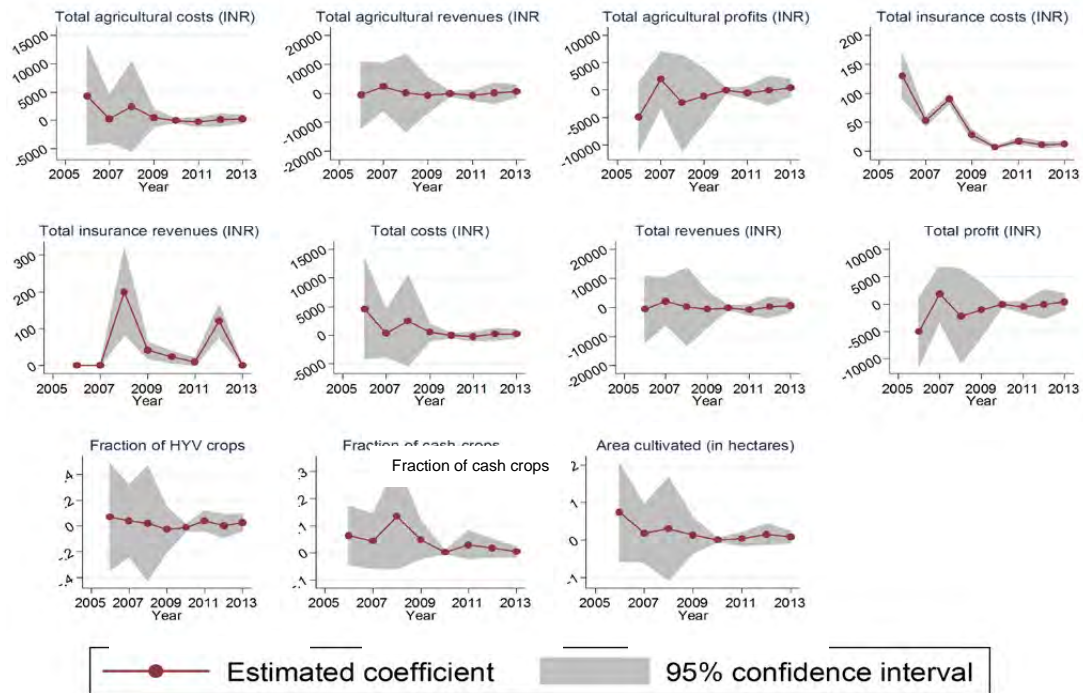
Note: this figure presents the coefficients and confidence intervals obtained from IV regressions of the main outcome variables on treatment status, instrumented by a vector of individual-level treatments for the sample of households who were surveyed and reported outcome data each year (700 unique households). Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Table 5: Impact of number of years of insurance coverage

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Total revenues (INR)	-161.04	-324.00	-57.18	-96.81
	(510.087)	(235.585)	(263.473)	(110.273)
Agricultural revenues (INR)	-170.28	-332.98	-64.64	-102.85
(from cultivation of own plot)	(510.087)	(235.259)	(263.460)	(110.118)
Financial revenues (INR)	9.23***	8.98***	7.46***	6.04***
	(1.094)	(0.950)	(0.998)	(1.081)
Total costs (INR)	45.10	172.85	1.56	-68.77
	(211.834)	(132.241)	(98.380)	(48.310)
Agricultural costs (INR)	37.06	163.63	-2.62	-70.79
	(211.820)	(132.214)	(98.384)	(48.358)
Irrigation costs (INR)	10.88	105.41***	2.70	0.54
	(32.356)	(30.913)	(12.472)	(12.652)
Hired labour costs (INR)	41.42	26.48	13.13	-34.07
	(114.254)	(72.120)	(48.780)	(27.262)
Other input costs (INR)	-15.23	31.74	-18.45	-37.27
	(81.406)	(88.079)	(43.897)	(28.807)
Total labour days	2.88	6.60	1.50	-0.29
	(3.006)	(4.321)	(1.148)	(1.521)
Hired labour days	0.76	2.32	0.19	-0.43
	(0.978)	(2.114)	(0.301)	(0.669)
Family labour days	2.27	3.46	1.32	-0.09
	(2.086)	(2.443)	(0.894)	(0.891)
Financial costs (INR)	8.04***	9.22***	4.18***	2.03***
	(0.405)	(0.807)	(0.258)	(0.418)
Total profit (INR)	-206.14	-496.85*	-58.74	-28.04
	(313.018)	(266.884)	(172.285)	(108.225)
Agricultural profit (INR)	-207.33	-496.62*	-62.01	-32.05
(from cultivation of own plot)	(313.052)	(266.458)	(172.275)	(108.022)
Fraction of high-yielding variety crops grown	0.00	-0.01	0.00	0.00
	(0.015)	(0.010)	(0.008)	(0.005)
Fraction of cash crops grown	0.00	0.00	0.00	0.00
	(0.005)	(0.003)	(0.003)	(0.002)
Area cultivated (ha)	0.02	0.02	0.01	0.00
	(0.041)	(0.034)	(0.021)	(0.009)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-stat.	1763.51	394.47	195.52	174.86
N	6,300	6,300	6,300	6,300

5. Effects on financial activity, consumption and welfare

5.1 Data

In this section, we focus on the effects of rainfall insurance on financial activity, consumption and welfare. For the analysis below, we consider households who were introduced to this study in 2006, or were one of the households added to the study in 2009. As before, we only consider households who did not attrite and provided non-missing data on key outcome variables. Out of the 1,500 original households, 1,049 were thus observed in all nine waves, while 326 households added in 2009 completed all surveys until 2014. Figures A3a and A3b report the year-by-year sample size and cumulative attrition by treatment group. Attrition does not vary systematically by village-level treatment, so it is unlikely that our estimates will suffer because of differential attrition. Table A7 further compares baseline characteristics and key outcome variables for attritors and non-attritors, by treatment assignment. These characteristics do not vary significantly between households in the balanced panel and attritors, overall and across treatment groups. This suggests no difference in the composition of attritors across groups.

Table 6 reports summary statistics for the outcome variables of the balanced panel used in this analysis. These suggest relatively good balance across treatment groups; for added robustness, all regressions below include indicators for each treatment group to control for baseline differences. All variables correspond to financial activity, consumption and well-being in the year up to the survey, including the kharif season covered by the rainfall insurance policy. Looking at households included in the study from the start, the average household received about INR27,000 in total yearly income at baseline (USD614 using 2005's average exchange rate), had INR1,100 in savings, owed INR11,300 in outstanding loans and held around INR35,000 in debt. Total yearly reported expenditures amounted to INR94,000. Food expenses account for about 40% of all expenditures, non-food non-durable items for 29%, events and festivals for 18% and investments on durables for 14% of all yearly expenditures. Households in the treatment expansion group, who were surveyed first in 2009, appear to have higher incomes on average, reporting close to INR37,000 in total (USD841 using 2005's exchange rate). Note that not all outcome variables were collected in all years of the study, which is why some information is not reported at baseline for the treatment expansion group. Figure 8, which graphically summarises outcome variables for each group across time, confirms the good relative balance at baseline across groups. It also allows us to see which variables are available each year. Notably, savings were not collected for 2007, borrowing, lending and transfers were not collected for 2007 and 2008, and subjective assessments of whether 'good things happen' and how much 'control over life' one has were not asked for 2007, 2008 and 2009. Finally, households were not asked about food sufficiency in 2012 and 2013.

Figure 8: Mean household outcome variables by village-year treatment status
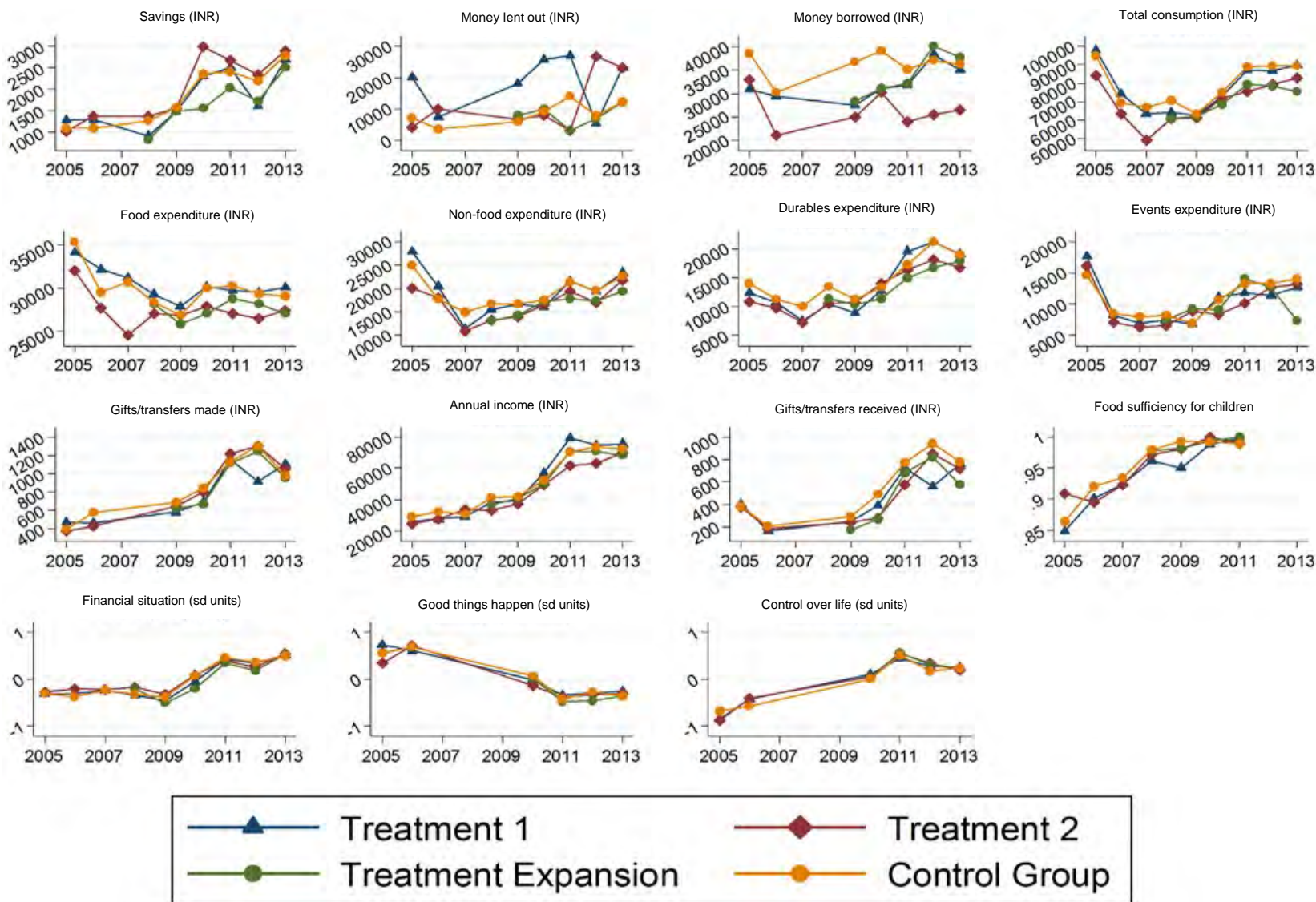
Sample used to study household outcomes

Note: this figure reports mean outcome variables by village-year treatment status. The sample is restricted to the households who were surveyed and reported outcome data each year (1,049 households until 2008, and 1,375 households 2009 onwards). Treatment group 1 is the set of villages offered to purchase insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The treatment expansion group includes villages added to the sample and offered to purchase insurance 2009 onwards. The control group was never offered weather insurance. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. See Appendix B2 for detailed description of outcome variables. 1INR = USD0.016.

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Table 6: Baseline summary statistics and tests for village-level balance

Sample used to study household outcomes

	Full sample	Control	Treatment group 1	Treatment group 2	Test for pair-wise equality	Treatment expansion group
	Mean (s.d.) (1)	Mean (s.d.) (2)	Mean (s.d.) (3)	Mean (s.d.) (4)	p-value (5)	Mean (s.d.) (6)
A. Consumption (INR)						
Total consumption	93768.15	95044.48	97831.67	84037.56	0.17	61102.38
	(80140.72)	(81974.15)	(82859.03)	(70136.85)		(51049.70)
Non-durable, food	34357.12	35447.46	34184.50	32059.69	0.27	28190.67
	(20253.02)	(20164.71)	(20855.01)	(19326.08)		(15081.97)
Non-durable, events (e.g. weddings)	16031.60	14724.38	17803.87	16207.42	0.32	7876.14
	(26501.74)	(25444.75)	(25634.00)	(30084.40)		(20493.94)
Non-durable, gifts/transfers made	413.59	390.88	468.65	376.37	0.78	
	(1629.41)	(1573.10)	(1760.59)	(1537.81)		
Non-durable, other	25064.52	25145.88	27993.98	20050.54	0.02	13139.12
	(33110.26)	(31998.91)	(37521.96)	(26926.03)		(17467.14)
Durable	12866.25	14004.83	12415.76	10911.09	0.08	11555.93
	(18788.77)	(22376.42)	(15287.37)	(13969.61)		(22511.76)
B. Income (INR)						
Annual income	27247.77	29314.85	26029.32	24363.37	0.16	37019.72
	(23534.92)	(27144.22)	(18950.44)	(20638.02)		(34527.02)
Gifts/transfers received	388.16	381.09	404.26	377.91	0.97	
	(1532.45)	(1533.89)	(1539.83)	(1524.30)		
C. Financial activity (INR)						
Savings	1137.80	1087.55	1279.82	1022.39	0.57	817.01

	(2816.64)	(2501.40)	(3577.51)	(1972.89)		(2943.95)
Lending	11290.00	7228.95	20108.33	4125.00	0.16	
	(20623.11)	(10981.39)	(31320.85)	(3966.00)		
Borrowing	34857.47	38589.58	30878.85	32938.47	0.22	
	(49761.70)	(53045.74)	(46971.32)	(46043.55)		
D. Well-being						
Food sufficiency for child	0.87	0.86	0.85	0.91	0.21	0.98
	(0.34)	(0.34)	(0.36)	(0.29)		(0.15)
Financial situation (s.d. units)	-0.29	-0.30	-0.30	-0.26	0.93	-0.20
	(1.06)	(1.00)	(1.15)	(1.06)		(0.77)
Good things happen (s.d. units)	0.58	0.56	0.73	0.35	0.03	
	(1.34)	(1.32)	(1.33)	(1.35)		
Control over life (s.d. units)	-0.77	-0.68	-0.84	-0.88	0.13	
	(1.15)	(1.15)	(1.15)	(1.15)		
N	1,049	495	345	209		326

Note: this table reports baseline summary statistics by treatment group and tests for village-level balance for the sample of households who were surveyed and reported household outcome data each year. Treatment group 1 is the set of villages offered the opportunity to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered weather insurance every year from 2007 on. Treatment expansion group villages were added to the sample in 2008 and offered insurance beginning in 2009. The control group was never offered weather insurance. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. Information on borrowing, lending, gifts and transfers and the outlook towards life indicators was not collected in 2008, which is the baseline year for the treatment expansion group. INR1 = USD0.01. s.d. = standard deviation.

Insurance take-up and payouts, summarised in Table 7, are similar to those described in the previous section. Insurance take-up varied between 16% and 57%. The fraction of households receiving payouts, conditional on having purchased insurance, was highest in 2012, with about 75 per cent of households receiving some payout, and averages around 44 per cent across all years. The average amount paid out varied by year, with no payouts in 2006, 2007 or 2013, and a high of INR353 per policy in 2012.

Table 7: Sample composition – treatment, take-up and insurance coverage

Sample used to study household outcomes

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Villages by insurance access group									
Control group	95	65	65	65	45	45	45	45	45
Treatment group 1	-	30	30	30	30	30	30	30	30
Treatment group 2			20	20	20	20	20	20	20
Treatment expansion group					8	8	8	8	8
Total		95	95	95	103	103	103	103	103
Households by insurance access group									
Control group	1049	704	495	821	495	495	495	495	495
Treatment group 1	-	345	345	345	345	345	345	345	345
Treatment group 2	-	-	209	209	209	209	209	209	209
Treatment expansion group	-	-	-	-	326	326	326	326	326
Total	1,049	1,049	1,049	1,375	1,375	1,375	1,375	1,375	1,375
Take-up									
Targeted marketing sample	-	345	554	554	880	880	880	880	880
Purchased (yes/no)	-	74	229	117	142	499	398	413	506
Treatment group 1 purchased		74	131	71	86	196	141	183	207
Treatment group 2 purchased		-	98	46	29	118	101	100	115
Treatment expansion group purchased		-	-	-	27	185	156	130	184
Average number of policies (if purchased)	-	1.05	1.03	1.08	2.30	4.53	2.18	1.98	2.01
Treatment group 1	-	1.05	1.05	1.13	2.35	4.64	2.12	1.91	1.99
Treatment group 2	-	-	1.00	1.00	1.97	4.39	2.02	2.15	1.86
Treatment expansion group	-	-	-	-	2.48	4.51	2.33	1.95	2.14

Repurchasers (bought insurance in year y as well as y-1)	-	-	37	78	50	93	283	239	291
Fraction repurchasing			0.50	0.34	0.43	0.65	0.57	0.60	0.70
Payouts									
Payout (yes/no)	-	0	0	32	54	321	53	309	0
Average payout (if purchased)	-	-	-	156	87	331	22	353	-
Average payout per policy (INR) (if purchased)	-	-	-	156	38	80	13	173	-
Average payout (if payout >= INR 1.00)	-	-	-	570	229	515	168	471	-
Average payout per policy (INR) (if payout >= INR 1.00)	-	-	-	570	99	124	94	231	-

Note: this table reports sample composition by village and household treatment group, insurance take-up and repurchase rates and observed payouts by year. The sample is restricted to households who were surveyed and reported outcome data each year from the sample used to study household outcomes. Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. No insurance was offered in 2005. Three households in 2007, belonging to the control group, purchased one weather insurance policy each. The treatment expansion group included eight additional villages added to the sample in 2008 and offered insurance every year from 2009 on. INR1 = USD0.016.

5.2 Empirical strategy: overview

We focus on the effects of rainfall insurance on a series of proxies for welfare. We consider four vectors of outcomes: (i) financial activity, as measured by savings, lending and borrowing; (ii) yearly consumption, separately on food, non-food items, durables, events and gifts; (iii) household income, including money earned by each household member and gifts received; and finally (iv) well-being. Well-being is proxied by a dummy equal to one if children have had enough to eat over the previous year, and a series of subjective assessments of the household's financial situation, how much control over life they feel they have, and how much they believe that 'good things tend to happen to them'. Outcome variables are described in greater detail in Appendix B2, where we also present evidence that productivity shocks (as proxied by the amount insurance policies would have paid out in the control group) matter for household welfare and are not fully insured without access to rainfall insurance.

While predictions for the effects of insurance on most of these outcomes are straightforward, savings and consumption stand out. Insurance might indeed impact them in one of two ways: covered households might no longer see a need to accumulate precautionary savings, and therefore dis-save and consume more (deNicola 2015), or on the contrary covered households might be better protected and no longer need to use savings, sell assets or reduce consumption when hit by a shock. We will try to see which of these effects dominates here.

The empirical strategy employed to study effects on these outcomes is the same as the one used in the previous section; we therefore refer readers to that section for a full description of regression specifications, which we only summarise here. As before, we exploit both village-level and individual-level variation. All households are included in individual-level variation specifications, while treatment expansion group villages (added in 2009) are excluded from village-level specifications since they were all assigned to treatment.

We study first the impact of insurance coverage, as proxied by units of insurance purchased, and second the impact of amounts received as payouts. Payouts received, as they should provide a more complete picture of the amplitude of shocks and at the same time compensate for the outcomes of bad weather, are particularly expected to matter for welfare outcomes. Again, these independent variables are likely to be endogenous, and are therefore instrumented for by either village- or individual-level treatment assignment indicators, depending on the specification. In order to improve the precision of the instruments for insurance payouts, we additionally interact treatment indicators with the amount of payout a person would have received if they had purchased an insurance policy. We present results successively with and without individual fixed effects for each specification.

5.3 Results

5.3.1 Descriptive figures and benchmark specifications

We discuss first figures that present unconditional results, in the sense that no control is included in these specifications. Figure 8 shows the evolution of the outcome variables of interest over the years of the study, by treatment group. Beyond pre-treatment imbalances already discussed in the sub-section above, the four groups represented here appear quite similar at baseline. Income and expenditure variables all seem to display an upward trend, which is consistent with the trends for agricultural outcomes described above.

In this analysis, we look for differences in trends between the control group and: either (i) treatment group 1 from 2006 on; or (ii) treatment group 2 from 2007 on. We cannot directly compare the treatment expansion group with the control group, but can look for breaks in trends for that group from 2009 on. The amounts held in savings by treatment group 1 households seem to increase slightly more in the first year they were treated, the food expenditures of treatment group 2 households seem to have decreased more on average in 2007 than for control group households, and the expenditures on festivals and events of treatment expansion group households do seem to increase sharply after they were treated the first time. These observations remain marginal though, and we do not see any clear breaks in trends beyond these.

Figure 8 presents unconditional intention-to-treat results – it might therefore be that we do not directly see any clear difference between treatment and control because not all treated households actually took up insurance policies. As before, we present in Figure 9 similar figures, but this time comparing: (i) treated households who purchased insurance; (ii) treated households who did not purchase insurance; and (iii) control households. Note that we do not include the treatment expansion group here as it is not directly comparable with the other treatment groups. In other words, Figure 9 presents

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unconditional average treatment effects on the treated. Using this specification, we see that households covered by rainfall insurance on average held more savings and lent more money, at least in the first years of the study and up to 2010. After 2010, we also see that the amounts borrowed by covered households decreased, while the amounts borrowed by uncovered households kept following an upward trend. We see no clear effects on expenditures or well-being proxies on these graphs. These observations suggest that rainfall insurance coverage could help households dis-save less than non-covered households following a productivity shock.

Figure 9: Mean outcome variables by village-year insurance coverage status

Sample used to study household outcomes
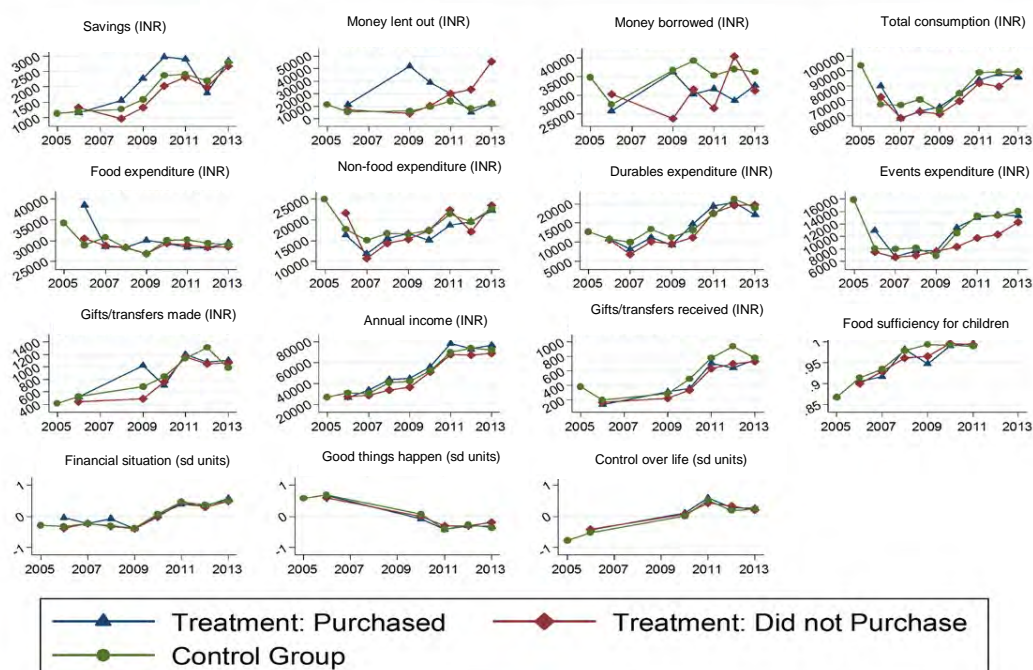
Note: this figure reports mean outcome variables by village-year insurance coverage status. The sample is restricted to the households who were surveyed and reported outcome data each year. Treatment: Purchased corresponds to the group of households having purchased insurance in the year preceding the survey; Treatment: Did not purchase is the group of people offered weather insurance the year before but who did not purchase; and control group includes the people who were never offered weather insurance. We started marketing insurance in 2006, which is why the 2005 data cannot be plotted for the treatment groups when defined this way. This figure does not include the eight additional villages added to the treatment expansion group in 2009. Standard errors, clustered at the village level, are shown in parentheses. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

These figures present raw unconditional results, and only discuss the effects of discrete treatment or take-up indicators. The empirical strategy described earlier allows us to move past these limitations, by using continuous variables for the amount of insurance coverage and payouts received, as well as by including various controls. We discuss the results from our regression analyses below.

Main results are presented in Tables 8 and 9, which respectively discuss the effects of insurance coverage and insurance payouts on a series of dependent variables. As in earlier tables, the outcome variables (listed in Table 6) are reported in rows, while each column presents results from different specifications. Namely, columns 1 and 2 present results of IV regressions using village-level assignment to treatment to instrument for the endogenous regressor, respectively without and with individual-level fixed effects, and columns 3 and 4 present results of IV regressions using individual-level assignment to various marketing treatments as instruments, again respectively without and with fixed effects. As discussed earlier, we choose to present these four specifications without emphasising any particular one, as they represent different potential channels for the effects of rainfall insurance.

Table 8 presents the impact of insurance coverage, as proxied by the number of policy units purchased. Monetary outcome variables are reported in 2005 rupee terms here, so that, for example, the first estimated coefficient in column 1 would imply that each additional unit of insurance coverage purchased causes a decrease of total household consumption of INR1,542. This coefficient is not significantly different from zero though.

Table 8: Impact of insurance purchase

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-1542.499	-1662.624	-1087.137	-1049.925
	(4429.148)	(5715.103)	(1257.453)	(922.048)
Non-durable, food	767.094	1453.403	-2.551	-155.436
	(1317.266)	(1278.437)	(305.721)	(171.412)
Non-durable, events (e.g. weddings)	-797.387	-2343.903	-420.808	-502.706
	(770.387)	(1830.433)	(349.810)	(385.718)
Non-durable, gifts/transfers made	-65.442	-9.486	-14.674	-9.946
	(70.632)	(112.388)	(26.516)	(20.389)
Non-durable, other	-329.597	-1453.421	-355.110	-284.125
	(1127.089)	(2171.636)	(361.938)	(314.588)
Durable	-810.785	809.387	-124.697	61.015
	(1312.861)	(1367.285)	(434.719)	(351.614)
B. Income (INR)				
Annual income	253.011	481.545	470.542	494.889
	(3771.415)	(2790.492)	(1147.339)	(638.512)
Value of gifts/transfers received	-87.299*	-110.070	-51.481***	-52.357***
	(47.312)	(95.348)	(17.498)	(18.736)

C. Financial activity (INR)

Savings	-78.086	-78.952	-97.751	-81.012
	(287.192)	(259.985)	(97.835)	(69.535)
Lending	601.680	178.505	-29.402	-129.031
	(414.954)	(376.859)	(113.555)	(89.731)
Borrowing	-1615.954	1914.752	-924.134	-737.220
	(2553.771)	(2674.019)	(869.438)	(590.374)
D. Well-being				
Food sufficiency for child	-0.012**	0.000	-0.002	0.001
	(0.006)	(0.023)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.030	-0.075	-0.018	-0.014
	(0.041)	(0.089)	(0.014)	(0.012)
Good things happen (s.d. units)	0.001	-0.092	0.006	0.004
	(0.024)	(0.099)	(0.012)	(0.013)
Control over life (s.d. units)	0.033	0.118	0.005	0.009
	(0.025)	(0.082)	(0.011)	(0.012)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-stat.	1170.19	192.32	165.83	130.46
Includes expansion group households	No	No	Yes	Yes
N	9,441	9,441	11,397	11,397

Note: this table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption are winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

We find no significant effect on expenditures or income, which is not surprising since we did not find any impact of insurance purchases on investment. The coefficient estimates on well-being proxies are moreover of inconsistent signs across specifications, overall not significantly different from zero and of relatively small magnitude.

We do not find significant effects on savings, lending or borrowing in any specification, but do find significant negative effects on transfers received from others in three out of four specifications. The coefficient estimates are of relatively low magnitude (between INR51 and INR87 per additional policy purchased) but suggest that insurance might be used as a substitute to informal risk-sharing mechanisms used previously to compensate losses due to shocks. These results overall do not say much about the way rainfall insurance coverage affects consumption smoothing, financial activity and welfare. It is possible though that these effects would only be observed when households are actually hit by a shock. Indeed, we did not find any effects of insurance purchases on ex-ante risk management, which suggests that any effect of rainfall insurance should come from changes in ex-post risk-coping strategies.

In Table 9, we study the effects of the amounts received as insurance payouts on the same series of outcomes. As these are meant to compensate for the effects of bad productivity shocks, we should expect to identify more precisely the impact of insurance when households suffer a shock. The top coefficient in column 1 should now be interpreted as 'Every additional rupee received as insurance payout causes an average decrease in total consumption of INR24'.

The estimated negative effects on the amount of transfers received are still significant in three out of four specifications, but the magnitudes here make more economic sense, and suggest that weather insurance is a good substitute for informal insurance: the coefficient in column 1, for example, indicates that an increase in payout by INR1 leads to a decrease in transfers received by approximately INR1.4.

The effects on financial activity reported in Table 9 are of some interest: payouts have negative effects on amounts held in savings. This effect is significant in both individual-level specifications, and suggests that every additional rupee in payout leads to reductions of INR1.7–2 in savings held on average. This effect could support the hypothesis that rainfall insurance allows households to reduce and invest their stock of precautionary savings, or be linked to the effect of the bad weather shock itself rather than the payouts received. Indeed, payout levels are strongly correlated (as required) with the seriousness of weather shocks, and it could therefore be that these specifications capture some of the effect of the shock, after which individuals need to eat into their savings.

Effects on consumption can be used to distinguish between these two explanations: if consumption increases, in particular of durables, this would support the hypothesis of redirecting precautionary savings to investments. Estimated effects on consumption are never significantly different from zero though; the coefficient signs are negative for overall consumption and inconsistent across specifications for durables consumption. This therefore seems to lend more support to the explanation of dis-saving being a consequence of a bad weather shock, even though this cannot be shown formally at this point and requires further research.

Table 9: Impact of insurance payout amount

Sample used to study household outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	**(2)**	**(3)**	**(4)**
Endogenous variable	Payout amount	Payout amount	Payout amount	Payout amount
A. Consumption (INR)				
Total consumption	-24.041	-28.459	-13.160	-6.867
	(68.922)	(98.513)	(13.037)	(10.203)
Non-durable, food	11.956	24.878	-0.683	-1.960
	(20.642)	(21.862)	(3.355)	(2.199)
Non-durable, events (e.g. weddings)	-12.428	-40.121	-6.991*	-6.683
	(11.813)	(32.233)	(4.014)	(4.175)
Non-durable, gifts/transfers made	-1.020	-0.162	-0.452	-0.309
	(1.094)	(1.924)	(0.337)	(0.300)
Non-durable, other	-5.137	-24.878	-3.617	-1.360
	(17.527)	(37.918)	(3.557)	(3.323)
Durable	-12.637	13.854	-0.486	3.712
	(20.530)	(23.203)	(5.067)	(4.293)
B. Income (INR)				
Annual income	3.943	8.243	6.680	5.321
	(58.828)	(47.645)	(13.519)	(7.942)
Value of gifts/transfers received	-1.361*	-1.884	-0.601**	-0.464*
	(0.731)	(1.639)	(0.263)	(0.260)
C. Financial activity (INR)				
Savings	-1.217	-1.351	-1.741*	-1.977***
	(4.478)	(4.431)	(0.927)	(0.704)
Lending	9.378	3.056	0.328	-0.593
	(6.493)	(6.414)	(1.076)	(0.989)
Borrowing	-25.186	32.775	-6.776	-3.776
	(40.194)	(46.055)	(10.282)	(6.388)
D. Well-being (per INR1,000 of payout amount received)				
Food sufficiency for child	-0.186**	-0.005	-0.022	0.011
	(0.093)	(0.390)	(0.015)	(0.022)
Financial situation (s.d. units)	-0.468	-1.286	-0.299*	-0.229*

	(1)	(2)	(3)	(4)
	(0.644)	(1.513)	(0.166)	(0.131)
Good things happen (s.d. units)	0.017	-1.581	0.004	-0.039
	(0.370)	(1.737)	(0.137)	(0.149)
Control over life (s.d. units)	0.511	2.026	0.005	0.022
	(0.388)	(1.458)	(0.141)	(0.152)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-stat.	184.83	24.52	42.57	35.04
Includes treatment expansion villages	No	No	Yes	Yes
N	9,441	9,441	11,397	11,397

Note: this table reports the impact of insurance on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for total payout amount received; individual-level IV regressions use individual-level marketing treatment status to instrument total payout received. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all its respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. Data on financial activity, income and consumption are winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

5.3.2 Robustness

As in the previous section, we include various robustness checks in the Appendix: Tables A9a and A9b are analogous to Tables 8 and 9 but use indicators for respectively 'buying insurance' and 'receiving a payout' as endogenous variables rather than the continuous amounts of policies purchased or amounts received. The results are qualitatively similar to those described above.

As in the previous section, we also investigate the potential effects of cumulative treatments, as well as potential composition effects, by successively excluding each treatment group. These results, overall similar to the results reported in our benchmark regressions, are reported in Tables A9c–g. Table A9f also reproduces Table 8, but includes an additional control for the severity of shock faced, as proxied by the amount of payout households would have received had they purchased insurance. Here again, the results are qualitatively unchanged.

Finally Figure 10 plots year-by-year estimates of the effect of insurance coverage on the same series of outcomes. It uses an individual-level IV specification, as that presented in column 3 of Table 8. This figure provides a cautionary tale, and additional evidence of the benefits of long panels: had we stopped the study in 2009, we might have concluded

that there were positive effects of insurance coverage on food expenditures, and negative effects on money lent out, non-food expenditure, durables expenditure, events expenditure and income – these effects disappear when using the full panel.

Figure 10: Year-by-year individual IV estimates of insurance policy coverage on household outcomes

Sample used to study household outcomes
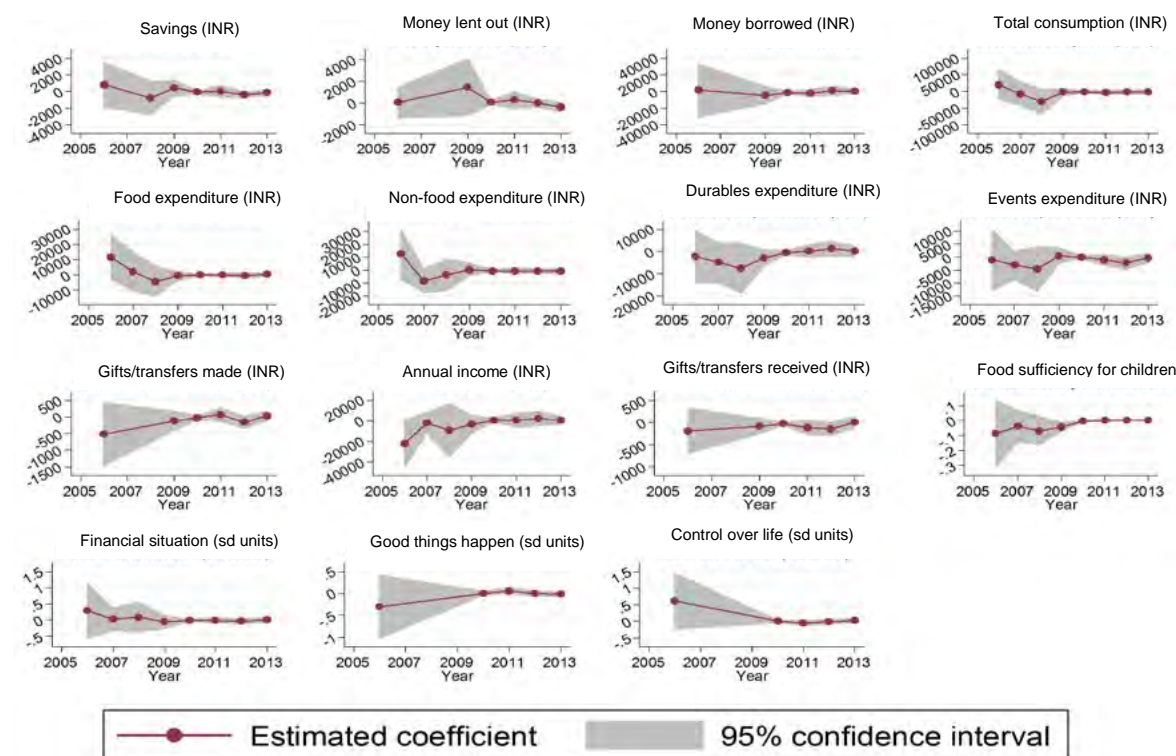
Note: This figure presents the coefficients and confidence intervals obtained from IV regressions of the main outcome variables on treatment status, instrumented by a vector of individual-level treatments for the sample of households who were surveyed and reported outcome data each year. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

6. Conclusion

This paper reports on data from an eight-year study into the effects of introducing index insurance to a set of villages in Gujarat, India. This work was inspired by the theoretical view that risk management can improve production decisions and ultimately impact on farmer welfare, as well as a substantial body of evidence which suggests that rainfall risk is important to farmers.

After eight years of sales, including several years in which almost half of the households who were offered insurance chose to buy it, we found no systematic effect of insurance on agricultural investment decisions. For some outcomes, such as the share of land devoted to cash crops or HYV crops, our estimates are quite precisely centred around zero. In every specification, and every sample, households that were induced to purchase insurance experienced greater average financial income (insurance payouts) than financial costs (premium costs) because policies were subsidised and farmers

experienced payouts. Yet, on the 'real' side, we saw little to no systematic difference in reported agricultural revenues and profits from insurance purchasers versus non-buyers. These results are perhaps particularly surprising when considering SEWA's choice to sell the policies at a subsidised price rather than giving them out for free. We expected that subsidised rather than free coverage would lead people who anticipated the biggest benefits from coverage to be the ones to adopt, and that these individuals would show especially large effects on production choices.

Our results contrast somewhat with those of Karlan *et al*. (2014), Cai *et al*. (2015) and Cole, Giné and Vickery (2013a), who found significant investment responses to the introduction of insurance. Several possible explanations for this difference in results relate to the small size of SEWA members' farms. First, modifying input mixes might be viewed as especially risky by small farmers. Additionally, landless labourers and sharecroppers were also among the respondents, and might have had limited ability to negotiate different input mixes. Second, it is possible that insurance adopters might have been those with the most liquid assets or access to credit, who were already operating with the expected profit-maximising technology.

Our results, beyond these contradictions, also leave us with a number of questions, some potentially answerable with further analysis. First, why are point estimates on agricultural costs, revenues and profits generally negative? A simple interpretation is that these negative point estimates are statistical noise. Alternative stories might involve slow learning with early mistakes (although see the discussion of Table 5 above) or adverse realisations of basis risk; indeed, in the first year of coverage, considerable flooding did occur, due to an uninsured dam opening). If insurance coverage caused out-migration, perhaps agricultural scale was reduced. A more speculative and difficult-to-assess possibility is imagined moral hazard, whereby farmers believed they had bought an indemnity product and thus reduced their efforts, when in fact they had purchased an index product.

In the paper's second half, we investigated potential impacts of insurance coverage and payouts on financial activity, consumption and well-being, and contributed some of the first impact estimates of such effects to the literature. Having found no effect on investment, we could only expect insurance to affect these outcomes through its effects on either non-agricultural investments or ex-post risk-coping strategies.

Interestingly, we found consistent evidence that insurance payouts can act as a substitute for informal transfers, but no consistent evidence of effects on consumption and savings. On the other hand, we found relatively consistent negative impacts on well-being proxies. These are counter-intuitive, and call for further study.

We perceive at least three purely technical possible explanations for our weak effects. First, perhaps early-year survey data were so noisy that we should focus attention on subsequent years, during which time the survey teams were more disciplined and precise. Figures 7 and 13 suggest increasing precision in year-by-year estimates of impacts over time. Second, the analyses may suffer from misspecification, particularly because of the long tails of INR-denominated outcome variables (see Figures 4–6); however, results in logs and levels are qualitatively similar. Third, perhaps impacts on average outcomes are too much to hope for, despite theoretical potential. It may be more

promising to test for reductions in volatility of income, consumption and well-being. In comparison with other work, this project involved a partnership with an NGO seeking to offer retail index insurance to small farmers and landless labourers on a persistent basis. The most straightforward implication of our results is that weather risk management for these households does not affect agricultural investment, and only weakly affects risk coping. Since the policies were generally sold at a subsidy, and the sales costs often exceeded the cost of the premium, such a distribution method would not pass a cost–benefit test. Alternatives that may merit consideration include retail sales to groups or institutions, or selling products to larger-scale farmers, who may be in a better position to change investment decisions.

Potentially useful perspective comes from viewing this study in light of recent work evaluating impacts of microcredit. Early supporters of microcredit promised that it would help put 'poverty in a museum'. Six recent randomised controlled trials in a range of settings, summarised by Banerjee, Karlan and Zinman (2015), collectively characterise microcredit as having 'modestly positive, but not transformative, effects'. The present study serves to suggest that index insurance, at least in this relevant setting, may have at best modest effects as well.

Appendix A: Figures and tables

Figure A1a: Attrition over time by village-level treatment status

Sample used to study agricultural investments and outcomes
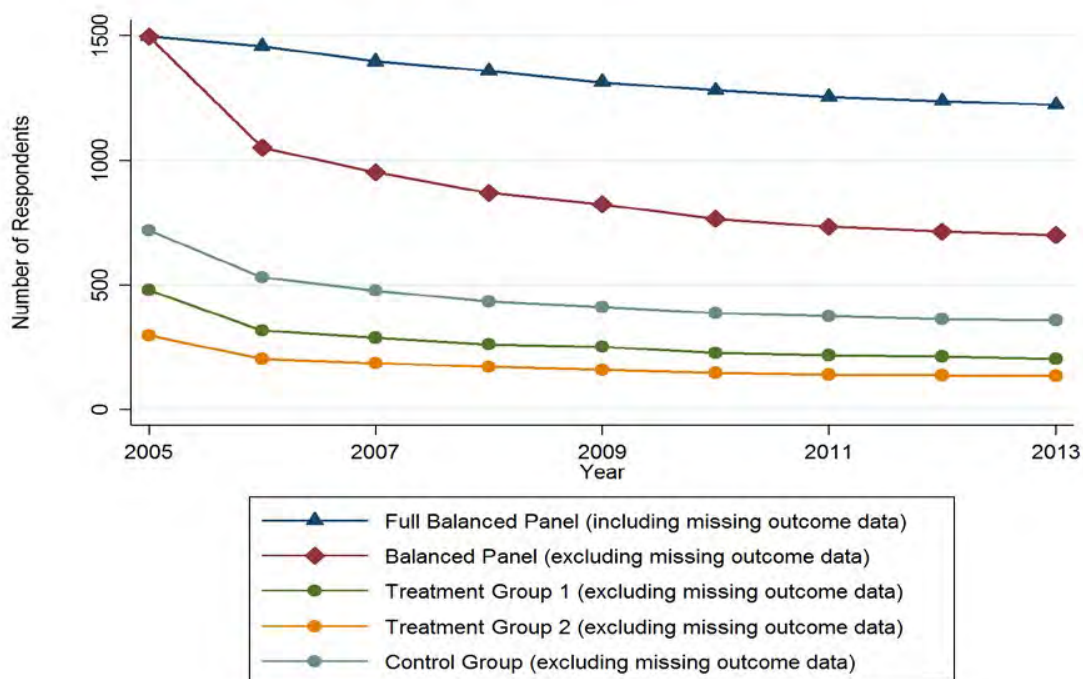
Note: This figure shows the evolution of the balanced sample used to study agricultural investments and outcomes by reporting year-by-year attrition both for each treatment group and for the entire sample (including and excluding those who report missing outcome variables). All analysis is conducted using the balanced panel group, which includes the 700 unique households that report non-missing outcome variables and are surveyed each year. Treatment group 1 is the set of villages first offered to purchase weather insurance in 2006, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The control group was never offered insurance.

Figure A1b: Cumulative proportional attrition rates by village-year treatment group

Sample used to study agricultural investments and outcomes
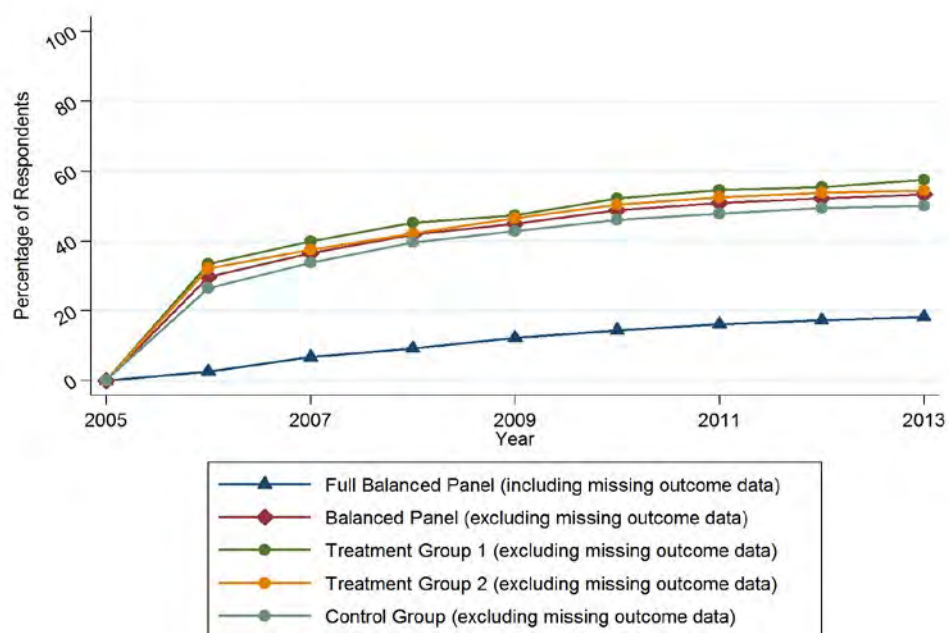
Note: This figure reports cumulative attrition as a percentage of total respondents that were intended to be surveyed for each treatment group and for the entire sample (including and excluding those that report missing outcome variables) for the sample used to study agricultural investments and outcomes. The intended survey sample for each year is 1,499 respondents, including 720 from the control group, 480 from treatment group 1 and 299 from Treatment group 2. All analysis is conducted using the 'balanced panel' group, which includes the 700 unique households that report non-missing outcome variables and are surveyed each year. Treatment group 1 is the set of villages first offered to purchase weather insurance in 2006, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The control group was never offered insurance.

Figure A2: Year-by-year effects of insurance coverage, controlling for baseline
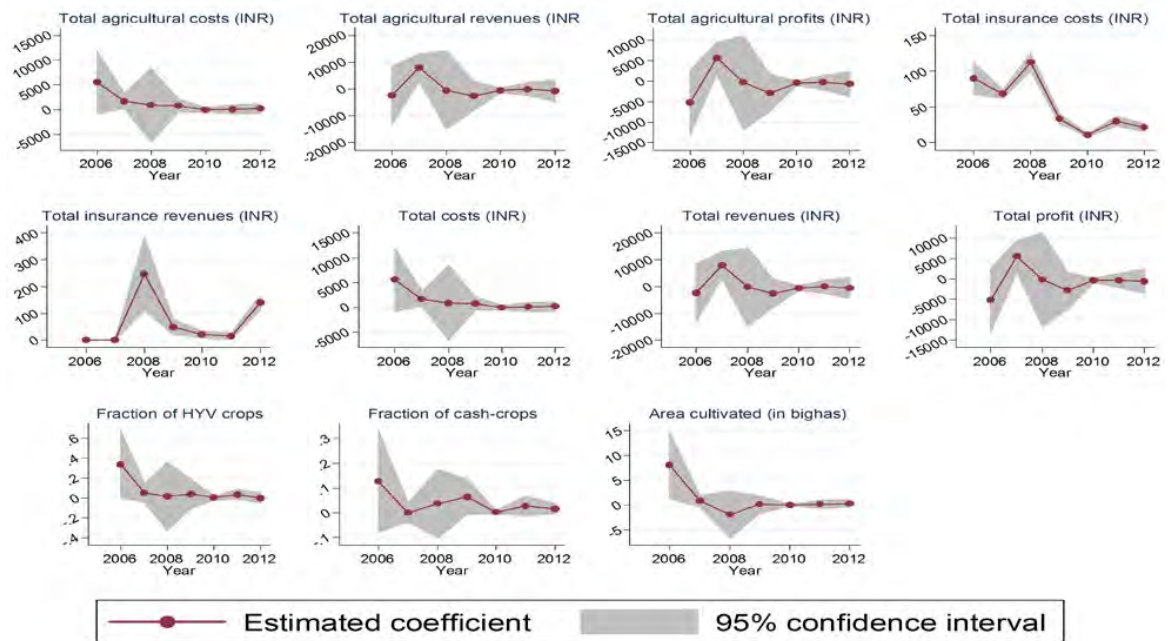
Sample used to study agricultural investments and outcomes

Note: This figure presents the coefficients and confidence intervals obtained from IV regressions of the main outcome variables on treatment status, controlling for baseline values, instrumented by a vector of individual-level treatments for the sample of households who were surveyed and reported outcome data each year (700 unique households). Total agricultural costs, revenues and profits are winsorised at the top (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Figure A3a: Attrition over time by village-level treatment status

Sample used to study household outcomes
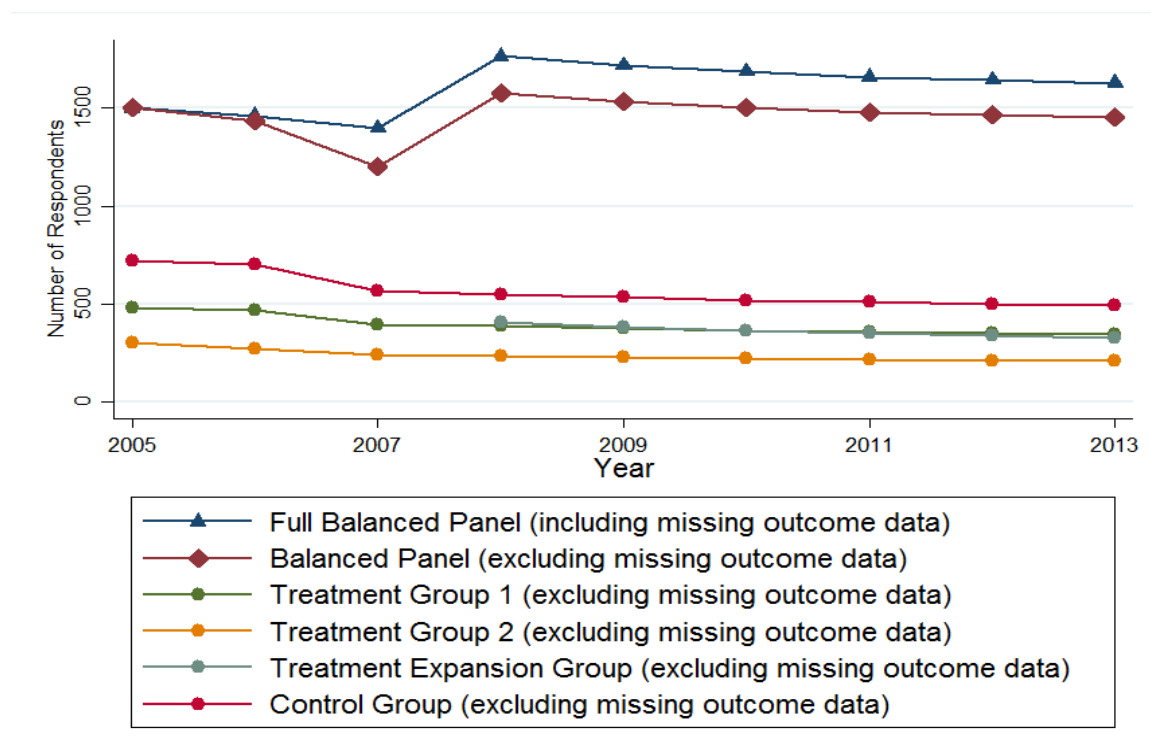
Note: This figure shows the evolution of the balanced sample for the sample used to study household outcomes, by reporting year-by-year attrition both for each treatment group, and for the entire sample (including and excluding those who report missing outcome variables). All analysis is conducted using the balanced panel group, which includes the 1,049 unique households that report non-missing outcome variables and are surveyed each year, and an additional 326 households in the treatment expansion group. Treatment group 1 is the set of villages first offered to purchase weather insurance in 2006, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. Treatment expansion group was added to the sample in 2008, and first offered insurance in 2009. The control group was never offered insurance.

Figure A3b: Cumulative proportional attrition rates by village-year treatment group

Sample used to study agricultural investments and outcomes
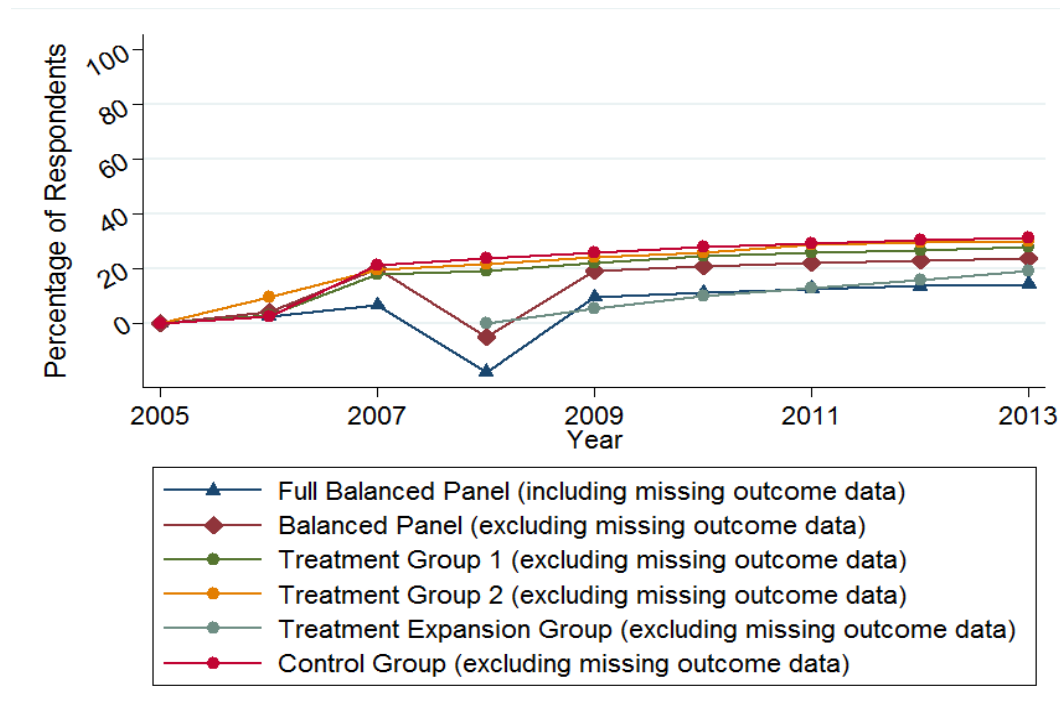
Note: This figure reports cumulative attrition as a percentage of total respondents that were intended to be surveyed for each treatment group and for the entire sample (including and excluding those that report missing outcome variables) for the sample used to study household outcomes. The intended survey sample for each year is 1,499 respondents, including 720 from the control group, 480 from treatment group 1, 299 from treatment group 2 and 403 from the treatment expansion group. All analysis is conducted using the balanced panel group, which includes the 1,049 unique households that report non-missing outcome variables and are surveyed each year, and an additional 326 households in the treatment expansion group. Treatment group 1 is the set of villages first offered to purchase weather insurance in 2006, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. Treatment expansion group was added to the sample in 2008, and first offered insurance in 2009. The control group was never offered insurance.

Figure A4: Year-by-year individual IV estimates of insurance policy coverage on household outcomes, controlling for baseline
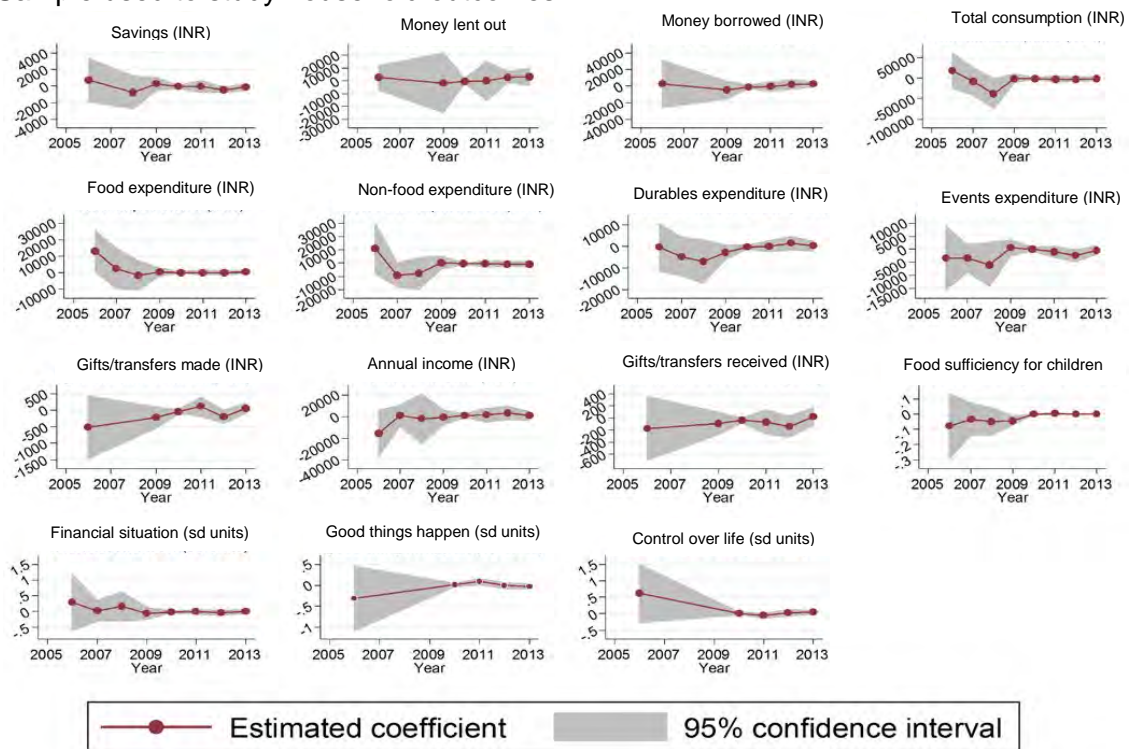
Sample used to study household outcomes

Note: This figure presents the coefficients and confidence intervals obtained from IV regressions of the main outcome variables on treatment status, controlling for baseline values, instrumented by a vector of individual-level treatments for the sample of households who were surveyed and reported outcome data each year. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. See Appendix B2 for detailed description of outcome variables. INR1 = USD0.016.

Figure A5a: Distribution of mean village outcomes for the treatment expansion group

Sample used to study household outcomes

Note: This figure plots the CDF of the coefficients obtained from OLS regressions of main outcome variables on a dummy for weather insurance having been offered to an individual (village-level treatment). Here, the sample is restricted to the eight additional villages that were non-randomly added to the treatment group in 2009 (the treatment expansion group) and reported outcome data each year. Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Figure A5b: Distribution of individual outcomes for the treatment expansion group

Sample used to study household outcomes

Note: This figure plots the CDF of the coefficients obtained from OLS regressions of main outcome variables on a dummy for weather insurance having been offered to an individual (village-level treatment). Here, the sample is restricted to the eight additional villages that were non-randomly added to the treatment group in 2009 (the treatment expansion group) and reported outcome data each year. Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Figure A5c: Distribution of individual outcomes by village-year insurance coverage status for treatment expansion group (OLS regressions)

Sample used to study household outcomes
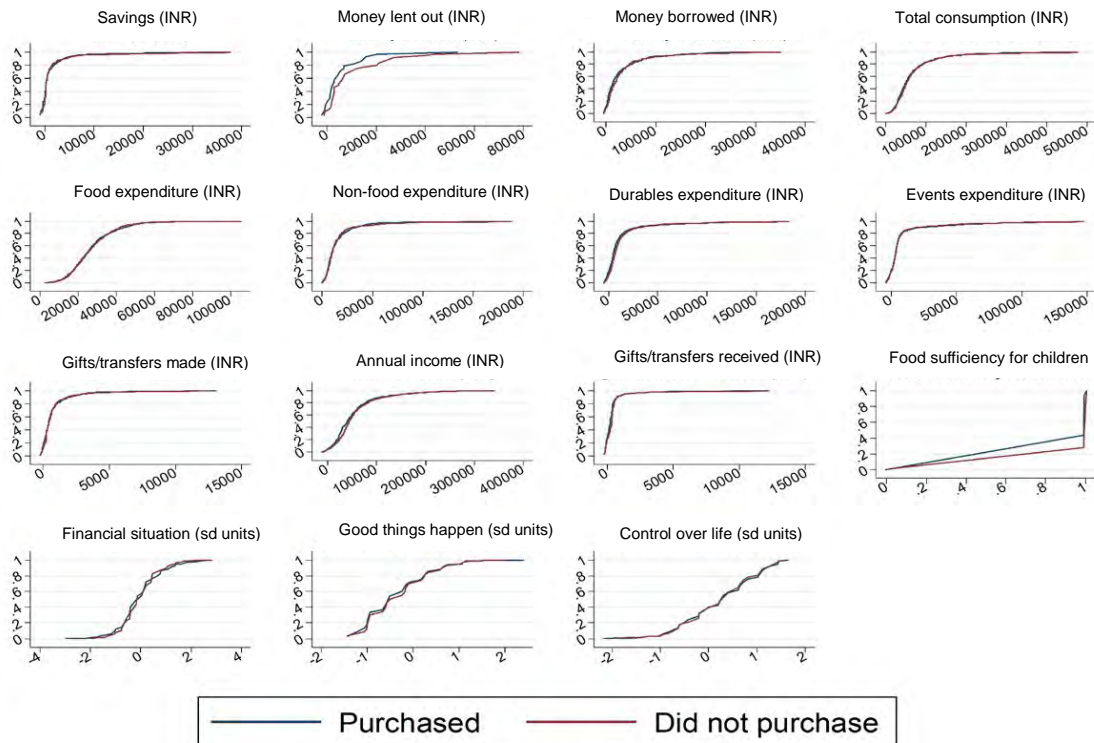
Note: This figure plots the CDF of the coefficients obtained from OLS regressions of main outcome variables on insurance coverage status (individual-level treatment). Here, the sample is restricted to the eight additional villages that were non-randomly added to the treatment group in 2009 (the treatment expansion group) and reported outcome data each year. Year effects are netted out and results are presented for the sample of households who were surveyed and reported outcome data each year. All outcome variables reported in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016.

Table A1a: Baseline comparisons between the full sample and balanced panel for sample used to study agricultural investments and outcomes

Dependent variable	All groups			Treatment group 1			Treatment group 2			Control group		
	Full sample	Balanced panel	Test for pair-wise equality	Full sample	Balanced Panel	Test for pair-wise equality	Full sample	Balanced panel	Test for pair-wise equalit	Full sample	Balanced panel	Test for pair-wise equality
	Mean (s.d.)	Mean (s.d.)	p-value	Mean (s.d.)	Mean (s.d.)	p-value	Mean (s.d.)	Mean (s.d.)	p-value	Mean (s.d.)	Mean (s.d.)	p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Education of household head, in	(12.73) 3.80	(12.26) 4.19	0.00	(12.57) 3.60	(12.76) 3.82	0.32	(13.28) 3.87	(11.99) 4.26	0.16	(12.60) 3.90	(12.07) 4.37	0.01
Financial literacy score	(4.02) 0.50 (0.24)	(4.07) 0.48 (0.24)	0.04	(3.94) 0.49 (0.24)	(3.94) 0.46 (0.23)	0.11	(4.08) 0.52 (0.24)	(4.04) 0.51 (0.24)	0.28	(4.05) 0.49 (0.23)	(4.14) 0.48 (0.23)	0.44
Wealth index	-1.42 (1.97)	-1.32 (1.96)	0.15	-1.57 (1.83)	-1.53 (1.79)	0.65	-1.36 (2.10)	-1.37 (2.06)	0.92	-1.34 (2.01)	-1.19 (2.00)	0.09
Own plot cultivation (Dummy)	0.47 (0.50)	0.37 (0.48)	0.00	0.48 (0.50)	0.36 (0.48)	0.00	0.44 (0.50)	0.28 (0.45)	0.00	0.48 (0.50)	0.40 (0.49)	0.00
Agricultural revenues (INR) (from cultivation of own plot)	5028.02 (14940.95)	3757.98 (12987.41)	0.00	5546.46 (16611.89)	3997.48 (11883.93)	0.02	4256.87 (13276.66)	2128.30 (12288.36)	0.05	4992.32 (14389.19)	4237.93 (13802.40)	0.22
Agricultural costs (INR)	2380.99 (6560.48)	1989.96 (6441.65)	0.05	2330.64 (5856.16)	1749.94 (4830.35)	0.04	2138.89 (5550.97)	1163.53 (3915.11)	0.03	2514.39 (7343.36)	2438.19 (7832.18)	0.79
Irrigation costs (INR)	409.81 (1785.52)	391.30 (1647.77)	0.75	295.47 (1229.17)	279.10 (889.75)	0.84	409.92 (2029.37)	198.16 (925.25)	0.15	485.10 (1975.45)	527.84 (2115.90)	0.61

Hired labour costs (INR)	1157.43	981.98	0.06	1171.13	910.88	0.06	1075.79	613.97	0.06	1182.21	1161.29	0.87
	(2988.47)	(3157.17)		(2473.88)	(2224.15)		(2930.97)	(2259.77)		(3308.08)	(3821.51)	
Other input costs	813.74	616.69	0.04	864.04	559.96	0.07	653.18	351.40	0.08	847.08	749.06	0.51
	(3561.47)	(3149.05)		(3610.33)	(2682.06)		(2498.76)	(1997.00)		(3890.55)	(3700.65)	
Total labour days	91.12	72.05	0.00	94.89	72.83	0.07	76.01	40.26	0.01	94.87	83.62	0.17
	(180.37)	(166.67)		(187.48)	(170.87)		(166.99)	(127.61)		(180.79)	(175.89)	
Hired labour days	26.18	23.99	0.36	26.89	21.50	0.23	24.14	15.87	0.16	26.56	28.46	0.54
	(69.35)	(68.94)		(70.42)	(61.94)		(64.83)	(56.58)		(70.51)	(76.36)	
Family labour days	57.39	42.14	0.00	59.82	45.64	0.06	44.74	21.18	0.00	61.03	48.08	0.02
	(118.96)	(103.30)		(123.48)	(113.67)		(103.17)	(66.90)		(121.78)	(107.61)	
Agricultural profit (INR) (from cultivation of own plot)	2600.84	1768.02	0.02	3161.97	2247.54	0.17	2182.32	964.77	0.13	2397.47	1799.74	0.24
	(13603.66)	(12364.22)		(15330.62)	(10787.16)		(11953.12)	(12307.61)		(13005.23)	(13210.62)	
Fraction of high-yielding variety crops	0.17	0.12	0.00	0.21	0.12	0.00	0.15	0.08	0.01	0.15	0.13	0.03
	(0.36)	(0.31)		(0.39)	(0.31)		(0.34)	(0.26)		(0.35)	(0.32)	
Fraction of cash crops grown	0.04	0.02	0.00	0.03	0.02	0.11	0.05	0.01	0.02	0.03	0.02	0.02
	(0.16)	(0.10)		(0.15)	(0.11)		(0.17)	(0.06)		(0.16)	(0.11)	
Area cultivated (ha)	0.42	0.33	0.00	0.41	0.30	0.03	0.36	0.16	0.04	0.46	0.40	0.04
	(1.70)	(1.71)		(0.88)	(0.79)		(0.99)	(0.55)		(2.26)	(2.28)	
N	1,499	700		480	204		299	136		720	360	

Note: This table reports baseline summary statistics and balance tests comparing the full original sample and the balanced panel obtained after attrition and removing households who did not report key outcomes in one or more years. Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. Financial literacy scores are the fraction of correct answers to questions adapted from Lusardi and Mitchell (2007). Wealth index is calculated through principal component analysis using data on assets and living conditions to compile a single index for each household (for details and validation of this method, see for example Filmer and Pritchett, 2001). The 'own plot cultivation' dummy is equal to 1 if a household cultivate on a plot it owns, rents or sharecrops in, and equal to 0 for landless labourers. All treatment groups are pooled here. All outcome variables reported in INR are corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A1b: Summary statistics by insurance purchase status

Sample used to study agricultural investments and outcomes

Dependent variable	Ever bought insurance Baseline (Mean) (1)	Never bought insuranc Baseline (Mean) (2)	Test for pair-wise (p-value) (3)	Bought insurance Contemporaneous (Mean) (4)	Did not buy insurance Contemporaneous (Mean) (5)	Test for pair-wise equality (p-value) (6)
(from cultivation of own plot)	(12441.76)	(5502.60)		(12132.59)	(10121.68)	
Agricultural costs (INR)	1545.80	1132.00	0.49	2629.81	1773.19	0.06
	(4598.41)	(2814.98)		(6138.80)	(4640.71)	
Irrigation costs (INR)	255.99	130.00	0.16	344.79	220.49	0.12
	(934.38)	(309.57)		(1187.42)	(788.47)	
Hired labour costs (INR)	811.81	544.00	0.25	1491.18	1031.20	0.05
	(2307.21)	(1073.19)		(3572.52)	(2922.45)	
Other input costs (INR)	478.00	458.00	0.96	793.83	521.50	0.10
	(2477.38)	(1768.30)		(2484.27)	(1839.49)	
Total labour days	58.88	71.40	0.64	48.69	39.05	0.15
	(156.03)	(153.32)		(104.50)	(99.89)	
Hired labour days	19.83	11.84	0.27	13.68	11.91	0.48
	(61.31)	(36.50)		(44.30)	(42.37)	
Family labour days	34.13	57.56	0.33	34.16	25.79	0.05
	(95.34)	(130.56)		(71.96)	(65.90)	
Agricultural profit (INR)	1743.83	1616.00	0.89	2473.04	1514.24	0.01
(from cultivation of own plot)	(11828.09)	(3386.32)		(9233.46)	(8100.46)	
Fraction of high-yielding variety crops grown	0.10	0.20	0.20	0.28	0.21	0.00
	(0.28)	(0.41)		(0.43)	(0.39)	
Fraction of cash crops grown	0.02	0.02	0.63	0.05	0.03	0.08
	(0.09)	(0.09)		(0.17)	(0.14)	
Area cultivated (ha)	0.25	0.21	0.59	0.47	0.32	0.01
	(0.72)	(0.43)		(1.08)	(0.95)	
N	315	25		959	1761	

Note: This table reports summary statistics and tests of pair-wise equality by insurance purchase status. The sample is the balanced panel used to study agricultural outcomes and investments, excluding control households (for whom the distinction by purchase status does not make sense). Columns 1 and 2 compare the baseline characteristics of households, split according to an indicator for 'ever purchasing' weather insurance, while columns 3 and 4 compare pre-treatment characteristics of households, splitting them according to an indicator which equals one if they purchased insurance in that particular treatment year. All outcome variables in INR are winsorised at the top one per cent and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A1c: Baseline summary statistics and balance tests for attritors by treatment status

Sample used to study agricultural investments and outcomes

Dependent variable	Full sample Attritors mean (s.d.) (1)	Control group Attritors mean (s.d.) (2)	Treatment group 1 Attritors mean (s.d.) (3)	Treatment group 2 Attritors mean (s.d.) (4)	Test for pair-wise equality p-value (5)
Agricultural revenues (INR)	6213.38	5795.81	6738.88	6226.16	0.81
(from cultivation of own plot)	(16478.25)	(14967.64)	(19424.62)	(13882.14)	
Agricultural costs (INR)	2731.01	2591.66	2774.32	2967.94	0.89
	(6649.67)	(6822.20)	(6506.42)	(6530.66)	
Irrigation costs (INR)	426.39	441.75	307.98	589.91	0.56
	(1901.28)	(1823.99)	(1437.02)	(2615.94)	
Hired labour costs	1314.49	1203.42	1369.97	1468.34	0.71
	(2821.74)	(2694.66)	(2635.68)	(3356.37)	
Other input costs	990.14	946.49	1096.37	909.69	0.92
	(3887.33)	(4076.93)	(4173.25)	(2838.01)	
Total labour days	107.82	106.12	111.20	105.85	0.97
	(190.10)	(185.12)	(197.59)	(189.09)	
Hired labour days	28.10	24.65	30.87	31.05	0.58
	(69.70)	(64.19)	(75.96)	(70.41)	
Family labour days	70.75	73.98	70.29	64.40	0.79
	(129.75)	(133.37)	(129.46)	(122.45)	
Agricultural profit (INR)	3396.17	3043.66	3890.66	3332.23	0.78
(from cultivation of own plot)	(14654.35)	(12767.81)	(18144.25)	(11533.25)	
Fraction of high-yielding variety crops grown	0.22	0.18	0.28	0.21	0.04
	(0.40)	(0.37)	(0.43)	(0.39)	
Fraction of cash crops grown	0.05	0.05	0.04	0.08	0.48
	(0.19)	(0.20)	(0.17)	(0.21)	
Area cultivated (ha)	0.51	0.52	0.49	0.54	0.96
	(1.70)	(2.24)	(0.93)	(1.22)	
N	799	360	276	163	

Note: This table reports baseline summary statistics by treatment group and tests for village-level balance for attritors from the sample of households used to study agricultural outcomes and investment decisions. Attritors refer to those individuals that drop out from one or more waves of the survey or report missing revenue and/or cost data in any wave of the survey. Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. The control group was never offered weather insurance. Total agricultural costs, revenues, profits and labour days are winsorised at the top (one per cent). All variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2a: Balance tests for individual-level treatments in 2007

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high-yield variety grown	Fraction cash crops grown	Area cultivated (ha)
Flyers	Hindu flyer	-375.38	356.45	342.57	291.15	-277.28	-0.37	9.57	-10.42	-731.82	-0.03	-0.01	-0.07
		(2008.54)	(966.97)	(222.80)	(514.46)	(379.68)	(29.29)	(10.96)	(23.56)	(2276.54)	(0.05)	(0.01)	(0.14)
Flyers	Muslim flyer	-2797.29	-760.93	10.00	-469.47	-301.47	-28.72	-1.87	-24.50	-2036.35	-0.04	-0.03*	-0.20**
		(2224.91)	(859.52)	(149.62)	(405.32)	(512.20)	(27.32)	(10.46)	(18.05)	(2593.04)	(0.04)	(0.02)	(0.10)
Flyers	Group	1093.91	521.69	249.10	125.58	147.00	-18.37	7.66	-22.40	572.22	0.01	0.01	-0.14
		(2034.48)	(886.60)	(179.42)	(487.51)	(402.05)	(27.53)	(11.83)	(17.05)	(1887.73)	(0.05)	(0.02)	(0.14)
Videos	Positive payout likelihood Framework video	2587.67	498.34	150.43	-103.18	451.08*	30.69	16.10*	6.19	2089.34	0.03	0.00	0.10
		(2219.34)	(458.06)	(148.08)	(261.93)	(261.56)	(26.44)	(9.00)	(10.72)	(2481.20)	(0.04)	(0.01)	(0.06)
Videos	Vulnerability framework	3697.58*	77.92	-71.10	485.35	-336.33	22.97	10.81	12.53	3619.66	0.01	0.02	0.10
		(2200.73)	(747.43)	(149.14)	(446.00)	(252.93)	(28.16)	(13.77)	(11.81)	(2473.34)	(0.06)	(0.01)	(0.11)
Discount	Fixed price	67.09	51.39	2.94	12.87	35.58	0.58	0.30	-0.10	15.70	0.00	0.00	0.00
		(85.56)	(66.43)	(5.84)	(20.05)	(36.80)	(1.63)	(0.71)	(0.40)	(86.88)	(0.00)	(0.00)	(0.00)
Video	Video dummy	x	x	x	x	x	x	x	x	x	x	x	x
	Joint significance Test (p-values)	0.40	0.64	0.81	0.33	0.46	0.69	0.61	0.49	0.15	0.91	0.26	0.24
	N	340	340	340	340	340	340	340	340	340	340	340	340

Note: This table reports the tests for individual balance on outcome variables using a vector for intended treatment assignments for 2007. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households, of which 340 are treated). In 2007, 204 households, which represent treatment group 1 that received weather insurance marketing in 2006, received flyers as part of the marketing treatment. The remaining 136 households represent treatment group 2 that received marketing for the first time in 2007, and were assigned videos as part of treatment. The effect of the SEWA endorsement video and peer endorsement video cannot be separately identified, as these were given to all households that were in treatment group 2. The positive framework video treatment is omitted due to collinearity since it is a perfect complement to the vulnerability framework video. See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2b: Balance tests for individual-level treatments in 2008

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high yield variety crops grown	Fraction cash crops grown	Area cultivated (ha)
Discount	Fixed price discount	23.28	8.05	1.76	4.77	1.52	0.15	-0.01	0.19	15.23	0.00	0.00*	0.00
		(18.33)	(9.11)	(1.63)	(4.08)	(5.74)	(0.28)	(0.10)	(0.18)	(24.42)	(0.00)	(0.00)	(0.00)
Rebate	Buy 1 get 1 50% off	426.10	677.45	304.30	398.64	-25.49	-14.94	0.13	-5.41	-251.35	0.01	0.00	0.06
		(2285.14)	(1056.35)	(297.50)	(564.34)	(410.50)	(29.86)	(14.21)	(18.45)	(1978.57)	(0.06)	(0.01)	(0.15)
Rebate	Buy 2 get 1 free	-2037.67*	-373.65	-13.88	-163.47	-196.31	-20.06	-10.26	-2.00	-1664.02	-0.02	-0.01	-0.02
		(1007.18)	(650.06)	(84.19)	(279.79)	(313.30)	(21.84)	(6.55)	(15.86)	(1079.06)	(0.05)	(0.01)	(0.12)
Rebate	Buy 3 get 1 free	-1091.35	-453.40	-177.72**	-10.59	-265.09	-20.40	-8.25	-2.33	-637.95	-0.01	0.06	-0.06
		(1020.09)	(704.17)	(84.46)	(443.99)	(272.12)	(28.01)	(13.03)	(20.01)	(876.31)	(0.05)	(0.05)	(0.10)
Flyer	HYV complementarity flyer	-1925.32	-1229.15**	-7.98	-706.66**	-514.51*	-36.33**	-5.71	-26.43	-696.17	-0.02	-0.03	-0.22***
		(1311.77)	(520.11)	(123.37)	(294.70)	(298.50)	(16.68)	(6.43)	(11.06)	(1216.14)	(0.03)	(0.02)	(0.07)
Flyer	Risk worksheet	-1252.46	-770.86*	-58.26	-408.66*	-303.94	-24.71*	-10.31**	-9.96	-481.60	-0.03	0.00	-0.15**
		(1084.83)	(449.14)	(91.66)	(240.35)	(235.03)	(13.95)	(4.71)	(9.57)	(1147.50)	(0.03)	(0.01)	(0.06)
Joint significance test (p-values)		0.61	0.13	0.00	0.09	0.59	0.11	0.17	0.08	0.68	0.89	0.41	0.14
N		340	340	340	340	340	340	340	340	340	340	340	340

Note: This table reports results from the individual balance tests on outcome variables using a vector of intended treatment assignments in 2008. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households, of which 340 are treated). See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2c: Balance tests for individual-level treatments in 2009

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high yield variety crops grown	Fraction cash crop grown	Area cultivated (ha)
BDM Game	BDM offer (as percentage of list premium)	-3250.03	-1605.86	330.57	-810.36	-1126.08	-67.23	-15.88	-61.30**	-1644.16	-0.07	-0.01	-0.32
		(3646.91)	(1957.07)	(441.23)	(766.49)	(1031.77)	(45.91)	(18.45)	(29.93)	(3034.85)	(0.10)	(0.05)	(0.25)
BDM game	BDM game for 4 policies	-4374.17**	-1552.88	-177.28	-705.67	-669.93	-64.18*	-16.36	-46.16*	-2821.29*	0.02	-0.01	-0.20
		(2166.71)	(1228.78)	(148.37)	(585.17)	(525.10)	(36.96)	(11.76)	(25.96)	(1639.01)	(0.06)	(0.02)	(0.16)
BDM game	BDM offer* BDM game for 4 policies	3574.46	2212.11	-150.43	1073.18	1289.37	81.32	12.21	73.93*	1362.35	0.02	0.00	0.41
		(4086.37)	(2156.31)	(458.02)	(936.69)	(1090.49)	(56.88)	(18.26)	(40.89)	(3138.16)	(0.14)	(0.05)	(0.31)
	Joint significance test (p-values)	0.08	0.61	0.07	0.68	0.65	0.32	0.44	0.23	0.22	0.73	0.41	0.59
	N	340	340	340	340	340	340	340	340	340	340	340	340

Note: This table reports results from the individual balance tests on outcome variables using a vector of intended treatment assignments in 2009. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). The dummy for the one-policy game and the interaction term BDM offer * BDM game for 1 policy is omitted due to collinearity. See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2d: Balance tests for individual-level treatments in 2010

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high yield variety crops grown	Fraction cash crops grown	Area cultivated (ha)
BDM game	BDM offer (as percentage of list premium)	1655.88	-18.26	-151.94	-74.35	208.02	-44.94	-19.22	-19.77	1674.14	0.05	0.05*	0.11
		(5573.95)	(904.69)	(195.88)	(573.02)	(342.34)	(40.22)	(15.01)	(32.62)	(4862.54)	(0.09)	(0.03)	(0.36)
BDM game	BDM game for 4 policies	1943.95	1356.14	-134.56	790.86*	699.84	24.54	9.53	20.16	587.81	0.02	0.05*	0.12
		(1868.25)	(966.31)	(136.06)	(418.25)	(558.14)	(27.57)	(10.33)	(22.07)	(2257.45)	(0.05)	(0.03)	(0.14)
BDM game	BDM game for 4 policies * BDM offer	-1534.67	-2535.33	207.61	-927.31	-1815.64	-18.78	-10.98	-20.85	1000.67	-0.11	-0.10	-0.31
		(6315.58)	(1975.58)	(287.20)	(1089.36)	(1121.87)	(59.92)	(23.49)	(51.15)	(6590.26)	(0.11)	(0.06)	(0.40)
Flyer/Video	Assigned peer video	-444.02	-492.41	-35.28	-183.17	-273.96	-12.74	-3.53	-14.57**	48.40	-0.03	-0.01	-0.01
		(1220.16)	(465.69)	(81.26)	(243.73)	(265.77)	(10.51)	(5.72)	(7.34)	(1111.00)	(0.03)	(0.01)	(0.07)
Flyer/Video	Assigned drought flyer	120.82	-42.76	-16.97	121.74	-147.53	1.67	2.06	-5.33	163.58	0.00	0.01	-0.05
		(1383.88)	(454.16)	(112.20)	(241.22)	(240.16)	(14.66)	(5.63)	(10.22)	(1140.51)	(0.02)	(0.01)	(0.08)
Flyer/Video	Assigned subsidies flyer	-317.97	857.21**	62.69	366.35	428.17	-0.40	7.08	-8.92	-1175.18	0.06**	-0.01	0.03
		(1100.30)	(408.96)	(72.95)	(223.58)	(263.30)	(13.11)	(4.80)	(11.00)	(1137.97)	(0.03)	(0.01)	(0.07)
Flyer/Video	Assigned risk worksheet	-2220.96*	-741.62	-33.12	-371.13	-337.36	-11.29	-6.85	-8.03	-1479.34	-0.05	0.00	-0.05
		(1282.09)	(620.15)	(74.85)	(263.49)	(289.80)	(14.50)	(6.29)	(7.83)	(1244.38)	(0.04)	(0.01)	(0.08)
Flyer/Video	Assigned loan	-650.03	421.35	-17.66	241.01	198.00	10.56	0.52	14.69	-1071.38	0.02	0.00	0.09
		(1255.25)	(607.39)	(92.11)	(262.96)	(256.15)	(17.40)	(7.52)	(10.96)	(1262.37)	(0.03)	(0.01)	(0.07)
Joint significance test (p-values)		0.20	0.53	0.92	0.23	0.85	0.78	0.48	0.16	0.10	0.20	0.20	0.80
N		340	340	340	340	340	340	340	340	340	340	340	340

Note: This table reports results from the individual balance tests on outcome variables using a vector of intended treatment assignments in 2010. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households, of which 340 are treated). The dummy for the one-policy game, the interaction term BDM offer * BDM game for 1 policy and the indicator for assigned rain flyer are omitted due to collinearity. See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2e: Balance tests for individual-level treatments in 2011

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high yield variety grown	Fraction cash crops grown	Area cultivated (ha)
BDM game	BDM offer (as percentage	681.79	-1303.66	94.68	-452.67	-945.67	-68.17	-22.20	-26.23	1985.45	-0.11	-0.01	-0.24
	of list premium)	(3529.01)	(800.52)	(210.29)	(386.51)	(587.39)	(49.97)	(23.85)	(27.82)	(3456.06)	(0.10)	(0.01)	(0.24)
BDM game	BDM game for 4 policies	-1097.33	-523.39	101.53	-444.89	-180.02	-54.85*	-12.23	-29.56*	-573.94	-0.06	0.01	-0.10
		(2628.91)	(786.73)	(136.21)	(373.02)	(511.21)	(30.86)	(10.90)	(17.86)	(2180.91)	(0.05)	(0.01)	(0.12)
BDM game	BDM offer* BDM game for 4 policies	5176.36	1107.37	-143.85	908.92	342.29	78.18	3.14	39.05	4068.99	0.11	-0.02	0.25
		(8947.76)	(1469.18)	(383.90)	(725.37)	(852.46)	(70.29)	(24.66)	(49.50)	(7717.11)	(0.13)	(0.02)	(0.30)
	Joint significance test (p-values)	0.86	0.39	0.87	0.57	0.30	0.28	0.18	0.24	0.74	0.65	0.10	0.76
	N	340	340	340	340	340	340	340	340	340	340	340	340

Notes: This table reports results from the individual balance tests on outcome variables using a vector of intended treatment assignments in 2011. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households, of which 340 are treated). The dummy for the one-policy game, the interaction term BDM offer * BDM game for 1 policy and the indicator assigned risk worksheet are omitted due to collinearity. See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A2f: Balance tests for individual-level treatments in 2013

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Agricultural revenues (INR)	Agricultural costs (INR)	Irrigation costs (INR)	Hired labour costs (INR)	Other input costs (INR)	Total labour days	Hired labour days	Family labour days	Agricultural profit (INR)	Fraction high yield variety grown	Fraction cash crops grown	Area cultivated (ha)
BDM game	BDM offer (as percentage	-1195.45	19.93	-116.63	-606.18	742.73	-49.83	-12.54	-28.98	-1215.38	0.00	0.00	-0.20
	of list premium)	(3356.89)	(1113.65)	(205.59)	(525.64)	(643.79)	(33.97)	(12.57)	(20.34)	(3668.53)	(0.09)	(0.02)	(0.13)
BDM game	BDM game for 4 policies	-1750.40	806.46	299.41	0.45	506.60*	5.87	1.70	-1.92	-2556.86	0.08	0.02	0.07
		(1146.09)	(541.05)	(207.10)	(241.29)	(281.46)	(27.25)	(8.52)	(13.86)	(1451.81)	(0.06)	(0.02)	(0.13)
BDM game	BDM offer* BDM game for 4 policies	-1288.29	-1902.92	-258.43	-382.12	-1262.37	12.37	-7.76	25.33	614.63	-0.18	-0.06	-0.12
		(3655.11)	(1644.35)	(432.53)	(574.15)	(870.30)	(57.80)	(19.40)	(37.04)	(3938.11)	(0.13)	(0.04)	(0.26)
	Joint significance test (p-values)	0.03	0.37	0.19	0.13	0.22	0.36	0.53	0.38	0.08	0.03	0.47	0.24
	N	340	340	340	340	340	340	340	340	340	340	340	340

Note: This table reports results from the individual balance tests on outcome variables using a vector of intended treatment assignments in 2012. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households, of which 340 are treated). The dummy for the one-policy game, the interaction term BDM offer * BDM game for 1 policy and the indicator assigned risk worksheet are omitted due to collinearity. See Appendix B1 for a more detailed description of the individual-level marketing treatments. Standard errors are bootstrapped using 100 repetitions and clustered at the village level. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3a: First stage regressions (2007)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		0.35***		0.34***	
		(0.04)		(0.04)	
Flyers	Hindu flyer		0.22***		0.22***
			(0.08)		(0.06)
	Muslim flyer		0.08		0.08
			(0.09)		(0.09)
	Group promotion flyer		0.14*		0.14*
			(0.08)		(0.08)
Videos	Positive payout likelihood		-0.12*		-0.12
	Framework video		(0.07)		(0.09)
	Vulnerability framework video		0.05		0.05
			(0.06)		(0.07)
	Video: SEWA and peer endorsement		0.01**		0.01**
			(0.01)		(0.01)
Discount	Fixed price discount		0.24**		0.25**
			(0.10)		(0.13)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables (number of policies and dummy for insurance purchasers) used in the main analysis on a vector of treatment instruments used in 2007. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The effect of the SEWA endorsement video and peer endorsement video cannot be separately identified, as these were given to the same households. The positive framework video treatment is omitted due to collinearity since it is a perfect complement to the vulnerability framework video. Note also that the estimate on fixed price discount is not directly comparable with the one from Cole *et al.* (2013), as the sample considered here is more restricted compared with the one in our previous paper. See Appendix B1 for a detailed description of each of the marketing treatments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3b: First stage regressions (2008)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
		(0.04)		(0.03)	
Discount	Fixed price discount		0.00***		0.00***
			(0.00)		(0.00)
Rebate	Buy 1 get 1 50% off		-0.03		-0.03
			(0.08)		(0.08)
Rebate	Buy 2 get 1 free		-0.09		-0.09
			(0.06)		(0.07)
Rebate	Buy 3 get 1 free		0.03		0.03
			(0.07)		(0.07)
Flyer	HYV complementarity flyer		-0.04		-0.04
			(0.04)		(0.04)
Flyer	Risk worksheet		0.07		0.07*
			(0.04)		(0.04)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2008. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. See Appendix B1 for descriptions of marketing treatments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively..

Table A3c: First stage regressions (2009)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		0.43***		0.20***	
		(0.07)		(0.04)	
BDM game	BDM offer (as percentage of list premium)		-0.39*		-0.19
			(0.23)		(0.13)
BDM game	BDM game for 1 policy		0.38***		0.28***
			(0.11)		(0.06)
BDM game	BDM game for 4 policies		0.73***		0.20***
			(0.23)		(0.06)
BDM game	BDM offer* BDM game for 4		0.06		0.11
			(0.56)		(0.22)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2009. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The interaction BDM offer * BDM game for 1 policy is omitted because of collinearity. See Appendix B1 for descriptions of marketing treatments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3d: First stage regressions (2010)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		2.65***		0.58***	
		(0.23)		(0.03)	
BDM game	BDM offer (as percentage of list premium)		-0.61*		-0.32*
			(0.32)		(0.16)
BDM game	BDM bame for 1 policy		1.24***		0.71***
			(0.34)		(0.08)
BDM game	BDM game for 4 policies		5.35***		0.69***
			(0.57)		(0.09)
BDM game	BDM offer* BDM game for 4 policies		-3.10***		-0.06
			(1.19)		(0.20)
Flyer/Video	Assigned peer video		0.06		-0.05
			(0.36)		(0.07)
Flyer/Video	Assigned drought flyer		-0.29		-0.00
			(0.19)		(0.04)
Flyer/Video	Assigned subsidies flyer		0.21		-0.02
			(0.29)		(0.05)
Flyer/Video	Assigned risk worksheet		0.18		0.02
			(0.31)		(0.05)
Flyer/Video	Assigned loan		0.23		0.05
			(0.29)		(0.05)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2010. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The interaction BDM offer * BDM game for 1 policy and the indicator for having assigned rain flyer are omitted because of collinearity. See Appendix B1 for descriptions of each individual marketing treatment. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3e: First stage regressions (2011)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		0.85***		0.43***	
		(0.07)		(0.03)	
BDM game	BDM offer (as percentage		-0.07		-0.04
	of list premium)		(0.16)		(0.16)
BDM game	BDM game for 1 policy		0.48***		0.47***
			(0.08)		(0.07)
BDM game	BDM game for 4 policies		2.26***		0.56***
			(0.30)		(0.07)
BDM game	BDM offer* BDM game for 4 policies		-2.84***		-0.44*
			(0.58)		(0.24)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2011. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The interaction BDM offer * BDM game for 1 policy and the indicator assigned risk worksheet are omitted because of collinearity. See Appendix B1 for descriptions of each individual marketing treatment. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3f: First stage regressions (2012)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		0.77***		0.43***	
		(0.07)		(0.03)	
BDM game	BDM offer (as percentage		-0.60***		-0.60***
	of list premium)		(0.14)		(0.12)
BDM game	BDM game for 1 policy		0.72***		0.72***
			(0.07)		(0.06)
BDM game	BDM game for 4 policies		1.81***		0.41***
			(0.24)		(0.06)
BDM game	BDM offer* BDM game for 4 policies		-1.69***		0.36
			(0.53)		(0.23)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2012. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The interaction BDM offer * BDM game for 1 policy and the indicator assigned risk worksheet are omitted because of collinearity. See Appendix B1 for descriptions of each individual marketing treatment. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A3g: First stage regressions (2013)

Sample used to study agricultural investments and outcomes

Treatment type	Dependent variable	Number of policies purchased		Dummy for purchased insurance	
Village-level treatment indicator		1.01***		0.54***	
		(0.11)		(0.04)	
BDM game	BDM offer (as percentage of list premium)		-1.01***		-1.00***
			(0.15)		(0.15)
BDM game	BDM game for 1 policy		0.96***		0.95***
			(0.06)		(0.05)
BDM game	BDM game for 4 policies		2.68***		0.64***
			(0.35)		(0.09)
BDM game	BDM offer* BDM game for 4 policies		-2.53***		0.47**
			(0.62)		(0.20)
P-value: Test of joint significance		0.00	0.00	0.00	0.00
N		700	700	700	700

Note: This table reports the results of year-wise first stage regressions of both endogenous variables used in the main analysis on a vector of treatment instruments used in 2013. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). We present separately the regressions on a village-level treatment indicator and on individual-level treatments. The interaction BDM offer * BDM game for 1 policy and the indicator assigned risk worksheet are omitted because of collinearity. See Appendix B1 for descriptions of each individual marketing treatment. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4a: Impact of insurance purchase

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV	Village IV I	Individual IVI	Individual IV
	(1)	(2)	(3)	(4)
Total revenues (INR)	-1273.75	-2351.52	-2569.89	-635.92
	(4035.48)	(1670.12)	(3493.32)	(1387.51)
Agricultural revenues (INR)	-1346.77	-2416.72	-2642.04	-699.53
(from cultivation of own plot)	(4035.52)	(1666.93)	(3493.02)	(1387.56)
Financial revenues (INR)	73.02***	65.20***	72.14***	63.61***
	(8.24)	(8.88)	(8.63)	(17.98)
Total costs (INR)	356.69	1254.50	-474.86	208.13
	(1674.72)	(960.30)	(1436.58)	(777.13)
Agricultural costs (INR)	293.11	1187.61	-528.07	174.00
	(1674.75)	(960.25)	(1436.38)	(777.63)
Irrigation costs (INR)	86.02	765.02***	-10.65	458.35***
	(255.92)	(227.35)	(220.66)	(147.76)
Hired Labour costs (INR)	327.57	192.22	-157.10	-173.67
	(902.24)	(522.70)	(727.75)	(390.60)
Other input costs (INR)	-120.48	230.37	-360.32	-110.68
	(643.78)	(639.85)	(577.94)	(508.31)
Total labour days	22.76	47.88	6.36	26.90
	(23.71)	(31.07)	(17.72)	(19.27)
Hired labour days	6.01	16.85	0.97	4.26
	(7.75)	(15.25)	(5.49)	(9.04)
Family labour days	17.93	25.13	7.45	19.85*
	(16.42)	(17.61)	(12.75)	(11.20)
Financial costs (INR)	99.44***	100.57***	83.64***	51.77***
	(3.50)	(4.37)	(2.88)	(7.11)
Total profit (INR)	-1630.44	-3606.02*	-2095.03	-844.05
	(2475.59)	(1883.87)	(2151.09)	(1376.85)
Agricultural profit (INR)	-1639.88	-3604.33*	-2113.97	-873.53
(from cultivation of own plot)	(2475.84)	(1881.45)	(2150.98)	(1376.95)
Fraction of high-yielding variety crops grown	-0.03	-0.07	-0.05	0.01
	(0.12)	(0.07)	(0.09)	(0.05)
Fraction of cash crops grown	0.03	0.01	0.03	0.01
	(0.04)	(0.02)	(0.03)	(0.02)
Area cultivated (ha)	0.15	0.11	0.01	0.05
	(0.33)	(0.24)	(0.25)	(0.15)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1658.980	343.560	69.420	19.160
N	6300	6300	6300	6300

Note: This table shows IV regressions under four different specifications: (1) village level IV; (2) village level IV with HH fixed-effects; (3) individual level IV; (4) individual level IV with HH fixed effects, and for 11 outcome variables. Village-level IV regressions use village-level treatment status as an instrument for purchasing insurance policies (dummy); individual-level IV regressions use individual-level marketing treatment statuses to instrument insurance purchase (dummy). The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent). All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald weak instruments tests. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4b: Impact of insurance purchase – normalised by area cultivated

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Total revenues (INR)	-2839.58	-1449.75	-588.52	351.10
	(3260.66)	(5514.24)	(961.14)	(586.65)
Agricultural revenues (INR)	-2929.78	-1547.29	-636.44	324.88
(from cultivation of own plot)	(3259.68)	(5511.37)	(961.93)	(586.68)
Financial revenues (INR)	90.20***	97.55***	47.92***	26.21
	(17.61)	(21.82)	(17.91)	(20.62)
Total costs (INR)	-635.56	3469.28**	-146.31	128.21
	(1249.78)	(1504.01)	(391.29)	(248.44)
Agricultural costs (INR)	-717.01	3389.81**	-176.29	118.05
	(1246.73)	(1500.51)	(391.08)	(248.80)
Irrigation costs (INR)	-45.39	1763.23**	61.27	145.51*
	(318.09)	(637.80)	(81.60)	(76.24)
Hired labour costs (INR)	-157.86	1007.91	-96.16	-29.48
	(448.48)	(629.69)	(154.69)	(123.30)
Other input costs (INR)	-513.76	618.66	-141.40	2.02
	(574.46)	(930.57)	(201.30)	(137.25)
Total labour days	20.82	206.47**	10.52	17.56*
	(39.67)	(90.06)	(9.94)	(9.60)
Hired labour days	0.66	70.51	-0.46	2.34
	(10.97)	(48.65)	(2.81)	(3.30)
Family labour days	28.75	119.86**	13.33*	13.96*
	(29.97)	(56.50)	(7.76)	(8.29)
Financial costs (INR)	130.82***	120.42***	51.27***	19.80**
	(16.89)	(19.67)	(8.45)	(9.17)
Total profit (INR)	-2204.02	-4919.02	-442.20	222.89
	(2193.28)	(5666.46)	(727.36)	(592.74)
Agricultural profit (INR)	-2212.77	-4937.10	-460.15	206.83
(from cultivation of own plot)	(2194.61)	(5662.78)	(727.83)	(593.68)
Fraction of high-yielding variety crops grown	0.35	0.67	0.02	0.08
	(0.51)	(0.55)	(0.16)	(0.11)
Fraction of cash crops grown	0.03	0.14*	0.02	0.02
	(0.04)	(0.08)	(0.02)	(0.02)
Area cultivated (ha)	No	Yes	No	Yes
Cragg-Donald F Stat.	409.030	36.570	64.290	42.030
N	2339	2287	2339	2287

Note: This table shows IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects, and for 10 outcome variables, standardised by area cultivated. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment statuses to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). Households reporting zero hectares of area cultivated at the individual-year level are dropped when normalising by area cultivated. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. The dummy for household data misplaced in 2007 is dropped due to collinearity. 52 observations are dropped from the fixed-effects specifications because of singleton dummies (i.e. there are 52 respondents who have non-missing normalised data observations in only one year). Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent).We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4c: Impact of insurance coverage – excluding treatment group 2

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Total revenues (INR)	-405.80	-91.77	-75.33	-182.78
	(1947.93)	(940.70)	(703.69)	(207.54)
Agricultural revenues (INR)	-439.08	-125.03	-99.27	-202.69
(from cultivation of own plot)	(1947.77)	(940.59)	(704.11)	(207.53)
Financial revenues (INR)	33.28	33.25***	23.94***	19.91**
	(4.04) ***	(4.04)	(6.54)	(8.34)
Total costs (INR)	166.40	1011.86*	45.88	-132.32
	(809.33)	(536.88)	(295.74)	(119.89)
Agricultural costs (INR)	138.65	984.10*	34.53	-137.04
	(809.23)	(536.78)	(295.83)	(120.03)
Irrigation costs (INR)	3.51	303.02**	14.59	14.21
	(126.44)	(135.23)	(43.23)	(24.05)
Hired labour costs (INR)	196.79	511.59*	38.67	-100.86
	(437.28)	(290.93)	(148.78)	(82.88)
Other input costs (INR)	-61.65	169.50	-18.73	-50.38
	(306.47)	(417.43)	(123.37)	(57.82)
Total labour days	9.00	22.34	5.07	0.76
	(11.40)	(20.78)	(3.58)	(2.69)
Hired labour days	2.55	11.02	0.27	-1.44
	(3.63)	(8.47)	(0.98)	(1.27)
Family labour days	7.53	10.72	5.05*	2.17
	(7.96)	(13.04)	(2.84)	(1.85)
Financial costs (INR)	43.85***	43.86***	19.04***	9.28***
	(2.17)	(2.18)	(1.27)	(1.54)
Total profit (INR)	-572.20	-1103.64	-121.21	-50.45
	(1184.78)	(1031.16)	(446.46)	(238.08)
Agricultural profit (INR)	-577.73	-1109.13	-133.80	-65.65
(from cultivation of own plot)	(1184.82)	(1030.03)	(446.87)	(237.61)
Fraction of high-yielding variety crops grown	-0.01	0.00	0.00	0.00
	(0.06)	(0.05)	(0.02)	(0.01)
Fraction of cash crops grown	0.01	0.01	0.01	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Area cultivated (ha)	0.08	0.22	0.04	0.00
	(0.16)	(0.15)	(0.05)	(0.01)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-Stat.	857.880	97.190	134.180	93.420
N	5076	5076	5076	5076

Note: This table reports the impact of insurance on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment statuses to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households), excluding the treatment group 2 households that were offered insurance every year from 2007 on. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent). We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4d: Impact of insurance coverage – excluding treatment 1 group

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Total revenues (INR)	-3405.87*	-1478.96	-1257.87*	-307.58
	(1862.41)	(989.78)	(743.66)	(317.27)
Agricultural revenues (INR)	-3436.71*	-1509.81	-1287.88*	-336.44
(from cultivation of own plot)	(1861.38)	(987.32)	(743.86)	(316.31)
Financial revenues (INR)	30.84	30.85***	30.01	28.86***
	(4.42)	(4.43)	(6.63)	(8.06)
Total costs (INR)	-1088.87	-9.40	-504.08*	-220.87
	(724.91)	(406.85)	(289.82)	(170.45)
Agricultural costs (INR)	-1113.66	-34.19	-516.90*	-229.19
	(725.44)	(407.18)	(290.27)	(170.87)
Irrigation costs (INR)	-78.16	293.99***	-31.42	14.50
	(115.76)	(107.91)	(41.14)	(22.54)
Hired labour costs (INR)	-623.32*	-283.92	-293.19**	-161.48*
	(373.19)	(241.10)	(132.38)	(88.05)
Other input costs (INR)	-412.18	-44.26	-192.28	-82.22
	(280.32)	(238.99)	(125.86)	(83.09)
Total labour days	-13.15	20.42	-3.83	2.51
	(8.51)	(14.64)	(2.41)	(2.54)
Hired labour days	-3.17	4.79	-0.73	0.89
	(2.48)	(7.91)	(0.87)	(1.53)
Family labour days	-8.65	11.49	-2.78	0.85
	(6.49)	(7.07)	(1.91)	(1.26)
Financial costs (INR)	40.48***	40.47***	21.50***	14.37***
	(2.84)	(2.85)	(2.31)	(2.55)
Total profit (INR)	-2317.00*	-1469.56	-753.79	-86.71
	(1193.58)	(1058.80)	(476.18)	(247.34)
Agricultural profit (INR)	-2323.05*	-1475.62	-770.98	-107.25
(from cultivation of own plot)	(1191.81)	(1056.44)	(475.43)	(244.93)
Fraction of high-yielding variety crops grown	-0.08	-0.05	-0.03	-0.01
	(0.05)	(0.04)	(0.02)	(0.01)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Area cultivated (ha)	-0.18	-0.06	-0.08**	-0.03
	(0.13)	(0.09)	(0.04)	(0.02)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-Stat.	873.860	199.020		
N	4464	4464	4464	4464

Note: This table reports the impact of insurance on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment statuses to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households), excluding the treatment group 1 that was offered insurance every year from 2006 on. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. The dummy for household data misplaced in 2007 is dropped due to collinearity. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent).We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See remaining appendix for a detailed description of individual treatments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4e: Impact of insurance coverage – excluding control group
Sample used to study agricultural investments and outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Total revenues (INR)	-7192.26	-7240.21	292.74	-9.53
	(5779.09)	(6007.62)	(185.42)	(187.85)
Agricultural revenues (INR)	-7178.43	-7227.22	270.02	-31.24
(from cultivation of own plot)	(5760.21)	(5989.77)	(185.84)	(187.47)
Financial revenues (INR)	-13.83	-12.99	22.72***	21.71***
	(38.05)	(37.81)	(5.86)	(5.91)
Total costs (INR)	3938.72	3906.69	152.68	-50.74
	(4402.14)	(4370.39)	(113.55)	(85.82)
Agricultural costs (INR)	3781.94	3749.95	148.60	-54.85
	(4359.18)	(4326.64)	(113.59)	(86.06)
Irrigation costs (INR)	1802.94	1829.36	17.10	-14.35
	(1168.16)	(1178.23)	(20.86)	(21.80)
Hired labor costs (INR)	496.61	435.80	63.79	-43.60
	(2129.10)	(2066.67)	(65.82)	(60.04)
Other input costs (INR)	1482.39	1484.79	67.71	3.10
	(1757.83)	(1761.03)	(42.94)	(33.84)
Total labour days	47.06	46.25	4.13***	-0.30
	(67.49)	(67.05)	(1.38)	(1.45)
Hired labour days	13.79	13.74	0.72	-0.76
	(36.75)	(36.69)	(0.54)	(0.82)
Family labour days	25.72	24.96	3.41***	0.54
	(36.80)	(36.82)	(1.27)	(1.15)
Financial costs (INR)	165.48**	165.29**	6.45***	6.62***
	(77.55)	(77.41)	(1.73)	(1.84)
Total profit (INR)	-11130.98	-11146.90	140.05	41.21
	(7889.07)	(8037.13)	(153.08)	(189.17)
Agricultural profit (INR)	-10960.37	-10977.17	121.42	23.60
(from cultivation of own plot)	(7818.06)	(7967.53)	(153.41)	(188.31)
Fraction of high-yielding variety crops grown	-0.16	-0.16	0.01*	0.00
	(0.21)	(0.21)	(0.01)	(0.01)
Fraction of cash crops grown	-0.06	-0.06	0.01	0.00
	(0.07)	(0.07)	(0.00)	(0.00)
Area cultivated (ha)	-0.27	-0.31	0.03*	-0.01
	(0.67)	(0.62)	(0.02)	(0.01)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F-Stat.	1.370	1.420	28.110	26.240
N	3060	3060	3060	3060

Note: This table reports the impact of insurance on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment statuses to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households), excluding the control group that was never offered insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent). We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4f: Impact of insurance coverage – using instruments from all previous years

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Total revenues (INR)	-1637.79	-2099.39	655.35	247.58
	(3579.44)	(2203.12)	(464.15)	(331.32)
Agricultural revenues (INR)	-1643.28	-2100.46	634.52	230.20
(from cultivation of own plot)	(3578.87)	(2202.01)	(462.68)	(330.03)
Financial revenues (INR)	5.49	1.06	20.83***	17.38***
	(4.94)	(5.96)	(5.70)	(5.62)
Total costs (INR)	1989.68	2698.78*	222.19	-262.01
	(2550.35)	(1498.94)	(216.91)	(179.71)
Agricultural costs (INR)	1889.26	2608.26*	215.28	-267.37
	(2548.70)	(1494.55)	(216.78)	(179.71)
Irrigation costs (INR)	223.84	886.96***	22.89	-5.95
	(519.13)	(291.93)	(34.38)	(24.32)
Hired labour costs (INR)	1067.90	821.71	88.63	-214.58*
	(1292.48)	(738.82)	(106.43)	(110.67)
Other input costs (INR)	597.51	899.59	103.76	-46.84
	(957.65)	(768.88)	(90.68)	(87.92)
Total labour days	23.66	47.80	6.74**	-5.55
	(44.17)	(34.38)	(2.78)	(4.13)
Hired labour days	4.60	15.33	0.71	-3.50**
	(17.99)	(16.96)	(0.71)	(1.76)
Family labour days	24.57	29.75	6.18**	-1.71
	(26.84)	(20.57)	(2.48)	(3.02)
Financial costs (INR)	110.61***	103.69***	10.91***	8.81***
	(13.55)	(14.51)	(3.00)	(3.12)
Total profit (INR)	-3627.48*	-4798.17*	433.16	509.60*
	(1971.32)	(2561.08)	(331.28)	(298.88)
Agricultural profit (INR)	-3532.54*	-4708.72*	419.24	497.57*
(from cultivation of own plot)	(1970.45)	(2558.14)	(330.31)	(297.63)
Fraction of high-yielding variety crops grown	0.01	-0.02	0.03	0.01
	(0.14)	(0.08)	(0.03)	(0.02)
Fraction of cash crops grown	0.02	0.00	0.02**	0.01
	(0.04)	(0.02)	(0.01)	(0.01)
Area cultivated (ha)	0.41	0.35	0.11**	0.02
	(0.41)	(0.28)	(0.05)	(0.02)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	17.310	13.870	26.170	20.870
N	6300	6300	6300	6300

Note: This table shows IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects, and for 11 outcome variables. Village-level IV regressions use village-level treatment status as an instrument for purchasing insurance policies (dummy); individual-level IV regressions use individual-level marketing treatment statuses from all previous years to instrument the number of insurance policies purchased. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent). We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A4g: Impact of insurance coverage – excluding landless labourers

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Total Revenues (INR)	-1265.73	-2821.64	-526.14	-616.51*
	(2738.37)	(2237.19)	(853.80)	(351.95)
Agricultural revenues (INR)	-1301.24	-2857.11	-551.80	-639.40*
(from cultivation of own plot)	(2738.82)	(2235.84)	(853.90)	(351.54)
Financial revenues (INR)	35.51***	35.47***	25.66***	22.89**
	(4.84)	(5.04)	(8.46)	(11.13)
Total costs (INR)	140.18	1168.96	-128.62	-318.34
	(1043.89)	(1316.53)	(334.17)	(206.10)
Agricultural costs (INR)	112.30	1138.61	-137.93	-321.62
	(1043.49)	(1316.56)	(334.15)	(206.22)
Irrigation costs (INR)	50.49	830.17***	19.49	12.24
	(184.59)	(279.35)	(48.24)	(39.77)
Hired labour costs (INR)	217.24	33.09	-63.15	-230.26*
	(574.48)	(702.88)	(169.73)	(131.32)
Other input costs (INR)	-155.43	275.35	-94.26	-103.60
	(442.94)	(886.08)	(152.12)	(90.92)
Total labour days	15.45	37.53	6.51**	2.68
	(11.24)	(33.42)	(3.02)	(3.82)
Hired labour days	3.28	9.37	0.31	-1.19
	(4.66)	(17.31)	(1.31)	(1.76)
Family labour days	13.74*	22.09	6.38**	3.40
	(8.02)	(21.42)	(2.49)	(2.89)
Financial costs (INR)	43.55***	43.72***	15.66***	6.57***
	(2.94)	(5.12)	(1.53)	(1.79)
Total profit (INR)	-1405.91	-3990.60	-397.52	-298.17
	(1803.24)	(2554.94)	(594.72)	(367.68)
Agricultural profit (INR)	-1413.54	-3995.73	-413.87	-317.79
(from cultivation of own plot)	(1804.03)	(2552.82)	(595.02)	(367.28)
Fraction of high-yielding variety crops grown	-0.03	-0.02	-0.02	0.00
	(0.04)	(0.08)	(0.01)	(0.01)
Fraction of cash crops grown	0.02	0.02	0.01	0.00
	(0.03)	(0.03)	(0.01)	(0.01)
Area cultivated (ha)	0.10	0.10	0.01	-0.03
	(0.23)	(0.33)	(0.06)	(0.03)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	366.42	36.56	62.29	42.03
N	2339	2287	2339	2287

Note: This table shows IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects, and for 11 outcome variables. Village-level IV regressions use village-level treatment status as an instrument for purchasing insurance policies (dummy); individual-level IV regressions use individual-level marketing treatment statuses from all previous years to instrument the number of insurance policies purchased. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour-days are winsorised at the top (one per cent). We report the F-stats of Cragg-Donald weak instruments tests. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A5: Impact of insurance coverage on wages from agricultural labour

Sample used to study agricultural investments and outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Entire balanced panel				
Wage revenue from agricultural	-127.22	363.79	57.80	337.75*
	(792.72)	(997.49)	(270.41)	(176.87)
Total profit (INR)	-854.76	-1306.86	-51.67	258.54
	(1252.09)	(1385.04)	(408.43)	(237.88)
Individual fixed effects	No	Yes	No	Yes
Cragg Donald F Stat.	726.37	129.97	118.93	91.35
N	6300	6300	6300	6300
Only landless labourers				
Wage revenue from agricultural labour (INR)	-653.26	-214.79	-37.81	213.15
	(1282.05)	(1332.11)	(399.77)	(206.66)
Total profit (INR)	-652.03	-216.58	-24.56	228.64
	(1282.14)	(1331.55)	(401.06)	(208.58)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	361.36	74.52	57.99	43.31
N	3961	3912	3961	3912

Note: This table reports the impact of insurance coverage on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects for the balanced panel and the sample of only landless laborers. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year (700 unique households). Landless labourers refers to the people who report zero area cultivated and no agricultural revenues or costs. Total profit is the sum of agricultural revenues from own plot cultivation, financial costs and wage revenue from agricultural labour. 49 observations are dropped from the fixed-effects specifications for the sample of landless labourers because of singleton dummies (i.e. there are 49 respondents who have non-missing normalised data observations in only one year). Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Revenues and profits are winsorised at the top (one per cent). All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A6: Panel regressions of ex-ante outcomes on productivity shock

Sample used to study agricultural investments and outcomes

	'Shadow' (1)	'Shadow' (2)
Weather station assignment	Based on household-district	Based on geographical proximity of household to weather station
Agricultural revenues (INR)	-0.58	-1.04
(from cultivation of own plot)	(1.044)	(0.996)
Agricultural costs (INR)	0.63	1.32**
	(0.632)	(0.656)
Irrigation costs (INR)	-0.06	-0.06
	(0.088)	(0.081)
Hired labour costs(INR)	-0.15	0.34
	(0.495)	(0.528)
Other input costs (INR)	0.84**	1.04**
	(0.414)	(0.415)
Total labour days	0.01	0.02
	(0.013)	(0.014)
Hired labour days	-0.01	0.00
	(0.006)	(0.005)
Family labour days	0.01	0.02
	(0.011)	(0.011)
Agricultural profit (INR)	-1.21	-2.36*
(from cultivation of own plot)	(1.272)	(1.235)
Fraction of high-yielding variety	0.00	0.00
Crops grown	(0.000)	(0.000)
Fraction of cash crops grown	0.00	0.00
	(0.000)	(0.000)
Area cultivated (ha)	0.00**	0.00
	(0.000)	(0.000)
Individual fixed effects	Yes	Yes
N	3716	3716

Note: This table reports the impact of 'shadow' payout amounts on agricultural investment and outputs for households from the control group. Shadow payouts correspond to the amount a rainfall insurance policy would have paid out, had it been purchased, and are proxies for productivity shocks. For robustness, two weather station assignments for control households are included: (1) based on district; (2) based on geographical proximity. We include year dummies and indicators for households that had to be surveyed twice in 2011. We include individual fixed effects and correct standard errors for heteroskedasticity and intra-village correlation. All outcome variables reported in INR have been winsorised at the top only (one per cent) and corrected for inflation (2005 prices) using the rural labourers' CPI. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A7a: Baseline comparisons between full sample and balanced panel

Sample used to study household outcomes

Dependent variable	All groups Full sample Mean (s.d.) (1)	Balanced panel Mean (s.d.) (2)	Test for pair-wise equality p-value (3)	Control group Full sample Mean (s.d.) (4)	Balanced panel Mean (s.d.) (5)	Test for pair-wise equality p-value (6)	Treatment group 1 Full sample Mean (s.d.) (7)	Balanced panel Mean (s.d.) (8)	Test for pair-wise equality p-value (9)	Treatment group 2 Full sample Mean (s.d.) (10)	Balanced panel Mean (s.d.) (11)	Test for pair-wise equality p-value (12)	Treatment expansion group Full sample Mean (s.d.) (13)	Balanced panel Mean (s.d.) (14)	Test for pair-wise equality p-value (15)
Age of household head	48.78	49.13	0.17	49.04	49.87	0.01	48.03	47.91	0.82	49.38	49.40	0.97	47.14	46.69	0.15
	(12.73)	(12.55)		(12.60)	(12.50)		(12.57)	(12.18)		(13.28)	(13.15)		(13.45)	(13.64)	
Education of household head	3.80	3.81	0.94	3.90	4.00	0.34	3.60	3.51	0.50	3.87	3.84	0.81	3.69	3.85	0.22
	(4.02)	(4.03)		(4.05)	(4.13)		(3.94)	(3.93)		(4.08)	(3.97)		(3.90)	(3.88)	
Owns a plot	0.47	0.49	0.05	0.48	0.50	0.16	0.48	0.52	0.10	0.44	0.44	0.91	0.59	0.57	0.13
	(0.50)	(0.50)		(0.50)	(0.50)		(0.50)	(0.50)		(0.50)	(0.50)		(0.49)	(0.50)	
Financial literacy	0.50	0.49	0.14	0.49	0.49	0.44	0.49	0.48	0.15	0.52	0.52	0.70	0.51	0.50	0.15
	(0.24)	(0.24)		(0.23)	(0.23)		(0.24)	(0.24)		(0.24)	(0.25)		(0.21)	(0.22)	
Wealth index	-1.42	-1.48	0.14	-1.34	-1.36	0.68	-1.57	-1.62	0.58	-1.36	-1.53	0.05	-0.23	-0.17	0.37
	(1.97)	(1.88)		(2.01)	(1.96)		(1.83)	(1.70)		(2.10)	(1.99)		(1.82)	(1.76)	
B. Consumption (INR)															
Total consumption	92805.54	93768.15	0.49	95192.08	95044.48	0.95	94956.46	97831.67	0.17	83605.71	84037.56	0.89	64697.85	61102.38	0.01
	(81709.55)	(80140.72)		(84350.87)	(81974.15)		(83430.70)	(82859.03)		(71414.16)	(70136.85)		(55235.89)	(51049.70)	
Nondurable, food	33995.33	34357.12	0.36	35034.20	35447.46	0.52	33593.76	34184.50	0.28	32132.12	32059.69	0.93	28906.11	28190.67	0.05
	(20319.88)	(20253.02)		(20518.51)	(20164.71)		(20384.74)	(20855.01)		(19632.19)	(19326.08)		(15145.74)	(15081.97)	
Nondurable, events (e.g. weddings)	15403.65	16031.60	0.16	14668.45	14724.38	0.94	17119.42	17803.87	0.27	14419.59	16207.42	0.09	8385.04	7876.14	0.35
	(26167.72)	(26501.74)		(25474.60)	(25444.75)		(25869.23)	(25634.00)		(28179.33)	(30084.40)		(21825.80)	(20493.94)	
Nondurable, gifts/transfers made	389.98	413.59	0.41	412.50	390.88	0.67	405.60	468.65	0.10	310.75	376.37	0.10			
	(1559.23)	(1629.41)		(1616.40)	(1573.10)		(1597.31)	(1760.59)		(1344.98)	(1537.81)				
Nondurable, other	25105.74	25064.52	0.94	25487.67	25145.88	0.67	27032.07	27993.98	0.34	21087.93	20050.54	0.41	14258.16	13139.12	0.12
	(33447.49)	(33110.26)		(33321.79)	(31998.91)		(36438.85)	(37521.96)		(28063.54)	(26926.03)		(20911.01)	(17467.14)	
Durable	12684.07	12866.25	0.58	13843.51	14004.83	0.77	11794.88	12415.76	0.25	11311.98	10911.09	0.49	12419.40	11555.93	0.10

	(18975.69)	(18788.77)		(22226.27)	(22376.42)		(15789.99)	(15287.37)		(14494.77)	(13969.61)		(23057.90)	(22511.76)	
C. Income (INR)															
Annual income	27993.90	27247.77	0.27	29377.13	29314.85	0.95	27356.68	26029.32	0.28	25686.35	24363.37	0.19	38109.76	37019.72	0.19
	(26819.30)	(23534.92)		(29949.55)	(27144.22)		(24878.67)	(18950.44)		(21117.08)	(20638.02)		(37859.44)	(34527.02)	
Value of gifts/transfers received	371.50	388.16	0.55	405.32	381.09	0.64	359.12	404.26	0.22	314.21	377.91	0.11			
	(1491.32)	(1532.45)		(1599.20)	(1533.89)		(1425.05)	(1539.83)		(1334.11)	(1524.30)				
D. Financial activity (INR)															
Savings	1159.57	1137.80	0.70	1191.13	1087.55	0.31	1221.40	1279.82	0.48	984.34	1022.39	0.57	765.03	817.01	0.20
	(3096.01)	(2816.64)		(3125.38)	(2501.40)		(3624.05)	(3577.51)		(1861.61)	(1972.89)		(2774.36)	(2943.95)	
Lending	9118.27	11290.00	0.06	6229.31	7228.95	0.31	15277.78	20108.33	0.14	3700.00	4125.00	0.39			
	(17328.76)	(20623.11)		(9217.72)	(10981.39)		(26360.61)	(31320.85)		(3563.71)	(3966.00)				
Borrowing	35642.29	34857.47	0.50	36628.37	38589.58	0.24	35728.71	30878.85	0.04	33130.68	32938.47	0.93			
	(52518.74)	(49761.70)		(52183.77)	(53045.74)		(55622.54)	(46971.32)		(48285.14)	(46043.55)				
E. Well-being															
Food sufficiency for children	0.87	0.87	0.50	0.88	0.86	0.04	0.85	0.85	0.78	0.88	0.91	0.11	0.98	0.98	0.60
	(0.33)	(0.34)		(0.32)	(0.34)		(0.36)	(0.36)		(0.32)	(0.29)		(0.14)	(0.15)	
Financial situation (s.d. units)	-0.26	-0.29	0.10	-0.28	-0.30	0.38	-0.28	-0.30	0.51	-0.20	-0.26	0.18	-0.21	-0.20	0.40
	(1.09)	(1.06)		(1.03)	(1.00)		(1.14)	(1.15)		(1.13)	(1.06)		(0.79)	(0.77)	
Good things happen (s.d. units)	0.60	0.58	0.28	0.61	0.56	0.17	0.69	0.73	0.39	0.46	0.35	0.08			
	(1.34)	(1.34)		(1.32)	(1.32)		(1.34)	(1.33)		(1.39)	(1.35)				
Control over life (s.d. units)	-0.79	-0.77	0.36	-0.69	-0.68	0.72	-0.90	-0.84	0.04	-0.86	-0.88	0.69			
	(1.15)	(1.15)		(1.15)	(1.15)		(1.11)	(1.13)		(1.19)	(1.17)				
N	1499	1049		720	495		480	345		299	209		403	326	

Note: This table reports baseline summary statistics and balance tests comparing the full original sample and the balanced panel obtained after attrition and removing households who did not report key outcomes in one or more years from the sample used to study household outcomes. Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. Treatment expansion group was added to the sample in 2008, and offered insurance in 2009 and every year on. The control group was never offered insurance. Financial literacy scores are the fraction of correct answers to questions adapted from Lusardi and Mitchell (2007). Wealth index is calculated through principal component analysis using data on assets and living conditions to compile a single index for each household (for details and validation of this method, see for example Filmer and Pritchett, 2001). The 'own plot cultivation' dummy is equal to 1 if a household cultivate on a plot it owns, rents or sharecrops in, and equal to 0 for landless labourers. All treatment groups are pooled here. We did not collect information on lending, borrowing, gifts/transfers, outlook towards life and control over life in 2008 which is the baseline year for the treatment expansion group. Data on financial activity, income and consumption is winsorised at the top 1%, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A7b: Summary statistics by insurance purchase status

Sample used to study household outcomes

Dependent variable	Ever bought insurance Baseline (Mean) (1)	Never bought insurance Baseline (Mean) (2)	Test for pair-wise equality (p-value) (3)	Bought insurance Contemporaneous (Mean) (4)	Did not buy insurance Contemporaneous (Mean) (5)	Test for pair-wise equality (p-value) (6)
A. Consumption (INR)						
Total consumption	81503.45	72944.16	0.31	81538.24	69538.88	0.00
	(71908.48	(60701.70)		(74686.38	(63207.33	
Nondurable, food	31604.90	29358.79	0.22	29795.38	28407.98	0.00
	(19060.15	(12289.78)		(15752.91	(15330.03	
Nondurable, events (e.g.	13882.49	13286.94	0.86	12007.16	9373.50	0.00
	(25456.59	(26422.77)		(24243.97	(21293.63	
Nondurable, gifts/transfers	451.42	90.74	0.00	931.49	776.31	0.04
	(1718.56)	(305.10)		(1841.84)	(1696.85)	
Nondurable, other	20673.70	19474.85	0.79	19748.93	16756.22	0.00
	(29238.59	(34831.18)		(27163.08	(23820.65	
Durable	11885.68	9636.88	0.20	15858.91	12287.18	0.00
	(18320.00	(13099.04)		(29173.28	(22806.50	
B. Income (INR)						
Annual income	29618.05	30962.02	0.64	57361.37	46515.94	0.00
	(27004.26	(22404.98)		(56891.71	(48829.78	
Value of gifts/transfers received	410.00	90.74	0.00	679.42	368.01	0.00
	(1568.87)	(305.10)		(1843.77)	(1224.08)	
C. Financial activity (INR)						
Savings	1033.20	1249.84	0.76	1927.55	1741.98	0.20
	(2829.13)	(5146.64)		(4914.41)	(4954.10)	
Lending	16112.50	.		13595.96	17026.78	0.62
	(27814.31	(.)		(36636.19	(41596.72	
Borrowing	30490.20	54052.40	0.23	32706.18	30395.22	0.30
	(43203.60	(88816.79)		(52104.51	(50073.36	
D. Well-being						
Food sufficiency for children	0.91	0.88	0.47	0.95	0.96	0.88
	(0.28)	(0.33)		(0.21)	(0.21)	
Financial situation (s.d. units)	-0.26	-0.19	0.71	0.13	-0.07	0.00
	(1.00)	(1.02)		(0.98)	(0.94)	
Good things happen (s.d. units)	0.62	-0.03	0.01	-0.15	-0.00	0.00
	(1.35)	(1.17)		(0.94)	(0.96)	
Control over life (s.d. units)	-0.88	-0.39	0.03	0.13	0.03	0.02
	(1.14)	(1.14)		(0.96)	(0.97)	
N	823	57		2377	4564	

Note: This table reports summary statistics and tests of pair-wise equality by insurance purchase status. The sample is the balanced panel used to study household outcomes, excluding control households (for whom the distinction by purchase status does not make sense). Columns 1 and 2 compare the baseline characteristics of households, split according to an indicator for 'ever purchasing' weather insurance, while columns 3 and 4 compare pre-treatment characteristics of households, splitting them according to an indicator which equals 1 if they purchased insurance in that particular treatment year. Baseline year for the treatment expansion group is 2008. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI.

Table A7c: Baseline summary statistics and balance tests for attritors by treatment status

Sample used to study household outcomes

Dependent variable	Full sample Attritors Mean (s.d.) (1)	Control group Attritors Mean (s.d.) (2)	Treatment group 1 Attritors Mean (s.d.) (3)	Treatment group 2 Attritors Mean (s.d.) (4)	Test for pair-wise equality p-value (5)	Treatment expansion group Attritors Mean (s.d.) (6)
A. Consumption (INR)						
Total consumption	90561.59	87608.68	82602.87	95516.82	0.54	79920.24
	(85303.98)	(84740.73)	(74688.59)	(89545.92)		(68582.76)
Nondurable, food	33150.07	32084.08	32302.23	34125.04	0.75	31935.15
	(20472.96)	(19122.17)	(20443.79)	(21293.74)		(15138.11)
Nondurable, events (e.g. weddings)	13943.55	15380.39	10241.28	14545.90	0.28	10576.11
	(25342.95)	(26474.26)	(22733.09)	(25596.27)		(26877.11)
Nondurable, gifts/transfers made	334.99	244.44	158.37	459.97	0.15	
	(1382.21)	(1061.41)	(704.70)	(1710.29)		
Nondurable, other	25201.87	24580.98	23524.04	26238.08	0.84	18995.90
	(34258.20)	(33529.38)	(30590.90)	(36120.04)		(31306.70)
Durable	12258.83	10212.78	12253.40	13488.61	0.38	16052.69
	(19419.54)	(16960.43)	(15701.62)	(21937.63)		(25057.56)
B. Income (INR)						
Annual income	29744.88	30799.86	28758.61	29514.75	0.92	42724.76
	(33243.31)	(35835.99)	(22000.81)	(35436.99)		(49568.79)
Value of gifts/transfers received	331.98	243.18	167.00	460.35	0.18	
	(1389.87)	(1072.11)	(709.96)	(1741.06)		
C. Financial activity (INR)						
Savings	1210.33	1072.09	896.00	1419.00	0.36	544.92
	(3668.57)	(3749.79)	(1579.86)	(4180.77)		(1894.89)
Borrowing	37534.36	50628.87	33594.41	32542.53	0.20	
	(58677.52)	(74719.52)	(53700.30)	(50249.79)		
D. Well-being						
Food sufficiency for children	0.88	0.86	0.82	0.92	0.06	0.99
	(0.32)	(0.35)	(0.38)	(0.27)		(0.11)
Financial situation (s.d. units)	-0.19	-0.24	-0.05	-0.22	0.61	-0.29
	(1.14)	(1.13)	(1.26)	(1.10)		(0.88)
Good things happen (s.d. units)	0.67	0.57	0.71	0.71	0.77	
	(1.35)	(1.37)	(1.45)	(1.30)		
Control over life (s.d. units)	-0.83	-1.05	-0.81	-0.71	0.02	
	(1.16)	(1.07)	(1.25)	(1.16)		
N	450	135	90	225		77

Note: This table reports baseline summary statistics by treatment group and tests for village-level balance for attritors from the sample of households who were surveyed and reported household outcome data each year. Attritors refer to those individuals that drop out from one or more waves of the survey or report missing consumption and/or income data in any wave of the survey. Treatment group 1 is the set of villages offered to purchase weather insurance from 2006 on, while villages in treatment group 2 were offered to purchase weather insurance every year from 2007 on. Treatment expansion group includes villages added to the sample in 2008 and offered to purchase insurance 2009 onwards. The control group was never offered weather insurance. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. Information on borrowing, lending, gifts and transfers, and the outlook towards life indicators was not collected in 2008 which is the baseline year for the treatment expansion group. The lending outcome variable is not included in this table because the data are too sparsely populated for the sample of attritors, with only one observation in the treatment group 2 attritor group. INR1 = USD0.01. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A8: Panel regressions of ex-post outcomes on productivity shock

Sample used to study household outcomes

Dependent variable	'Shadow' payout (1)	'Shadow' payout (2)
Weather station assignment	Based on household- district	Based on geographical proximity of household to weather station
Year-fixed effects	Yes	Yes
A. Consumption (INR)		
Total consumption	-1.55	-0.30
	(7.757)	(7.931)
Nondurable, food	-2.44*	-2.28
	(1.422)	(1.462)
Nondurable, events (e.g. weddings)	3.70*	4.17*
	(2.121)	(2.337)
Nondurable, gifts/transfers made	-0.12	-0.21
	(0.181)	(0.181)
Nondurable, other	-5.56**	-6.37**
	(2.617)	(2.510)
Durable	1.06	1.57
	(3.714)	(3.900)
B. Income (INR)		
Annual income	3.11	4.72
	(4.604)	(4.547)
Value of gifts/transfers received	0.03	0.03
	(0.152)	(0.156)
C. Financial activity (INR)		
Savings	-0.48	-0.54
	(0.586)	(0.598)
Lending	0.01	0.06
	(0.286)	(0.295)
Borrowing	-7.45	-6.29
	(4.671)	(4.804)
D. Well-being		
Food sufficiency for children	-0.02	-0.02
	(0.016)	(0.016)
Financial situation (s.d. units)	-0.24**	-0.32***
	(0.118)	(0.121)
Good things happen (s.d. units)	0.10	0.12**
	(0.059)	(0.056)
Control over life (s.d. units)	-0.08	-0.09*
	(0.055)	(0.056)
Individual fixed effects	Yes	Yes
N	5218	5218

Note: This table reports the impact of 'shadow' payout amounts on well-being and consumption outcomes on households from the control group. Shadow payouts correspond to the amount a rainfall insurance policy would have paid out, had it been purchased, and are proxies for productivity shocks. For robustness, two weather station assignments for control households are included: (1) based on district; and (2) based on geographical proximity to weather station. We include year dummies and indicators for households that had to be surveyed twice in 2011. We include individual fixed effects and correct standard errors for heteroskedasticity and intra-village correlation. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9a: Impact of purchasing insurance

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
	Bought insurance	Bought insurance	Bought insurance	Bought insurance
Endogenous variable				
A. Consumption (INR)				
Total consumption	-3453.036	-3503.791	-3731.747	-4131.206
	(9917.720)	(12034.176)	(7858.760)	(6570.554)
Nondurable, food	1715.443	3060.261	460.728	-975.531
	(2943.986)	(2695.545)	(2384.634)	(1446.563)
Nondurable, events (e.g. weddings)	-1784.969	-4939.804	-1394.115	-2444.780
	(1718.852)	(3834.518)	(1466.112)	(2354.592)
Nondurable, gifts/transfers made	-146.498	-19.990	-118.442	-14.523
	(158.269)	(236.815)	(133.379)	(158.172)
Nondurable, other	-737.836	-3062.919	-901.838	-1548.560
	(2523.706)	(4585.775)	(2073.615)	(2535.837)
Durable	-1814.310	1703.888	-1636.133	300.308
	(2933.507)	(2880.074)	(2413.008)	(2290.144)
B. Income (INR)				
Annual income	515.515	1004.983	-447.233	313.598
	(8395.225)	(5856.621)	(6763.012)	(4419.304)
Value of gifts/transfers received	-195.428*	-231.960	-162.603*	-178.497
	(105.690)	(198.913)	(89.744)	(122.119)
C. Financial activity (INR)				
Savings	-174.802	-166.383	-211.955	-285.297
	(642.358)	(547.351)	(532.577)	(447.608)
Lending	1346.919	376.180	752.517	-361.862
	(928.973)	(795.266)	(599.579)	(528.056)

Borrowing	-3617.471	4035.122	-3774.061	771.658
	(5732.230)	(5617.360)	(4637.540)	(3917.515)
D. Well-being				
Food sufficiency for children	-0.027**	-0.001	-0.016	0.013
	(0.013)	(0.048)	(0.011)	(0.022)
Financial situation (s.d. units)	-0.067	-0.158	-0.128*	-0.249**
	(0.092)	(0.186)	(0.077)	(0.103)
Good things happen (s.d. units)	0.002	-0.195	-0.018	-0.135
	(0.053)	(0.209)	(0.050)	(0.100)
Control over life (s.d. units)	0.073	0.249	0.054	0.102
	(0.056)	(0.173)	(0.052)	(0.093)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	2679.853	532.957	90.886	33.106
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for insurance purchase. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9b: Impact of receiving a payout

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
	Received payout	Received payout	Received payout	Received payout
Endogenous variable				
A. Consumption (INR)				
Total consumption	-	-13481.644	-3637.713	6185.894
	(33352.99	(46467.494)	(16618.230)	(11801.413)
Nondurable, food	5779.027	11775.060	995.190	571.323
	(9985.549)	(10371.290)	(4488.275)	(2301.182)
Nondurable, events (e.g. weddings)	-6013.249	-19007.034	-1831.270	-586.419
	(5801.722)	(14966.863)	(3668.773)	(4185.131)
Nondurable, gifts/transfers made	-493.525	-76.915	-602.427*	-503.260
	(530.838)	(911.908)	(312.987)	(314.071)
Nondurable, other	-2485.641	-11785.288	-1251.679	506.820
	(8495.382)	(17806.735)	(4364.584)	(4238.770)
Durable	-6112.091	6556.103	-2316.538	2686.207
	(9852.370)	(11046.238)	(5606.530)	(4385.262)
B. Income (INR)				
Annual income	1736.680	3866.905	-1478.160	2277.091
	(28306.69	(22452.664)	(14794.333)	(7896.864)
Value of gifts/transfers received	-658.361*	-892.520	-448.464**	-369.141
	(355.458)	(772.890)	(223.661)	(231.985)
C. Financial activity (INR)				
Savings	-588.879	-640.195	-739.881	-630.727
	(2166.479)	(2101.013)	(1075.894)	(711.891)
Lending	4537.535	1447.438	2061.032	393.190
	(3109.658)	(3042.502)	(1708.426)	(1181.924)
Borrowing	-12186.626	15526.060	-9960.320	-3661.610
	(19177.13	(21717.112)	(11152.803)	(7241.875)
D. Well-being				
Food sufficiency for children	-0.090**	-0.003	-0.025	0.028
	(0.044)	(0.185)	(0.020)	(0.030)
Financial situation (s.d. units)	-0.226	-0.609	-0.360**	-0.400
	(0.308)	(0.715)	(0.157)	(0.150)
Good things happen (s.d. units)	0.008	-0.749	-0.190	-0.419**
	(0.179)	(0.812)	(0.139)	(0.182)
Control over life (s.d. units)	0.247	0.960	0.140	0.157
	(0.191)	(0.676)	(0.132)	(0.156)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	560.53	77.59	30.96	20.54
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for receiving a payout. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9c: Impact of insurance coverage – excluding treatment group 1

Sample used to study household outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-9622.433**	-390.307	-681.963	-719.584
	(4785.157)	(5612.651	(1311.37	(1303.406
Nondurable, food	-2666.283**	116.389	-239.564	-280.306
	(1349.873)	(1062.696	(239.921	(199.845)
Nondurable, events (e.g. weddings)	-1243.108	-1164.545	-632.287	-860.557
	(954.141)	(2256.007	(517.621	(530.229)
Nondurable, gifts/transfers made	9.548	99.671	13.708	4.767
	(88.161)	(114.658)	(31.358)	(27.125)
Nondurable, other	-2557.905**	161.588	-144.485	28.926
	(1286.224)	(1934.540	(418.653	(427.118)
Durable	-1821.636	717.208	249.022	260.955
	(1473.635)	(1379.250	(509.887	(470.655)
B. Income (INR)				
Annual income	-5506.424	-392.564	-92.157	-154.942
	(4461.205)	(3168.284	(937.512	(776.371)
Value of gifts/transfers received	-96.115	-91.860	-35.586*	-49.796**
	(71.509)	(97.686)	(21.514)	(24.509)
C. Financial activity (INR)				
Savings	183.892	76.195	-	-87.547
	(358.179)	(283.060)	(86.484)	(73.785)
Lending	532.181	445.079	-89.581	-81.341
	(457.401)	(465.715)	(74.159)	(82.073)
Borrowing	-6469.629**	-876.320	-723.734	-1123.810
	(2656.982)	(3179.984	(907.228	(694.026)
D. Well-being				
Food sufficiency for children	-0.004	-0.014	0.000	0.001
	(0.005)	(0.023)	(0.002)	(0.003)
Financial situation (s.d. units)	0.018	-0.098	-0.032*	-0.029*
	(0.059)	(0.096)	(0.018)	(0.016)
Good things happen (s.d. units)	-0.022	0.068	0.008	0.012
	(0.025)	(0.090)	(0.015)	(0.017)
Control over life (s.d. units)	0.032	0.047	-0.006	0.000
	(0.028)	(0.088)	(0.016)	(0.016)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	1376.98	311.90	121.51	118.06
N	6336	6336	8292	8292

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for receiving a payout. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes, excluding the treatment group 1 who were offered insurance from 2006 on. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests

Table A9d: Impact of insurance coverage – excluding treatment group 2

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy	No. of policy	No. of policy
A. Consumption (INR)				
Total consumption	-1971.975	-4904.150	-1465.094	-1528.296
	(4711.141)	(7935.093)	(1395.346)	(966.463)
Nondurable, food	791.685	2301.444	-47.488	-230.004
	(1421.077)	(1975.319)	(356.941)	(203.422)
Nondurable, events (e.g. weddings)	-891.100	-4259.793*	-472.781	-571.345
	(808.295)	(2296.559)	(371.060)	(436.424)
Nondurable, gifts/transfers made	-88.656	-174.011	-22.340	-18.055
	(74.519)	(150.129)	(27.743)	(19.971)
Nondurable, other	-498.978	-3615.348	-342.771	-288.486
	(1177.661)	(3082.641)	(404.279)	(347.530)
Durable	-957.266	879.789	-328.542	-209.644
	(1400.536)	(1680.607)	(457.577)	(320.989)
B. Income (INR)				
Annual income	606.721	4386.332	840.346	921.557
	(4028.075)	(3214.817)	(1318.444)	(724.923)
Value of gifts/transfers received	-87.441*	-125.924	-58.408***	-
	(49.411)	(124.095)	(19.348)	(21.754)
C. Financial activity (INR)				
Savings	-110.356	-339.020	-104.783	-107.098
	(307.052)	(298.618)	(112.051)	(77.537)
Lending	634.299	159.500	48.821	-59.845
	(463.724)	(408.336)	(131.515)	(100.471)
Borrowing	-1760.163	3337.429	-882.074	-613.066
	(2705.712)	(2800.690)	(1004.537)	(686.401)
D. Well-being				
Food sufficiency for children	-0.012**	0.005	-0.003*	0.001
	(0.006)	(0.033)	(0.002)	(0.002)
Financial situation (s.d. units)	-0.021	-0.028	-0.017	-0.018
	(0.043)	(0.103)	(0.015)	(0.012)
Good things happen (s.d. units)	-0.002	-0.190	0.003	-0.003
	(0.023)	(0.132)	(0.013)	(0.015)
Control over life (s.d. units)	0.036	0.212**	0.008	0.009
	(0.024)	(0.102)	(0.012)	(0.012)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	1328.83	151.27	165.38	123.99
N	7560	7560	9516	9516

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for receiving a payout. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes, excluding the treatment group 2 who were offered insurance from 2007 on. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9e: Impact of insurance coverage – excluding treatment expansion group

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-1542.499	-1662.624	-693.576	-439.033
	(4429.148)	(5715.103)	(1523.532)	(1021.911)
Nondurable, food	766.302	1452.160	145.672	-8.280
	(1317.051)	(1277.779)	(381.031)	(213.626)
Nondurable, events (e.g. weddings)	-797.360	-2344.043	-256.131	-136.219
	(770.349)	(1830.351)	(390.594)	(404.211)
Nondurable, gifts/transfers made	-65.442	-9.486	-27.464	-16.034
	(70.632)	(112.388)	(31.933)	(25.250)
Nondurable, other	-329.597	-1453.421	-418.524	-450.434
	(1127.089)	(2171.636)	(412.710)	(343.722)
Durable	-810.467	808.532	-2.401	328.939
	(1309.827)	(1364.238)	(538.356)	(448.357)
B. Income (INR)				
Annual income	230.285	476.886	521.263	751.302
	(3749.838)	(2775.529)	(1425.258)	(782.503)
Value of gifts/transfers received	-87.299*	-110.070	-55.891***	-50.344***
	(47.312)	(95.348)	(19.880)	(18.631)
C. Financial activity (INR)				
Savings	-78.086	-78.952	-42.435	-18.893
	(287.192)	(259.985)	(119.650)	(87.944)
Lending	601.680	178.505	-29.882	-163.615*
	(414.954)	(376.859)	(136.456)	(96.684)
Borrowing	-1615.954	1914.752	-1269.699	-715.588
	(2553.771)	(2674.019)	(967.618)	(662.837)
D. Well-being				
Food sufficiency for children	-0.012**	0.000	-0.002	0.003
	(0.006)	(0.023)	(0.002)	(0.003)
Financial situation (s.d. units)	-0.030	-0.075	-0.015	-0.007
	(0.041)	(0.089)	(0.016)	(0.014)
Good things happen (s.d. units)	0.001	-0.092	0.002	-0.004
	(0.024)	(0.099)	(0.014)	(0.015)
Control over life (s.d. units)	0.033	0.118	0.014	0.023
	(0.025)	(0.082)	(0.013)	(0.015)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	1170.19	192.32	166.78	125.27
N	9441	9441	9441	9441

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for receiving a payout. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes, excluding the treatment expansion group who were offered insurance from 2009 on. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9f: Impact of insurance coverage – excluding control group

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	22828.449	21709.210	-1568.616	-1809.165*
	(31379.776)	(32209.634)	(1152.184)	(1057.265)
Nondurable, food	10280.956	9707.895	-148.283	-185.674
	(9306.625)	(9201.991)	(189.228)	(163.614)
Nondurable, events (e.g. weddings)	5837.850	5741.809	-307.880	-416.404
	(8919.468)	(9092.887)	(412.708)	(423.402)
Nondurable, gifts/transfers made	610.265	598.801	12.154	-0.699
	(856.387)	(874.813)	(26.365)	(21.368)
Nondurable, other	3484.758	3301.089	-579.250	-423.829
	(14130.150)	(14452.044)	(372.639)	(356.100)
Durable	1166.130	894.086	-181.076	-327.144
	(10696.234)	(10928.454)	(463.362)	(422.498)
B. Income (INR)				
Annual income	-38104.125	-39791.327	7.950	-181.899
	(30951.933)	(32595.377)	(909.752)	(638.435)
Value of gifts/transfers received	-159.522	-169.765	-31.906	-43.185*
	(568.383)	(584.598)	(19.924)	(22.895)
C. Financial Activity (INR)				
Savings	913.689	1025.052	-140.890	-114.780
	(1509.488)	(1560.370)	(88.136)	(77.434)
Lending	-3420.674	-3449.109	-344.497	-266.098
	(4261.282)	(4333.757)	(257.642)	(184.022)
Borrowing	24842.265	24166.181	-335.304	-489.247
	(23958.021)	(24332.416)	(844.674)	(680.963)
D. Well-being				
Food sufficiency for children	0.123	0.124	-0.001	-0.001
	(0.184)	(0.187)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.362	-0.359	-0.002	0.006
	(0.867)	(0.882)	(0.014)	(0.011)
Good things happen (s.d. units)	-1.132	-1.148	0.018	0.023*
	(0.921)	(0.948)	(0.012)	(0.013)
Control over life (s.d. units)	-0.101	-0.103	-0.008	0.000
	(0.700)	(0.712)	(0.011)	(0.010)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	1.48	1.50	58.15	53.74
N	4986	4986	6942	6942

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for receiving a payout. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes, excluding the control group who were never offered weather insurance. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A9g: Impact of insurance coverage – including marketing instruments from previous years

Sample used to study household outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-4203.330	-3857.910	-207.330	-88.970
	(12787.60)	(14202.95)	(2169.97)	(1917.85)
Nondurable, food	576.460	1956.900	-190.410	-217.640
	(4520.91)	(3588.57)	(372.68)	(314.97)
Nondurable, events (e.g. weddings)	-1088.510	-4508.730	294.900	267.240
	(2877.94)	(4596.85)	(645.89)	(646.66)
Nondurable, gifts/transfers made	-195.590	-31.140	-27.640	-50.270
	(203.03)	(278.28)	(52.01)	(41.54)
Nondurable, other	2334.03	-435.43	-605.76	-416.23
	(4950.18)	(5840.15)	(628.15)	(544.70)
Durable	-2792.37	1262.83	595.57	637.92
	(3488.84)	(3485.69)	(899.72)	(829.24)
B. Income (INR)				
Annual income	227.130	1216.600	687.860	1641.200
	(6779.28)	(6651.40)	(1613.18)	(1205.38)
Value of gifts/transfers received	-62.170	-111.620	-9.120	-26.910
	(128.13)	(234.95)	(36.54)	(32.60)
C. Financial activity (INR)				
Savings	48.280	24.750	-95.360	32.040
	(726.14)	(523.08)	(138.08)	(114.80)
Lending	-161.590	-937.710	-630.950	-487.650
	(535.65)	(854.78)	(561.12)	(400.01)
Borrowing	8653.280	14903.030**	508.080	309.900
	(7507.76)	(7393.69)	(1424.99)	(1006.75)
D. Well-being				
Food sufficiency for children	-0.050	-0.010	0.000	0.010**
	(0.06)	(0.06)	(0.00)	(0.00)
Financial situation (s.d. units)	0.020	-0.080	-0.020	-0.020
	(0.23)	(0.28)	(0.03)	(0.02)
Good things happen (s.d. units)	-0.130	-0.290	-0.030*	-0.030
	(0.17)	(0.27)	(0.02)	(0.02)
Control over life (s.d. units)	0.180	0.330	0.000	0.020
	(0.19)	(0.24)	(0.02)	(0.02)
Individual fixed effects	No	Yes	No	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	30.26	21.97	44.24	36.95
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the cumulative number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument a dummy for insurance purchase. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10% 5% and 1% level, respectively.

Table A9h: Impact of payout amount controlling for productivity shocks

Sample used to study household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
A. Consumption (INR)				
Total consumption	-38.608	-21.298	-12.726	-4.732
	(31.118)	(25.648)	(11.025)	(9.786)
Nondurable, food	3.510	7.948	-1.454	-1.911
	(7.164)	(5.532)	(2.314)	(1.694)
Nondurable, events (e.g. weddings)	-11.296	-10.523	-6.714	-5.088
	(7.244)	(7.901)	(4.389)	(4.415)
Nondurable, gifts/transfers made	-1.056**	-0.750*	-0.399	-0.312
	(0.492)	(0.435)	(0.302)	(0.258)
Nondurable, other	-12.514*	-9.228	-4.384	-1.942
	(6.666)	(7.793)	(2.648)	(2.542)
Durable	-10.499	-2.332	1.041	5.100
	(11.466)	(9.692)	(4.868)	(4.722)
B. Income (INR)				
Annual income	-12.899	-3.993	9.291	5.876
	(22.414)	(10.731)	(10.264)	(6.621)
Value of gifts/transfers received	-0.780*	-0.465	-0.315	-0.246
	(0.411)	(0.416)	(0.302)	(0.319)
C. Financial activity (INR)				
Savings	-1.466	-1.172	-0.732	-1.393*
	(1.398)	(1.280)	(0.576)	(0.458)
Lending	2.422	-0.829	0.001	0.108
	(2.043)	(1.666)	(0.900)	(0.841)
Borrowing	-14.015	5.536	-6.175	-1.459
	(13.157)	(10.379)	(6.467)	(5.274)
Individual fixed effects	No	Yes	No	Yes
Control for shadow payout	Yes	Yes	Yes	Yes
Includes treatment expansion villages	No	No	Yes	Yes
Cragg-Donald F Stat.	471.22	280.58	85.71	71.39
N	9441	9441	11397	11397

Note: This table shows IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed-effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects. Village-level IV regressions use village-level treatment status interacted with shadow payout amount as an instrument for purchasing insurance policies (dummy); individual-level IV regressions use individual-level marketing treatment status interacted with shadow payout amount to instrument the number of insurance policies purchased. Here, shadow payout amounts correspond to the payout that would have been received, had insurance been purchased and is a proxy for productivity shocks. The sample is restricted to the households who were surveyed and reported outcome data each year from the sample used to study household outcomes. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Data on financial activity, income and consumption is winsorised at the top one per cent, reported in INR and corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A10: Impact of insurance coverage on investments and agricultural outcomes

Intersection of sample used to study agricultural outcomes/investments and household outcomes

3	Village IV (1)	Village (2)	Individual (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy	No. of policy	
Total revenues (INR)	-2759.09	-3961.55*	-851.77	-744.45*
	(3101.72)	(1842.34)	(971.64)	(408.38)
Agricultural revenues (INR)	-2815.94	-4013.17*	-895.81	-783.30*
(from cultivation of own plot)	(3101.28)	(1841.11)	(971.49)	(408.07)
Financial revenues (INR)	56.85***	51.62***	44.03***	38.85***
	(6.09)	(5.97)	(9.55)	(11.30)
Total costs (INR)	-536.58	-303.32	-299.18	-422.31**
	(1153.38)	(672.40)	(384.40)	(204.67)
Agricultural costs (INR)	-579.34	-348.10	-316.46	-432.98**
	(1153.13)	(672.53)	(384.44)	(204.76)
Irrigation costs (INR)	-49.03	356.82**	-15.73	-13.92
	(174.73)	(113.14)	(51.98)	(25.55)
Hired labour costs (INR)	-53.01	-323.74	-105.77	-234.59**
	(625.47)	(356.16)	(197.28)	(117.90)
Other input costs (INR)	-477.30	-381.18	-194.95	-184.47*
	(459.09)	(449.52)	(162.67)	(95.44)
Total labour days	8.10	26.26	3.38	0.89
	(10.52)	(16.81)	(2.74)	(1.98)
Hired labour days	0.86	6.83	-0.04	-0.74
	(3.22)	(8.23)	(0.81)	(0.89)
Family labour days	8.06	18.42**	3.48	1.43
	(7.61)	(9.36)	(2.12)	(1.44)
Financial costs (INR)	42.76***	44.78***	17.28***	10.67***
	(2.17)	(3.12)	(1.07)	(1.46)
Total profit (INR)	-2222.52	-	-552.59	-322.14
	(2017.85)	(1576.19)	(640.37)	(345.30)
Agricultural profit (INR)	-2236.60	-	-579.35	-350.32
(from cultivation of own plot)	(2017.77)	(1574.67)	(640.31)	(344.74)
Fraction of high-yielding variety crops grown	-0.01	-0.04	0.00	-0.01
	(0.05)	(0.04)	(0.02)	(0.01)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.02)	(0.01)	(0.01)	(0.00)
Area cultivated (ha)	0.06	0.05	0.01	-0.02
	(0.16)	(0.14)	(0.04)	(0.02)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	613.77	102.89	104.11	79.51
N	5175	5175	5175	5175

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the intersection of households who were used to study both agricultural outcomes and household outcomes, and who were surveyed and reported outcome data each year. Treatment expansion group villages are not included in this sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A11: Heterogeneous effects of insurance coverage on agricultural outcomes and investments

Intersection of sample used to study agricultural outcomes/investments and household outcomes

Dependent variable	FinLit-Low (1)	FinLit-High (2)	Educ-low (3)	Educ-high (4)	HasPlot- (5)	HasPlot- (6)	Wealth- (7)	Wealth-High (8)
Total revenues (INR)	109.44	-831.28**	-273.85	-1764.14*	-2028.19**	530.95	285.71	-1536.43**
	(376.29)	(374.88)	(395.94)	(916.14)	(909.83)	(310.28)	(404.83)	(716.73)
Agricultural revenues (INR)	-175.95	-850.32**	-411.83	-1645.26**	-1958.84**	355.94	291.13	-1504.87***'
(from cultivation of own plot)	(329.54)	(373.49)	(378.95)	(745.55)	(783.95)	(250.72)	(382.92)	(576.90)
Financial revenues (INR)	42.96***	19.04*	38.32**	35.42**	47.45**	33.42***	19.69***	52.24***
	(14.06)	(11.23)	(14.07)	(16.07)	(23.96)	10.90	(6.16)	(18.10)
Total costs (INR)	-438.90***	-193.51	-290.23	-2464.06*	-2203.07*	-80.86	-269.50**	-1952.84
	(169.98)	(209.99)	(226.52)	(2007.36)	(1540.23)	(109.72)	(131.68)	(1554.61)
Agricultural costs (INR)	-453.35***	-198.55	-301.34	-574.78*	-737.93*	-92.37	-283.09**	-496.19
	(166.78)	(306.67)	(218.17)	(317.51)	(385.67)	(107.37)	(129.95)	(311.51)
Irrigation costs (INR)	-27.64	-10.68	-33.60	14.73	-5.67	-12.43	-15.95	-14.15
	(23.98)	(35.75)	(33.09)	(39.39)	(48.92)	(16.36)	(20.80)	(39.63)
Hired labour costs (INR)	-287.59***	-80.20	-157.17	-322.47**	-445.71*	-39.73	-161.79**	-279.44
	(99.85)	(135.08)	(153.76)	(159.72)	(243.34)	(70.33)	(77.22)	(186.08)
Other input costs (INR)	-138.12*	-129.03	-110.58	-267.05*	-286.55	-40.21	-105.36*	-202.61
	(73.24)	(98.03)	(85.75)	(157.57)	(177.56)	(39.11)	(60.96)	(136.02)
Total labour days	-1.10	4.50	0.76	0.54	0.65	0.33	-1.14	2.97
	(2.25)	(3.11)	(2.02)	(3.54)	(4.74)	(0.89)	(2.61)	(2.76)
Hired labour days	-1.00	0.22	-1.23	0.36	-1.88	-0.35	-1.09	0.04
	(0.95)	(1.51)	(1.01)	(1.59)	(1.77)	(0.38)	(0.96)	(1.24)

Family labour days	-0.15	3.72*	1.97	-0.50	1.96	0.74	-0.24	2.65
	(1.55)	(2.06)	(1.57)	(2.22)	(3.65)	(0.53)	(1.77)	(2.17)
Financial costs (INR)	12.38***	5.03*	10.15**	11.39***	8.13***	12.66***	13.35***	9.18***
	(1.75)	(1.41)	(1.65)	(2.36)	(1.73)	(1.84)	(1.77)	(1.73)
Total profit (INR)	526.47	-637.77**	-77.69	743.68*	134.14	545.44*	522.87	413.58
	(407.08)	(306.67)	(392.22)	(1381.97)	(1218.35)	(294.67)	(393.54)	(1074.78)
Agricultural profit (INR)	277.39	-651.77**	-110.49	-1070.48**	-1220.92	448.31*	574.22	-1008.67**
(from cultivation of own plot)	(330.10)	(306.60)	(362.19)	(532.38)	(713.49)	(247.59)	(386.60)	(455.20)
Fraction of high-yielding variety crops	-0.01	0.00	0.00	-0.02	-0.01	0.00	0.01	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fraction of cash crops grown	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Area cultivated (ha)	-0.03	-0.01	-0.03	-0.02	-0.03	-0.01	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)	(0.02)	(0.02)
N	3060	2115	2916	2259	2070	3105	2592	2583

Note: This table reports heterogeneity in the main estimates using individual-level IV regressions with household fixed effects. The samples shown are split at the median level of financial literacy, education and wealth as well as a sample split between households with and without plots of land. Individual-level marketing treatment statuses for each year are used to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported outcome data each year for both agricultural outcomes and household outcomes. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. See Appendix B2 for a detailed description of outcome variables. INR1 = USD0.016. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A12: Impact of number of years of insurance coverage on agricultural outcomes and investment

Intersection of sample used to study agricultural outcomes/investments and household outcomes

Dependent variable	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Total revenues (INR)	-441.25	-528.21**	-182.45	-148.23
	(535.904)	(266.268)	(281.396)	(123.289)
Agricultural revenues (INR)	-450.80	-537.12**	-190.55	-154.90
	(535.881)	(265.973)	(281.337)	(123.185)
Financial revenues (INR)	9.55***	8.91***	8.11***	6.67***
	(1.093)	(1.049)	(1.087)	(1.206)
Total costs (INR)	-63.40	101.73	-55.42	-92.45*
	(211.560)	(148.738)	(100.156)	(54.178)
Agricultural costs (INR)	-71.11	92.97	-59.48	-94.42*
	(211.512)	(148.746)	(100.164)	(54.249)
Irrigation costs (INR)	-2.80	115.94***	-4.33	0.47
	(32.942)	(35.788)	(12.951)	(13.437)
Hired labour costs (INR)	3.51	-4.79	-5.43	-38.11
	(118.671)	(84.639)	(50.468)	(28.531)
Other input costs (INR)	-71.82	-18.18	-49.72	-56.78*
	(81.035)	(101.257)	(44.572)	(33.211)
Total labour days	2.30	7.80	1.24	-0.03
	(2.981)	(5.003)	(1.142)	(1.507)
Hired labour days	0.24	2.03	0.04	-0.35
	(0.916)	(2.449)	(0.307)	(0.643)
Family labour days	2.29	5.47**	1.24	0.13
	(2.153)	(2.781)	(0.899)	(0.908)
Financial costs (INR)	12.15***	13.30***	7.44***	5.07***
	(0.590)	(1.020)	(0.443)	(0.671)
Total profit (INR)	-377.86	-629.94**	-127.03	-55.78
	(340.505)	(304.433)	(188.913)	(119.935)
Agricultural profit (INR)	-379.69	-630.09**	-131.07	-60.48
(from cultivation of own plot)	(340.556)	(304.114)	(188.868)	(119.731)
Fraction of high-yielding variety crops grown	0.00	-0.01	0.00	0.00
	(0.015)	(0.011)	(0.008)	(0.005)
Fraction of cash crops grown	0.00	0.00	0.00	0.00
	(0.005)	(0.003)	(0.003)	(0.002)
Area cultivated (ha)	0.02	0.02	0.01	0.00
	(0.047)	(0.041)	(0.023)	(0.010)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1484.29	312.45	169.41	148.88
N	5175	5175	5175	5175

Note: This table reports the impact of the number of policy-years of insurance coverage on agricultural outcomes and investments using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with HH fixed- effects; (3) individual-level IV; (4) individual-level IV with HH fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported agricultural outcomes and household outcomes each year. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), data misplaced in 2008 and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. Agricultural revenues, costs, profits and labour days are winsorised at the top (one per cent). All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table A13: Impact of insurance coverage on household outcomes

Intersection of sample used to study agricultural outcomes/investments and household outcomes

Dependent variable	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-1878.454	-2663.259	1238.586	845.482
	(5741.300)	(7312.617)	(1981.116)	(1531.119)
Nondurable, food	1119.568	1216.011	420.560	-87.445
	(1554.692)	(1575.828)	(449.088)	(231.422)
Nondurable, events (e.g. weddings)	-806.116	-2722.242	122.924	65.252
	(1058.766)	(2702.244)	(523.507)	(527.039)
Nondurable, gifts/transfers made	-65.781	-14.792	0.839	4.914
	(81.910)	(139.370)	(40.873)	(35.955)
Nondurable, other	-666.895	-2684.590	-153.414	-336.885
	(1409.634)	(3321.504)	(503.524)	(550.125)
Durable	-1137.008	256.468	686.450	939.878
	(1781.201)	(1833.267)	(753.883)	(680.267)
B. Income (INR)				
Annual income	1384.931	936.980	1577.452	596.581
	(5255.125)	(3731.898)	(1840.132)	(1011.807)
Value of gifts/transfers received	-62.230	-31.372	-32.331	-41.636
	(60.829)	(103.857)	(23.337)	(23.927)
C. Financial activity (INR)				
Savings	177.716	100.686	123.831	34.985
	(401.518)	(394.301)	(173.542)	(135.268)
Lending	130.517	339.939	-40.662	-103.814
	(296.108)	(558.174)	(127.240)	(97.366)
Borrowing	570.821	4766.705	-54.985	-180.660
	(3477.866)	(3574.834)	(1142.281)	(869.156)
D. Well-being				
Food sufficiency for child	-0.012	0.010	-0.003	0.001
	(0.009)	(0.032)	(0.003)	(0.004)
Financial situation (s.d. units)	-0.037	-0.043	-0.007	-0.008
	(0.058)	(0.143)	(0.020)	(0.017)
Good things happen (s.d. units)	0.007	-0.171	0.004	-0.001
	(0.033)	(0.111)	(0.017)	(0.018)
Control over life (s.d. units)	0.037	0.128	0.021	0.027
	(0.036)	(0.105)	(0.015)	(0.017)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	613.773	102.887	104.110	79.505
Includes expansion group households	No	No	Yes	Yes
N	5175	5175	5175	5175

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the households who were surveyed and reported agricultural and household outcomes every year. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013), treatment groups and households that had to be surveyed twice in 2011. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. All outcome variables reported in INR have been corrected for inflation (2005 prices) using the rural labourers' CPI. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1%level, respectively.

Table A14: Marketing instruments

Dataset variable name	Description	2006	2007	2008	2009	2010	2011	2012	2013
discount	Fixed price discount		X	X					
groupT	Group promotion flyer (omitted cat. individual flyer)		X						
muslimT	Muslim imagery flyer (omitted cat. neutral flyer)		X						
hinduT	Hindu imagery flyer (omitted cat. neutral flyer)		X						
ppayT	Payout '2/10' video (omitted cat. '8/10' video)		X						
pframeT	Safety frame video (omitted cat. vulnerability video)		X						
rebate_50percentoff	Buy 1 get 1 50% off coupon				X				
rebate2_1free	Buy 2 get 1 free coupon				X				
rebate3_1free	Buy 3 get 1 free coupon				X				
flyer_hyv	HYV complementarity flyer				X				
assigned_risk_ws	Risk worksheet				X	X			
bdmperc	BDM offer (as percentage of list premium)					X	X	X	X	X
disc4game	BDM game for a package of 4 policies					X	X	X	X	X
fourbdmperc	BDM offer X offered BDM for 4 policies					X	X	X	X	X
assigned_video_test	Peer group video					X			
assigned_drought_flyer	Drought flyer (omitted cat. bounty flyer)					X			
assigned_subsidies_flyer	Subsidies flyer					X			
assigned_loan	BDM game (loan bundling)					X			

Note: This table lists all of the marketing variables and indicates the years in which they were implemented experimentally. A more detailed description of the marketing interventions can be found in Appendix B1. In regressions, all instruments are interacted with a dummy for the year in which its marketing experiment was active.

Table A15: Weather station assignment by village-year

Villageno	2006		2007		2008		2009		2010		2011		2012		2013	
	Treat	Weather station	Treat	Weather station	Treat	Weather station	Treat	Weather station	Treat	Weather station	Treat	Weather station	Treat	Weather station	Treat	Weather station
101	0	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
102	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
103	0	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
104	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
105	1	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Santalpur	1	Santalpur
106	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
107	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
108	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
109	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
110	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
111	0	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
112	1	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
113	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
114	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
115	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
116	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
117	1	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
119	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
120	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
121	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
122	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
123	0	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
124	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
125	1	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
126	0	Pata	0	Pata	0	Pata	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur	0	Radhanpur
127	1	Pata	1	Pata	1	Pata	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur	1	Radhanpur
128	0	Pata	0	Pata	0	Pata	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur	0	Santalpur
129	0	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
130	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
131	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
132	1	Pata	1	Pata	1	Pata	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur	1	Santalpur
133	1	Pata	1	Pata	1	Pata	1	Sami	1	Sami	1	Sami	1	Sami	1	Sam
134	1	Pata	1	Pata	1	Pata	1	Sami	1	Sami	1	Sami	1	Sami	1	Sam

| Villageno | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 |
	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station
202	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
203	1	Anand	1	Anand	1	Anand	1	Umreth	1	Umreth	1	Umreth	1	Umreth	1	Umreth
204	0	Anand	0	Anand	0	Anand	0	Petlad	0	Petlad	0	Petlad	0	Petlad	0	Petlad
205	0	Anand	0	Anand	0	Anand	0	Petlad	0	Petlad	0	Petlad	0	Petlad	0	Petlad
206	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
207	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
208	1	Anand	1	Anand	1	Anand	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad
209	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
210	1	Anand	1	Anand	1	Anand	1	Borsad	1	Borsad	1	Borsad	1	Borsad	1	Borsad
211	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
212	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
213	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
215	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
216	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
218	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
219	0	Anand	1	Anand	1	Anand	1	Anklav	1	Anklav	1	Anklav	1	Anklav	1	Anklav
220	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Nadiad	1	Nadiad
221	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
222	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
223	0	Anand	0	Anand	0	Anand	0	Anklav	0	Anklav	0	Anklav	0	Anklav	0	Anklav
225	0	Anand	0	Anand	0	Anand	0	Petlad	0	Petlad	0	Petlad	0	Petlad	0	Petlad
226	0	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
227	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
228	1	Anand	1	Anand	1	Anand	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad
229	0	Anand	1	Anand	1	Anand	1	Anklav	1	Anklav	1	Anklav	1	Anklav	1	Anklav
232	0	Anand	0	Anand	0	Anand	0	Nadiad	0	Nadiad	0	Nadiad	0	Nadiad	0	Nadiad
233	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand	1	Anand
234	0	Anand	0	Anand	0	Anand	0	Umreth	0	Umreth	0	Umreth	0	Umreth	0	Umreth
235	0	Anand	0	Anand	0	Anand	0	Petlad	0	Petlad	0	Petlad	0	Petlad	0	Petlad
236	1	Anand	1	Anand	1	Anand	1	Anklav	1	Anklav	1	Anklav	1	Anklav	1	Anklav
237	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
238	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
239	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
240	0	Anand	1	Anand	1	Anand	1	Umreth	1	Anand	1	Anand	1	Anand	1	Anand
241	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
242	0	Anand	1	Anand	1	Anand	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad	1	Nadiad
244	1	Anand	1	Anand	1	Anand	1	Petlad	1	Petlad	1	Petlad	1	Petlad	1	Petlad
245	0	Anand	0	Anand	0	Anand	0	Umreth	0	Umreth	0	Umreth	0	Umreth	0	Umreth
247	1	Anand	1	Anand	1	Anand	1	Anklav	1	Anklav	1	Anklav	1	Anklav	1	Anklav
248	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand	0	Anand
249	1	Anand	1	Anand	1	Anand	1	Khambh	1	Khambhat	1	Khambhat	1	Khambhat	1	Khambhat
250	1	Anand	1	Anand	1	Anand	1	Khambh	1	Khambhat	1	Khambhat	1	Khambhat	1	Khambhat

Villageno	2006		2007		2008		2009		2010		2011		2012		2013
	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station	Treat	Weather Station
301	0	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Sanand	1	Sanand	1	Sanand	1	Sanand	1	Sanand
303	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
304	0	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
305	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Sanand	0	Sanand	0	Sanand	0	Sanand	0	Sanand
306	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
307	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
308	0	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
311	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Sanand	1	Sanand	1	Sanand	1	Sanand	1	Sanand
312	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
314	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
315	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
317	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
318	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Sanand	0	Sanand	0	Sanand	0	Sanand	0	Sanand
319	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
320	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
321	0	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
322	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
323	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
324	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Sanand	0	Sanand	0	Sanand	0	Sanand	0	Sanand
325	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
326	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
327	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
328	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Sanand	0	Sanand	0	Sanand	0	Sanand	0	Sanand
330	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
331	1	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
332	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
333	0	Ahmedabad	1	Ahmedabad	1	Ahmedabad	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi	1	Daskroi
334	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
335	0	Ahmedabad	0	Ahmedabad	0	Ahmedabad	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi	0	Daskroi
336							1	Dhandhuka	1	Dhandhuka	1	Dhandhuka	1	Dhandhuka	1	Dhandhuka
337		Treatment expansion group villages were not included in these years					1	Dhandhuka	1	Dhandhuka	1	Dhandhuka	1	Dhandhuka	1	Dhandhuka
338							1	Barvala	1	Barvala	1	Barvala	1	Barvala	1	Barvala
339							1	Barvala	1	Barvala	1	Barvala	1	Barvala	1	Barvala

Note: This table lists the weather station assignment by village-year for both treatment and control villages. Control village weather-assignment is done based on geographical proximity since respondents in this group were never offered insurance. Treatment expansion villages were offered insurance every year from 2009 on, and were not part of the sample prior to this year. The village was offered insurance if 'Treat' equals 1, and was not offered insurance if 'Treat' equals 0. The policies were underwritten by ICICI/Lombard in 2006 and 2008, IFFCO-Tokio in 2007, and AICI in 2009–2013. In the first three years, weather information was recorded at district-level weather stations, following which assignment was done at the block level.

Table A16: Tests for attrition

PANEL A: Testing for differential attrition according to treatment group assignment

		Village	Individual	Village	Individual	Village	Individual	Village	Individual
Sample to study household outcomes (T8)									
	Pval	0.638	0.004	0.554	0.001	0..861	0.852	0.716	0.809
	N	10927	13137	10927	13137	10927	13137	10927	13137
Ever attrited dummy	F-stat	0.21	2.27	0.43	67.56	0.45	17.87	0.8	16.95
	Pval	0.808	0.001	0.808	0.000	0.798	0.001	0.849	0.005
	N	12904	15181	12904	15181	12904	15181	12904	15181
Sample to study investment and agricultural outcomes (T3)									
Year-by-year attrition (exit dummy) F-stat		0.220	3.100	0.360	71.670	0.070	0.270	0.400	0.020
	Pval	0.802	0.000	0.837	0.000	0.967	0.874	0.940	0.999
	N	8276	8276	8276	8276	8276	8276	8276	8276
Ever attrited dummy	F-stat	1.400	1.910	2.780	52.080	3.010	4.180	3.930	4.150
	Pval	0.252	0.011	0.249	0.004	0.222	0.123	0.269	0.246
	N	12904	12904	12904	12904	12904	12904	12904	12904

PANEL B: Testing for differential attrition according to baseline characteristics

		OLS	Probit
Sample to study household outcomes (T8)			
	Pval	0.783	0.785
	N	15173	15173
Sample to study investment and agricultural outcomes (T3)			
Ever attrited dummy	F-stat	5.480	36.440
	Pval	0.000	0.000
	N	12895	12729

		OLS		Probit		IV		IV Probit	
		Village	Individual	Village	Individual	Village	Individual	Village	Individual
Year-by-year attrition (exit	F-stat	1.550	1.900	13.590	77.060	15.450	12.020	37.260	34.460
	Pval	0.132	0.006	0.193	0.000	0.117	0.362	0.007	0.032
	N	10926	13136	10926	13136	10926	13136	10926	13136
Ever attrited dummy	F-stat	1.080	1.800	10.580	70.770	11.090	22.400	31.540	44.100
	Pval	0.383	0.010	0.392	0.001	0.351	0.022	0.035	0.002
	N	12896	15173	12896	15173	12896	15173	12896	15173
Sample to study investment and agricultural outcomes (T3)									
Year-by-year attrition (exit	F-stat	3.160	3.870	27.420	126.320	31.070	31.620	41.120	38.960
	Pval	0.002	0.000	0.002	0.000	0.001	0.001	0.002	0.005
	N	8275	8275	8275	8275	8275	8275	8275	8275
Ever attrited dummy	F-stat	4.400	5.490	36.480	172.120	45.980	46.310	67.570	62.370
	PPval	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	12895	12895	12729	12729	12895	12895	12729	12729

Note: This table reports the F-statistics and associated p-values from attrition bias tests for the samples used in both Table 3 and Table 8. We successfully regress attrition dummies on three sets of covariates: i) treatment indicators; ii) baseline characteristics; and iii) a combination of both. We use two attrition dummies: i) year-by-year attrition (equals 1 in the year of attrition, 0 before and is missing thereafter); and ii) an indicator for ever having attrited from the sample. The regressions on treatment indicators include treatment group dummies (at the village level or village plus individual level depending on the specification), a dummy for villages resurveyed in 2011 at the village level, and year dummies. The F-stat is the result from a test of joint significance of the treatment indicators only. Thepanel baseline characteristics regressions include controls for age, gender, education, wealth index, household size, real consumption, plot size in hectares, and a dummy for growing cash crops. When missing, we set these controls to 0 and include a set of dummies equal to 1 if a covariate was missing. The F-stat test for joint significance of the baseline characteristics only. When using a combination of both sets of covariates, we include all treatment indicators and baseline characteristics in the joint significance test. We present reduced-form OLS and probit specifications, as well as IV specifications for both models. The IV regressions use randomly assigned treatment indicators (successively at the village and individual level) to instrument the (endogenous) number of policy units purchased. One household is dropped from all observations due to missing consumption data. The T3 sample does not include the treatment expansion villages. The treatment expansion villages are excluded from the village-level regressions since all respondents were offered weather insurance. Standard errors are clustered at the village level and corrected for heteroskedasticity.

Table A17a: Impact of insurance purchase on household outcomes (analogous to T8)

Corrected for potential attrition bias using predicted attrition from probit regression of year-by-year attrition dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-1507.985	-2298.101	-1308.227	-1631.634
	(4321.122)	(6000.215)	(1540.159)	(1137.948)
Food	456.437	1504.043	-115.666	-43.325
	(1190.433)	(1461.608)	(317.724)	(195.490)
Non-food	-196.187	-1438.331	-203.026	-192.125
	(1122.766)	(2348.571)	(447.680)	(422.170)
Durables	-553.265	1135.089	141.854	105.695
	(1302.868)	(1369.506)	(587.402)	(462.003)
Events	-918.337	-3354.747*	-732.846	-966.144**
	(811.504)	(1882.444)	(476.993)	(472.282)
Value of gifts/transfers made	-57.566	-83.383	14.374	-10.248
	(78.855)	(119.592)	(39.618)	(28.494)
B. Income (INR)				
Annual income	923.262	3063.928	-234.198	-2.067
	(3898.837)	(2834.540)	(1466.965)	(868.404)
Value of gifts/transfers received	-88.516*	-117.244	-58.086**	-70.871***
	(52.874)	(101.382)	(28.823)	(25.614)
C. Financial activity (INR)				
Savings	-74.783	-129.447	15.767	-64.314
	(289.447)	(260.449)	(149.341)	(89.262)
Lending	653.676	373.215	-70.803	-173.106*
	(466.789)	(336.926)	(93.039)	(104.660)
Borrowing	-2178.506	1002.621	-781.968	-163.89
	(2668.201)	(2596.544)	(954.071)	(663.503)
D. Well-being				
Food sufficiency for child	-0.013***	-0.009	-0.003*	-0.001
	(0.005)	(0.024)	(0.002)	(0.003)
Financial situation (s.d. units)	-0.032	-0.042	-0.021	-0.01
	(0.039)	(0.079)	(0.015)	(0.013)
Good things happen (s.d. units)	0.038	-0.049	0.028**	0.015
	(0.025)	(0.104)	(0.013)	(0.015)
Control over life (s.d. units)	0.03	0.182**	-0.003	0.015
	(0.023)	(0.079)	(0.013)	(0.015)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1307.644	383.347	132.87	114.984
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A17b: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from IV probit regression of year-by-year attrition dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-140.292	-1054.83	-371.951	-656.329
	(2043.631)	(3197.368)	(894.396)	(789.363)
Food	389.83	755.032	35.066	-61.758
	(516.138)	(757.085)	(185.929)	(133.074)
Non-Food	-297.257	-812.246	-268.007	-287.489
	(503.497)	(1206.528)	(254.035)	(261.729)
Durables	-129.997	667.407	52.4	152.091
	(662.906)	(757.718)	(322.744)	(263.947)
Events	130.949	-1528.789	-116.227	-368.097
	(440.784)	(1026.667)	(268.232)	(299.991)
Value of gifts/transfers made	-8.901	-46.301	-6.295	-10.344
	(36.209)	(62.361)	(18.481)	(15.709)
B. Income (INR)				
Annual income	2141.884	2063.926	941.038	667.912
	(1880.606)	(1497.416)	(803.707)	(485.873)
Value of gifts/transfers received	-36.458	-73.529	-31.629***	-38.636***
	(23.657)	(52.959)	(12.144)	(14.462)
C. Financial activity (INR)				
Savings	67.045	-26.314	1.18	-18.62
	(160.528)	(142.131)	(74.599)	(55.968)
Lending	396.935	162.198	36.079	-84.056
	(277.162)	(154.805)	(105.564)	(56.658)
Borrowing	-496.071	494.484	-479.124	-487.737
	(1224.923)	(1378.537)	(587.678)	(474.679)
D. Well-being				
Food sufficiency for child	-0.006**	-0.007	-0.002*	-0.001
	(0.002)	(0.012)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.003	-0.021	-0.009	-0.009
	(0.018)	(0.042)	(0.009)	(0.009)
Good things happen (s.d. units)	0.014	-0.025	0.009	0.004
	(0.014)	(0.054)	(0.008)	(0.010)
Control over life (s.d. units)	0.025**	0.106**	0.009	0.018*
	(0.012)	(0.042)	(0.008)	(0.010)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	2643.847	586.489	317.548	239.045
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F- stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A18a: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from probit regression of year-by-year attrition dummy on treatment indicators and baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-3179.008	-6696.628	-1533.839	-1895.822
	(4807.550)	(9512.957)	(1741.778)	(1372.009)
Food	503.532	2140.607	-99.365	2.876
	(1222.657)	(1499.494)	(335.023)	(208.043)
Non-Food	-863.056	-3860.258	-419.229	-448.632
	(1411.444)	(3680.218)	(510.833)	(487.877)
Durables	-461.042	971.322	410.304	309.979
	(1289.204)	(1552.978)	(639.552)	(535.886)
Events	-1834.38	-6108.596*	-930.221	-1185.05**
	(1230.200)	(3222.483)	(574.889)	(547.404)
Value of gifts/transfers made	-42.929	-39.247	10.516	-11.959
	(80.726)	(109.553)	(41.022)	(28.632)
B. Income (INR)				
Annual income	1573.21	2977.225	459.56	546.91
	(3785.431)	(2869.867)	(1554.458)	(911.254)
Value of gifts/transfers received	-84.88	-102.674	-53.306*	-64.468**
	(52.335)	(89.375)	(31.593)	(25.865)
C. Financial activity (INR)				
Savings	14.677	91.849	37.792	-19.419
	(287.205)	(321.492)	(152.366)	(101.008)
Lending	514.892	233.772	-52.317	-137.585
	(392.823)	(237.391)	(84.561)	(86.446)
Borrowing	-2381.44	-879.134	-680.278	-100.715
	(2642.550)	(2853.293)	(964.186)	(707.952)
D. Well-being				
Food sufficiency for child	-0.014***	-0.011	-0.003*	-0.001
	(0.005)	(0.024)	(0.002)	(0.003)
Financial situation (s.d. units)	-0.044	-0.102	-0.025	-0.014
	(0.040)	(0.084)	(0.016)	(0.014)
Good things happen (s.d. units)	0.041	-0.035	0.021	0.01
	(0.026)	(0.105)	(0.013)	(0.015)
Control over life (s.d. units)	0.036	0.174**	0.001	0.018
	(0.024)	(0.082)	(0.013)	(0.015)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1280.96	400.409	129.211	111.814
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects, corrected for potential biases due to attrition responding differentially to treatment. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment and baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1= USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A18b: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from IV probit regression of year-by-year attrition dummy on treatment indicators and baseline characteristics

	Village IV (1)	Village IV (2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-952.384	-4626.6	-203.027	-1912.426
	(2267.637)	(5875.920)	(886.089)	(1469.241)
Food	450.145	1173.951	197.86	-8.641
	(545.913)	(773.922)	(204.881)	(133.721)
Non-Food	-746.364	-2575.288	-188.349	-845.642*
	(659.802)	(2226.457)	(238.658)	(494.695)
Durables	-96.832	503.878	250.129	272.687
	(691.889)	(863.777)	(326.661)	(263.997)
Events	-306.678	-3524.651*	-301.271	-969.249
	(524.336)	(2104.640)	(321.126)	(610.276)
Value of gifts/transfers made	-2.684	-22.789	-7.561	-14.455
	(37.431)	(56.018)	(18.368)	(17.316)
B. Income (INR)				
Annual income	2606.853	2003.013	1469.837*	890.508*
	(1873.426)	(1485.854)	(790.196)	(474.271)
Value of gifts/transfers received	-31.602	-63.234	-29.079**	-30.82**
	(24.433)	(46.312)	(11.844)	(14.033)
C. Financial activity (INR)				
Savings	77.994	162.162	101.376	56.819
	(154.862)	(216.976)	(111.115)	(86.839)
Lending	357.655	106.916	30.103	-67.111
	(251.010)	(108.831)	(83.545)	(45.496)
Borrowing	-429.648	-531.806	-441.135	-507.847
	(1214.577)	(1496.288)	(575.700)	(472.940)
D. Well-being				
Food sufficiency for child	-0.006***	-0.008	-0.002**	-0.001
	(0.002)	(0.012)	(0.001)	(0.002)
Financial Situation (s.d. units)	-0.008	-0.06	0	-0.014
	(0.020)	(0.048)	(0.011)	(0.010)
Good things happen (s.d. units)	0.014	-0.017	0.014	0.003
	(0.015)	(0.055)	(0.009)	(0.010)
Control over life (s.d. units)	0.026**	0.109**	0.015	0.026*
	(0.013)	(0.044)	(0.010)	(0.014)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	2550.003	619.519	329.72	250.266
N	9441	9441	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects, corrected for potential biases due to attrition responding differentially to treatment. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment and baseline covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A19a: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from probit regression of year-by-year attrition dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Endogenous variable				
Total revenues (INR)	-671.07	-1683.34*	-70.01	-201.55
	(1743.164)	(984.823)	(600.513)	(198.870)
Agricultural revenues (INR)	-692.66	-1704.38*	-83.76	-213.37
(from cultivation of own plot)	(1743.069)	(983.263)	(600.580)	(198.364)
Financial revenues (INR)	21.59***	21.04***	13.75***	11.82***
	(2.196)	(3.461)	(2.085)	(2.768)
Total Costs (INR)	156.87	365.89	61.07	-145.09
	(701.903)	(634.610)	(257.424)	(100.606)
Agricultural costs (INR)	128.03	332.70	49.18	-151.44
	(701.807)	(634.489)	(257.354)	(100.763)
Irrigation costs (INR)	36.36	392.35***	17.31	2.74
	(99.972)	(112.470)	(32.711)	(18.802)
Hired labour costs (INR)	127.30	-100.78	35.41	-84.92
	(348.662)	(385.987)	(121.189)	(52.436)
Other input costs (INR)	-35.63	41.13	-3.54	-69.26
	(298.601)	(284.327)	(116.783)	(52.596)
Total labour days	6.92	16.93	3.45	0.94
	(9.061)	(13.108)	(2.604)	(1.551)
Hired labour days	1.12	4.04	0.62	-0.26
	(2.889)	(7.787)	(0.788)	(0.812)
Family labour days	6.45	8.71	2.99	1.01
	(6.377)	(6.565)	(1.955)	(0.997)
Financial costs (INR)	48.13***	50.93***	20.48***	11.46***
	(2.714)	(4.179)	(2.123)	(2.260)
Total profit (INR)	-827.94	-2049.23**	-131.08	-56.46
	(1090.201)	(1021.859)	(366.014)	(162.738)
Agricultural pProfit (INR)	-820.69	-2037.09**	-132.93	-61.93
(from cultivation of own plot)	(1090.226)	(1020.093)	(366.085)	(161.844)
Fraction of high-yielding variety crops grown	-0.01	-0.06	0.01	0.00
	(0.051)	(0.047)	(0.018)	(0.008)
Fraction of cash crops grown	0.01	-0.01	0.02	0.01
	(0.017)	(0.013)	(0.010)	(0.006)
Area cultivated (ha)	0.07	-0.10	0.03	-0.01
	(0.140)	(0.131)	(0.043)	(0.010)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	893.67	95.79	89.76	67.29
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by- year attrition) based on treatment covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; Individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F- stats of Cragg Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A19b: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from IV probit regression of year-by-year attrition dummy on treatment indicators

	(1)	(2)	Individual IV (3)	Individual IV (4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-731.48	-1764.55*	-86.72	-260.83
	(1824.040)	(1028.853)	(602.800)	(170.457)
Agricultural revenues (INR)	-753.10	-1785.40*	-103.40	-276.17
(from cultivation of own plot)	(1823.934)	(1027.283)	(603.042)	(170.356)
Financial revenues (INR)	21.63***	20.85***	16.67***	15.35***
	(2.173)	(3.489)	(2.427)	(3.353)
Total costs (INR)	149.37	398.45	75.88	-133.12
	(733.536)	(666.971)	(251.861)	(99.240)
Agricultural costs (INR)	120.09	364.28	64.46	-138.58
	(733.442)	(666.809)	(251.824)	(99.425)
Irrigation costs (INR)	36.61	412.70***	23.39	5.94
	(104.589)	(117.860)	(33.604)	(20.443)
Hired labour costs (INR)	127.75	-97.32	27.46	-100.00*
	(364.607)	(404.929)	(116.744)	(55.225)
Other input costs (INR)	-44.28	48.90	13.62	-44.52
	(311.475)	(298.183)	(113.582)	(47.574)
Total labour days	7.08	17.80	3.97	0.80
	(9.496)	(13.707)	(2.862)	(1.612)
Hired labour days	1.13	4.30	0.47	-0.62
	(3.023)	(8.149)	(0.823)	(0.884)
Family labour days	6.63	9.16	3.62*	1.27
	(6.684)	(6.880)	(2.195)	(1.096)
Financial costs (INR)	48.80***	52.04***	19.75***	10.15***
	(2.762)	(4.363)	(1.482)	(1.703)
Total profit (INR)	-880.85	-2163.01**	-162.61	-127.70
	(1141.418)	(1069.574)	(375.850)	(150.736)
Agricultural profit (INR)	-873.19	-2149.68**	-167.86	-137.59
(from cultivation of own plot)	(1141.435)	(1067.740)	(375.984)	(150.361)
Fraction of high-yielding variety crops grown	-0.02	-0.06	0.00	0.00
	(0.054)	(0.049)	(0.017)	(0.007)
Fraction of cash crops grown	0.01	-0.01	0.01	0.00
	(0.017)	(0.013)	(0.006)	(0.003)
Area cultivated (ha)	0.07	-0.10	0.03	-0.02*
	(0.146)	(0.137)	(0.041)	(0.011)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	856.01	89.82	124.43	89.03
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A20a: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from probit regression of year-by-year attrition dummy on treatment indicators and baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Endogenous variable				
Total revenues (INR)	-671.07	-1683.34*	-70.01	-201.55
	(1743.164)	(984.823)	(600.513)	(198.870)
Agricultural revenues (INR)	-692.66	-1704.38*	-83.76	-213.37
(from cultivation of own plot)	(1743.069)	(983.263)	(600.580)	(198.364)
Financial revenues (INR)	21.59***	21.04***	13.75***	11.82***
	(2.196)	(3.461)	(2.085)	(2.768)
Total costs (INR)	156.87	365.89	61.07	-145.09
	(701.903)	(634.610)	(257.424)	(100.606)
Agricultural costs (INR)	128.03	332.70	49.18	-151.44
	(701.807)	(634.489)	(257.354)	(100.763)
Irrigation costs (INR)	36.36	392.35***	17.31	2.74
	(99.972)	(112.470)	(32.711)	(18.802)
Hired labor costs (IN	127.30	-100.78	35.41	-84.92
	(348.662)	(385.987)	(121.189)	(52.436)
Other input costs (IN	-35.63	41.13	-3.54	-69.26
	(298.601)	(284.327)	(116.783)	(52.596)
Total labour days	6.92	16.93	3.45	0.94
	(9.061)	(13.108)	(2.604)	(1.551)
Hired labour days	1.12	4.04	0.62	-0.26
	(2.889)	(7.787)	(0.788)	(0.812)
Family labour days	6.45	8.71	2.99	1.01
	(6.377)	(6.565)	(1.955)	(0.997)
Financial costs (INR)	48.13***	50.93***	20.48***	11.46***
	(2.714)	(4.179)	(2.123)	(2.260)
Total profit (INR)	-827.94	-2049.23**	-131.08	-56.46
	(1090.201)	(1021.859)	(366.014)	(162.738)
Agricultural profit (INR)	-820.69	-2037.09**	-132.93	-61.93
(from cultivation of own plot)	(1090.226)	(1020.093)	(366.085)	(161.844)
Fraction of high-yielding variety crops grown	-0.01	-0.06	0.01	0.00
	(0.051)	(0.047)	(0.018)	(0.008)
Fraction of cash crops grown	0.01	-0.01	0.02	0.01
	(0.017)	(0.013)	(0.010)	(0.006)
Area cultivated (ha)	0.07	-0.10	0.03	-0.01
	(0.140)	(0.131)	(0.043)	(0.010)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	893.67	95.79	89.76	67.29
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment and baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A20b: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from IV probit regression of year-by-year attrition dummy on treatment indicators and baseline characteristics

		Village IV	Village IV	Individual IV	Individual IV
		(1)	(2)	(3)	(4)
Endogenous variable		No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)		-1126.59	-1292.29	-201.87	-211.44
		(1735.240)	(821.348)	(564.275)	(149.712)
	Agricultural revenues (INR)	-1147.71	-1312.08	-221.90	-231.70
	(from cultivation of own plot)	(1735.183)	(820.652)	(564.394)	(149.610)
	Financial revenues (INR)	21.12***	19.79***	20.03***	20.27***
		(2.078)	(3.156)	(3.215)	(4.347)
Total costs (INR)		-19.64	526.53	7.08	-128.73
		(691.067)	(407.030)	(229.668)	(80.716)
	Agricultural costs (INR)	-48.68	493.10	-5.00	-135.97*
		(691.012)	(406.688)	(229.659)	(80.699)
	Irrigation costs (INR)	20.45	329.85***	14.49	-0.57
		(99.140)	(99.613)	(30.830)	(19.038)
	Hired labour costs (IN	55.49	96.34	5.76	-84.08*
		(327.521)	(226.355)	(104.849)	(46.162)
	Other input costs (IN	-124.62	66.91	-25.25	-51.32
		(301.006)	(208.825)	(103.872)	(37.526)
	Total labour days	4.32	11.93	3.11	-0.03
		(8.462)	(9.925)	(2.526)	(1.680)
	Hired labour days	1.09	8.58	0.28	-0.60
		(2.847)	(6.461)	(0.713)	(0.819)
	Family labour days	3.80	-1.11	2.92	0.39
		(5.891)	(7.890)	(1.937)	(1.131)
	Financial costs (INR)	48.09***	51.87***	20.59***	12.94***
		(2.753)	(3.844)	(1.455)	(2.276)
Total profit (INR)		-1106.95	-1818.82**	-208.95	-82.71
		(1089.801)	(835.954)	(358.425)	(139.191)
	Agricultural profit (INR)	-1099.03	-1805.18**	-216.90	-95.73
	(from cultivation of own plot)	(1089.784)	(834.726)	(358.393)	(139.005)
Fraction of high-yielding variety crops grown		-0.03	-0.07	0.00	-0.01
		(0.050)	(0.045)	(0.016)	(0.006)
Fraction of cash crops grown		0.01	-0.01	0.01	0.00
		(0.013)	(0.010)	(0.004)	(0.003)
Area cultivated (ha)		0.05	-0.04	0.02	-0.02*
		(0.118)	(0.076)	(0.033)	(0.009)
Individual fixed effects		No	Yes	No	Yes
Cragg-Donald F Stat.		837.00	115.48	131.50	99.26
N		6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for year-by-year attrition) based on treatment and baseline covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A21a: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from probit regression of 'Ever-attrit' dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-3494.364	-1741.328	-1420.545	-1530.304
	(4020.423)	(4838.446)	(1267.513)	(1019.819)
Food	-16.189	356.489	-98.204	-208.319
	(1137.035)	(1088.177)	(269.744)	(156.264)
Non-Food	-892.847	-727.168	-338.991	-240.226
	(1036.143)	(1760.292)	(419.484)	(344.516)
Durables	-1250.577	-243.17	-197.831	-130.774
	(1201.869)	(1462.635)	(429.278)	(361.337)
Events	-894.748	-1834.258	-544.171	-708.906*
	(738.060)	(1579.264)	(345.152)	(408.107)
Value of gifts/transfers made	-64.988	-22.725	-7.512	-9.426
	(68.766)	(92.386)	(25.917)	(18.499)
B. Income (INR)				
Annual income	-324.045	-15.589	531.524	395.621
	(3489.632)	(2903.657)	(1048.111)	(598.940)
Value of gifts/transfers received	-99.629**	-118.813	-48.521***	-51.765**
	(48.829)	(77.656)	(17.453)	(21.861)
C. Financial activity (INR)				
Savings	-151.291	-84.721	-146.693*	-139.375**
	(256.398)	(245.460)	(88.300)	(64.585)
Lending	323.733	-237.078	-61.531	-145.127
	(295.887)	(284.794)	(120.449)	(109.866)
Borrowing	-960.275	2358.846	-731.195	-705.625
	(2549.800)	(2846.690)	(952.540)	(639.974)
D. Well-being				
Food sufficiency for child	-0.008*	-0.001	-0.002	0
	(0.005)	(0.016)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.059	-0.154**	-0.013	-0.01
	(0.039)	(0.077)	(0.013)	(0.010)
Good things happen (s.d. units)	-0.022	-0.099	0.006	0.008
	(0.021)	(0.070)	(0.012)	(0.014)
Control over life (s.d. units)	0.033	0.088	0.001	0.002
	(0.022)	(0.058)	(0.011)	(0.011)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1146.676	182.746	144.735	116.912
N	11397	11397	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of individual treatments. We report the F- stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A21b: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from IV probit regression of 'ever-attrit' dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-2436.885	-1477.25	-937.394	-1106.682
	(2717.168)	(3668.027)	(1004.184)	(852.779)
Food	4.274	179.218	-64.597	-196.088
	(774.040)	(828.835)	(215.471)	(129.205)
Non-Food	-784.808	-661.275	-337.605	-278.352
	(712.702)	(1355.296)	(306.744)	(274.738)
Durables	-825.831	-129.713	-81.35	-44.533
	(814.225)	(1111.482)	(348.114)	(306.358)
Events	-517.073	-1430.077	-346.431	-484.002
	(500.202)	(1202.670)	(266.312)	(312.192)
Value of gifts/transfers made	-42.732	-21.647	-8.192	-8.694
	(46.698)	(69.887)	(20.329)	(15.609)
B. Income (INR)				
Annual income	409.146	137.03	728.345	468.358
	(2388.635)	(2251.226)	(827.070)	(531.580)
Value of gifts/transfers received	-69.146**	-95.901*	-38.077***	-40.96**
	(32.385)	(58.214)	(13.537)	(17.322)
C. Financial activity (INR)				
Savings	-91.394	-74.369	-87.915	-86.155
	(173.505)	(183.484)	(67.698)	(52.394)
Lending	212.992	-231.443	-34.108	-107.088
	(201.327)	(208.334)	(89.317)	(77.019)
Borrowing	-648.888	1610.223	-563.801	-690.152
	(1715.556)	(2108.294)	(727.419)	(562.478)
D. Well-being				
Food sufficiency for child	-0.006*	-0.002	-0.002	0
	(0.003)	(0.012)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.034	-0.117**	-0.008	-0.011
	(0.026)	(0.058)	(0.011)	(0.009)
Good things happen (s.d. units)	-0.016	-0.071	0.006	0.008
	(0.014)	(0.052)	(0.010)	(0.011)
Control over life (s.d. units)	0.025*	0.066	0.001	0.002
	(0.015)	(0.043)	(0.009)	(0.009)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1477.963	201.068	263.363	202.712
N	11397	11397	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A22: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from probit regression of 'ever-attrit' dummy on baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-3605.961	-2045.806	-1111.818	-1145.108
	(4050.293)	(4877.041)	(1285.350)	(939.103)
Food	-24.295	413.949	-5.816	-137.536
	(1153.745)	(1092.154)	(315.392)	(175.173)
Non-Food	-961.434	-838.722	-333.071	-271.947
	(1030.783)	(1772.569)	(368.315)	(320.548)
Durables	-1280.113	-313.775	-108.438	18.43
	(1227.853)	(1484.063)	(444.481)	(360.153)
Events	-900.469	-1887.834	-467.142	-545.884
	(743.735)	(1552.501)	(351.265)	(388.013)
Value of gifts/transfers made	-59.576	-16.433	-11.533	-6.667
	(70.334)	(90.443)	(27.444)	(21.489)
B. Income (INR)				
Annual income	-424.196	129.581	675.191	627.566
	(3551.990)	(2912.089)	(1161.457)	(658.217)
Value of gifts/transfers received	-99.072**	-113.798	-52.414***	-53.631***
	(49.513)	(75.812)	(17.469)	(18.846)
C. Financial activity (INR)				
Savings	-136.029	-30.35	-93.782	-78.368
	(259.252)	(246.702)	(100.017)	(71.891)
Lending	218.095	-238.682	-12.513	-111.643
	(254.110)	(273.438)	(110.589)	(76.528)
Borrowing	-800.661	2387.453	-881.298	-740.461
	(2656.067)	(2855.076)	(876.152)	(602.452)
D. Well-being				
Food sufficiency for child	-0.009*	-0.002	-0.002	0.002
	(0.005)	(0.016)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.061	-0.155**	-0.016	-0.013
	(0.038)	(0.074)	(0.014)	(0.012)
Good things happen (s.d. units)	-0.023	-0.094	0.005	0.003
	(0.021)	(0.069)	(0.012)	(0.013)
Control over life (s.d. units)	0.035	0.083	0.005	0.007
	(0.022)	(0.057)	(0.011)	(0.012)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1214.87	219.855	211.043	165.723
N	11397	11397	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of individual treatments. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A23a: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from probit regression of 'Ever-attrit' dummy on treatment indicators and baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-4046.404	-2207.594	-1333.94	-1601.836
	(4024.347)	(5141.156)	(1273.183)	(1023.951)
Food	-291.416	47.274	-96.526	-204.671
	(1113.910)	(1147.915)	(278.105)	(160.659)
Non-Food	-1098.222	-800.919	-279.692	-222.419
	(1032.394)	(1769.641)	(429.909)	(348.277)
Durables	-1311.896	-656.358	-144.62	-155.545
	(1221.179)	(1712.215)	(431.897)	(366.169)
Events	-944.268	-1738.512	-580.692*	-737.988*
	(784.066)	(1639.036)	(344.677)	(417.401)
Value of gifts/transfers made	-57.272	-15.603	-1.188	-4.757
	(72.200)	(90.554)	(26.156)	(19.382)
B. Income (INR)				
Annual income	-486.408	-465.499	1019.82	783.872
	(3550.940)	(3277.943)	(1057.655)	(612.504)
Value of gifts/transfers received	-101.491*	-114.647	-47.308***	-49.889**
	(53.744)	(77.096)	(16.803)	(21.792)
C. Financial activity (INR)				
Savings	-151.77	-22.846	-146.473	-131.475**
	(253.419)	(270.790)	(90.239)	(65.918)
Lending	115.932	-327.301	-30.107	-109.539
	(206.736)	(248.378)	(99.433)	(87.026)
Borrowing	-547.319	2489.879	-524.823	-592.569
	(2796.587)	(3294.664)	(877.930)	(614.500)
D. Well-being				
Food sufficiency for child	-0.007*	-0.001	-0.002	0.001
	(0.004)	(0.014)	(0.001)	(0.002)
Financial situation (s.d. units)	-0.072*	-0.177**	-0.01	-0.008
	(0.038)	(0.079)	(0.013)	(0.011)
Good things happen (s.d. units)	-0.033	-0.103*	0.005	0.007
	(0.021)	(0.061)	(0.012)	(0.014)
Control over life (s.d. units)	0.033	0.071	-0.001	-0.002
	(0.022)	(0.051)	(0.011)	(0.011)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	999.348	168.243	181.285	146.503
N	11397	11397	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment and baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A23b: Impact of insurance purchase on household outcomes (analogous to Table 8)

Corrected for potential attrition bias using predicted attrition from IV probit regression of 'ever-attrit' dummy on treatment indicators and baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
A. Consumption (INR)				
Total consumption	-2093.55	-1685.355	-884.621	-1166.377
	(2742.977)	(3796.140)	(1001.736)	(837.275)
Food	68.796	313.592	-48.917	-182.132
	(820.568)	(860.200)	(223.878)	(132.486)
Non-Food	-711.304	-856.849	-300.236	-262.761
	(717.721)	(1398.027)	(310.348)	(269.572)
Durables	-674.976	-162.731	-38.561	-57.404
	(826.614)	(1151.215)	(350.768)	(305.872)
Events	-550.043	-1560.914	-386.259	-517.372
	(506.549)	(1213.117)	(263.677)	(319.174)
Value of gifts/transfers made	-40.407	-13.411	-6.343	-7.157
	(47.360)	(68.608)	(19.962)	(15.800)
B. Income (INR)				
Annual income	842.593	-191.045	1088.711	760.11
	(2387.494)	(2271.930)	(842.061)	(536.653)
Value of gifts/transfers received	-65.837**	-90.15	-37.121***	-39.387**
	(32.433)	(56.382)	(12.726)	(16.978)
C. Financial activity (INR)				
Savings	-61.107	-7.425	-91.454	-85.447
	(169.761)	(183.570)	(68.818)	(53.958)
Lending	169.748	-209.734	-17.17	-81.65
	(174.509)	(197.652)	(73.919)	(61.081)
Borrowing	-500.776	1549.41	-424.874	-578.807
	(1742.415)	(2171.018)	(670.275)	(534.773)
D. Well-being				
Food sufficiency for child	-0.006**	-0.003	-0.002	0
	(0.003)	(0.012)	(0.001)	(0.002)
Financial Situation (s.d. units)	-0.031	-0.121**	-0.006	-0.009
	(0.026)	(0.058)	(0.011)	(0.010)
Good things happen (s.d. units)	-0.017	-0.078	0.005	0.008
	(0.015)	(0.054)	(0.010)	(0.011)
Control over life (s.d. units)	0.026*	0.059	0	-0.001
	(0.015)	(0.045)	(0.009)	(0.009)
Treatment expansion households	No	No	Yes	Yes
Household-fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	1484.803	205.146	262.539	201.93
N	11397	11397	11397	11397

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment and baseline covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not included in the village-level IVs since all respondents were offered weather insurance. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of individual treatments. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A24a: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from probit regression of 'Ever-attrit' dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-619.36	-1083.56	-176.36	-277.47
	(1748.225	(762.238)	(547.063)	(187.360)
Agricultural revenues (INR)	-649.19	-1111.55	-197.56	-295.86
(from cultivation of own plot)	(1748.144	(761.210)	(547.400)	(187.359)
Financial revenues (INR)	29.83***	27.99***	21.20***	18.39***
	(3.075)	(2.540)	(3.616)	(4.468)
Total costs (INR)	141.37	538.27	28.03	-100.67
	(722.080)	(418.635)	(235.775)	(98.114)
Agricultural costs (INR)	114.06	508.71	17.58	-106.51
	(721.980)	(418.597)	(235.810)	(98.350)
Irrigation costs (INR)	35.81	336.09***	20.80	17.67
	(109.942)	(100.304)	(32.710)	(18.784)
Hired labour costs (INR)	133.41	75.26	13.75	-84.58
	(386.094)	(226.993)	(117.059)	(52.787)
Other input costs (INR)	-55.15	97.37	-16.97	-39.61
	(279.325)	(282.135)	(98.831)	(50.760)
Total labour days	9.81	21.49	4.48	1.61
	(10.114)	(13.820)	(2.766)	(1.858)
Hired labour days	2.54	7.51	0.70	-0.30
	(3.243)	(6.785)	(0.835)	(1.046)
Family labour days	7.76	11.25	3.81*	1.62
	(7.059)	(7.784)	(2.148)	(1.204)
Financial costs (INR)	42.86***	44.80***	17.36***	10.44***
	(1.983)	(2.861)	(1.233)	(1.492)
Total profit (INR)	-760.73	-1621.83*	-204.39	-176.80
	(1073.093	(848.362)	(339.121)	(167.972)
Agricultural profit (INR)	-763.25	-1620.26*	-215.14	-189.35
(from cultivation of own plot)	(1073.171	(847.160)	(339.321)	(167.504)
Fraction of high-yielding variety crops grown	-0.01	-0.03	0.00	-0.01
	(0.050)	(0.034)	(0.015)	(0.007)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.017)	(0.010)	(0.005)	(0.003)
Area cultivated (ha)	0.06	0.05	0.02	-0.01
	(0.139)	(0.107)	(0.035)	(0.012)
Individual fixed effects	No	Yes	N	Yes
Cragg Donald F Stat.	759.71	135.97	123.55	95.23
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A24b: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from IV probit regression of 'ever-attrit' dummy on treatment indicators

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-982.98	-1441.28	-243.97	-317.46
	(2383.107)	(982.871)	(718.175)	(217.418)
Agricultural revenues (INR)	-1014.85	-1470.75	-266.81	-337.14
(from cultivation of own plot)	(2382.873)	(981.660)	(718.498)	(217.399)
Financial revenues (INR)	31.86***	29.47***	22.84***	19.68***
	(3.315)	(2.883)	(3.854)	(4.794)
Total costs (INR)	99.86	705.89	1.88	-137.96
	(977.719)	(545.123)	(309.871)	(121.176)
Agricultural costs (INR)	69.55	672.85	-9.27	-143.65
	(977.595)	(545.079)	(309.871)	(121.339)
Irrigation costs (INR)	39.72	442.24***	18.61	20.62
	(147.885)	(130.119)	(42.866)	(23.166)
Hired labour costs (INR)	141.69	102.25	8.19	-108.29*
	(522.344)	(296.745)	(153.846)	(65.716)
Other input costs (INR)	-111.86	128.35	-36.07	-55.98
	(377.848)	(364.619)	(129.427)	(62.014)
Total labour days	12.33	27.93	5.35	1.87
	(13.767)	(17.856)	(3.703)	(2.163)
Hired labour days	3.15	9.79	0.65	-0.59
	(4.401)	(8.799)	(1.041)	(1.190)
Family labour days	9.80	14.52	4.76*	2.13
	(9.616)	(10.054)	(2.864)	(1.396)
Financial costs (INR)	47.38***	49.63***	18.46***	10.30***
	(2.313)	(2.986)	(1.331)	(1.541)
Total profit (INR)	-1082.84	-2147.17**	-245.85	-179.50
	(1469.095)	(1092.883)	(442.048)	(197.400)
Agricultural profit (INR)	-1084.39	-2143.59**	-257.54	-193.49
(from cultivation of own plot)	(1469.066)	(1091.560)	(442.285)	(196.872)
Fraction of high-yielding variety crops grown	-0.02	-0.04	-0.01	-0.01
	(0.069)	(0.043)	(0.020)	(0.008)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.022)	(0.013)	(0.006)	(0.003)
Area cultivated (ha)	0.07	0.06	0.02	-0.01
	(0.185)	(0.139)	(0.047)	(0.014)
Individual fixed effects	No	Yes	No	Yes
Cragg Donald F Stat.	619.72	114.63	87.56	68.06
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of individual treatments. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A25: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from probit regression of 'Ever-attrit' dummy on baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-1127.33	-955.44	-254.30	-203.17
	(1924.275)	(781.222)	(600.975)	(195.687)
Agricultural revenues (INR)	-1159.26	-985.06	-278.78	-224.78
(from cultivation of own plot)	(1924.143)	(780.070)	(601.236)	(195.580)
Financial revenues (INR)	31.93***	29.62***	24.48***	21.61***
	(3.352)	(3.006)	(4.544)	(5.415)
Total costs (INR)	-61.54	589.15	-51.05	-129.90
	(777.401)	(394.925)	(248.337)	(96.919)
Agricultural costs (INR)	-89.91	558.03	-61.77	-135.99
	(777.296)	(394.802)	(248.373)	(97.086)
Irrigation costs (INR)	14.10	352.59***	12.85	14.72
	(120.730)	(106.774)	(33.386)	(19.022)
Hired labour costs (INR)	57.87	151.65	-22.07	-98.31*
	(389.656)	(200.184)	(121.092)	(56.180)
Other input costs (INR)	-161.88	53.79	-52.55	-52.41
	(313.813)	(284.992)	(106.630)	(50.694)
Total labour days	8.25	22.71*	4.21	1.56
	(10.032)	(13.807)	(2.745)	(1.945)
Hired labour days	1.71	8.56	0.48	-0.27
	(3.313)	(6.742)	(0.781)	(1.056)
Family labour days	7.13	10.44	3.78*	1.52
	(6.859)	(7.626)	(2.151)	(1.176)
Financial costs (INR)	44.32***	46.84***	17.73***	10.82***
	(2.103)	(3.030)	(1.222)	(1.508)
Total profit (INR)	-1065.79	-1544.59*	-203.26	-73.27
	(1193.232)	(839.373)	(385.020)	(185.152)
Agricultural profit (INR)	-1069.35	-1543.08*	-217.01	-88.79
(from cultivation of own plot)	(1193.232)	(838.002)	(385.134)	(184.602)
Fraction of high-yielding variety crops grown	-0.02	-0.04	-0.01	-0.01
	(0.051)	(0.035)	(0.015)	(0.007)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.014)	(0.009)	(0.004)	(0.003)
Area cultivated (ha)	0.04	0.04	0.01	-0.01
	(0.127)	(0.084)	(0.034)	(0.012)
Individual fixed effects	No	Yes	No	Yes
Cragg-Donald F Stat.	728.19	132.72	117.86	90.26
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A26a: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from probit regression of 'Ever-attrit' dummy on treatment indicators and baseline characteristics

	Village IV	Village IV	Individual IV	Individual IV
	(1)	(2)	(3)	(4)
Endogenous variable	No. of policy units	No. of policy units	No. of policy units	No. of policy units
Total revenues (INR)	-1097.75	-990.94	-310.17	-259.99
	(1861.075)	(763.870)	(595.768)	(196.931)
Agricultural revenues (INR)	-1127.59	-1018.91	-331.58	-278.64
(from cultivation of own plot)	(1860.971)	(762.886)	(596.082)	(196.954)
Financial revenues (INR)	29.84***	27.97***	21.41***	18.65***
	(2.987)	(2.511)	(3.542)	(4.409)
Total costs (INR)	-45.72	534.88	-33.08	-105.19
	(748.716)	(373.012)	(246.071)	(92.587)
Agricultural costs (INR)	-73.11	505.11	-43.67	-111.28
	(748.620)	(372.947)	(246.106)	(92.809)
Irrigation costs (INR)	14.80	334.12***	16.46	19.33
	(115.239)	(102.032)	(33.151)	(18.635)
Hired labour costs (INR)	64.58	127.87	-14.39	-87.09*
	(375.058)	(189.960)	(117.916)	(49.480)
Other input costs (INR)	-152.49	43.12	-45.73	-43.51
	(303.063)	(269.721)	(106.318)	(50.669)
Total labour days	8.45	21.86*	4.16	1.73
	(9.589)	(13.174)	(2.639)	(1.930)
Hired labour days	1.76	8.16	0.57	-0.10
	(3.131)	(6.479)	(0.776)	(1.086)
Family labour days	7.23	10.10	3.65*	1.51
	(6.597)	(7.215)	(2.069)	(1.153)
Financial costs (INR)	42.93***	45.14***	17.52***	10.75***
	(2.006)	(2.926)	(1.212)	(1.509)
Total profit (INR)	-1052.03	-1525.83*	-277.09	-154.80
	(1155.842)	(813.779)	(377.137)	(173.941)
Agricultural profit (INR)	-1054.49	-1524.02*	-287.91	-167.36
(from cultivation of own plot)	(1155.860)	(812.555)	(377.278)	(173.475)
Fraction of high-yielding variety crops grown	-0.02	-0.03	-0.01	-0.01
	(0.050)	(0.034)	(0.015)	(0.007)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.014)	(0.009)	(0.004)	(0.003)
Area cultivated (ha)	0.05	0.04	0.02	-0.01
	(0.122)	(0.082)	(0.032)	(0.010)
Individual fixed effects	No	Yes	No	Yes
Cragg Donald F Stat.	754.19	137.63	122.70	94.66
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment and baseline covariates (using a probit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Table A26b: Impact of insurance purchase on investment and agricultural outcomes (analogous to Table 3)

Corrected for potential attrition bias using predicted attrition from IV probit regression of 'ever-attrit' dummy on treatment indicators and baseline characteristics

	Village IV (1)	Village IV (2)	Individual (3)	Individual (4)
Endogenous variable	No. of	No. of	No. of policy	No. of
Total revenues (INR)	-1721.58	-1377.63	-426.93	-296.94
	(2561.631)	(995.148)	(790.421)	(235.735)
Agricultural revenues (INR)	-1753.27	-1406.80	-449.82	-316.65
(from cultivation of own plot)	(2561.366)	(993.951)	(790.715)	(235.710)
Financial revenues (INR)	31.69***	29.18***	22.88***	19.72***
	(3.263)	(2.908)	(3.728)	(4.664)
Total costs (INR)	-177.43	708.46	-75.39	-140.77
	(1023.171)	(489.495)	(327.426)	(117.152)
Agricultural costs (INR)	-207.95	674.99	-86.71	-146.67
	(1023.056)	(489.419)	(327.439)	(117.296)
Irrigation costs (INR)	9.90	446.09***	13.50	23.66
	(156.418)	(134.069)	(44.279)	(23.466)
Hired labour costs (INR)	33.97	166.27	-28.00	-112.78*
	(511.210)	(248.153)	(156.351)	(63.437)
Other input costs (INR)	-251.83	62.63	-72.21	-57.55
	(414.541)	(353.594)	(141.308)	(63.215)
Total labour days	10.25	29.12*	4.95	2.09
	(13.056)	(17.221)	(3.570)	(2.268)
Hired labour days	2.06	10.96	0.48	-0.32
	(4.257)	(8.499)	(0.985)	(1.270)
Family labour days	8.91	13.32	4.56	2.02
	(8.991)	(9.452)	(2.777)	(1.336)
Financial costs (INR)	47.63***	50.27***	18.64***	10.57***
	(2.356)	(3.093)	(1.326)	(1.565)
Total profit (INR)	-1544.15	-2086.08**	-351.55	-156.17
	(1598.825)	(1063.422)	(497.823)	(212.393)
Agricultural profit (INR)	-1545.32	-2081.79**	-363.11	-169.99
(from cultivation of own plot)	(1598.722)	(1062.053)	(497.986)	(211.886)
Fraction of high-yielding variety crops grown	-0.03	-0.05	-0.01	-0.01
	(0.069)	(0.045)	(0.020)	(0.008)
Fraction of cash crops grown	0.01	0.00	0.01	0.00
	(0.018)	(0.011)	(0.005)	(0.003)
Area cultivated (ha)	0.05	0.06	0.02	-0.01
	(0.163)	(0.111)	(0.042)	(0.013)
Individual fixed effects	No	Yes	No	Yes
Cragg Donald F Stat.	620.93	115.58	86.17	66.92
N	6300	6300	6300	6300

Note: This table reports the impact of insurance on household outcomes using IV regressions under four different specifications: (1) village-level IV; (2) village-level IV with household fixed-effects; (3) individual-level IV; (4) individual-level IV with household fixed effects. Inverses of individual-by-year predicted probability of attrition (using a dummy for having ever attrited) based on treatment and baseline covariates (using an ivprobit model) are applied as weights. Village-level IV regressions use village-level treatment status as an instrument for the number of insurance policies bought; individual-level IV regressions use individual-level marketing treatment status to instrument the number of insurance policies bought. The sample is restricted to the balanced panel, that is, those households that answer the survey every year and report non-missing outcome variables. The treatment expansion group is not part of the ex-ante sample. Dummy variables are included to control for each year that respondents were offered insurance (2005–2013) and households that had to be surveyed twice in 2011. All outcome variables reported in INR have been corrected for inflation using the rural labourers' CPI. Standard errors, clustered at the village level, are shown in parentheses. INR1 = USD0.016. See Appendix B2 for a detailed description of outcome variables. We report the F-stats of Cragg-Donald tests for weak instruments. The symbols *, ** and *** denote significance at the 10%, 5%, and 1% level, respectively.

Appendix B

B1: Description of marketing interventions

In each year of the experiment, SEWA conducted village-level and door-to-door marketing. As a first step in marketing each year, the SEWA marketing team held a village-level meeting introducing the concept of rainfall insurance, and explaining the details of the policy in the given year. They then went door-to-door, explaining details of insurance and offering various marketing materials. The exact materials varied by year, but generally included promotional videos, informational flyers and discounts. In all years, certain marketing interventions were randomly varied at the household level.

Table A7 reports the household-level marketing variants that were implemented each year. This section elaborates. Table A7 and the description that follows were adapted from the discussion of marketing variables and instruments found in the online appendix of Cole, Stein and Tobacman (2014). There are some differences in the instruments due to the different sample being used, and a correction of some minor errors in the earlier paper. For more details on the 2007 experiments, see Cole *et al.* (2013).

Flyers: In many years, participants received flyers with information about insurance as part of their marketing visits. These flyers incorporated the following manipulations.

> **Drought versus bounty:** Bounty flyers showed farmers standing in front of a bountiful harvest, while drought flyers showed farmers in front of a drought-scorched field.

> **Subsidies:** In 2010, Nabard was subsidising the policies with a 'buy one get one free' offer. Households were told that due to this offer, the expected payout would exceed the list price of INR150.

> **Group versus individual:** The group flyer emphasised the value of the policy for the purchaser's family, while the individual flyer emphasised the value for the individual.

> **Religion (Hindu, Muslim or Neutral):** These flyers provided group identity cues. A photograph on the flyer depicted a farmer in front of a Hindu temple (Hindu treatment), a mosque (Muslim treatment), or a nondescript building. The farmer has a matching first name, which is characteristically Hindu, characteristically Muslim, or neither.

> **High-yielding varieties (HYV complementarity):** HYV flyers explained that rainfall insurance might complement adoption of HYV seed varieties which are sensitive to extreme weather.

> **Risk exposure worksheet:** In this treatment, households were told about the relationship between the size of landholding and amount of insurance coverage. The flyer included a worksheet section, where SEWA's insurance representative worked through simple calculations with the household, in order to recommend the number of units of insurance coverage to buy.

Videos: Some participants were shown videos with information about insurance as part of their marketing visits. These videos had the following manipulations.

> **Payout ('2/10' versus '8/10'):** In the 2/10 treatment, households were told 'the product would have paid out in approximately 2 of the previous 10 years'. In the 8/10 frame they were told that the product would not have paid out in approximately 8 of the previous 10 years.

> **Safety or vulnerability:** The safety treatment described the benefits of insurance in terms of it being something that will protect the household and ensure prosperity. The vulnerability treatment warned the household of the difficulties it may face if it does not have insurance and a drought occurs.

> **Peer(s) group video:** In this treatment, households were shown interviews of farmers in the study who purchased weather insurance in previous years and were happy with the product.

Fixed price discounts: Some households were randomly assigned fixed price discount(s) of either INR5, 15, 30, 60 or 90 on purchase of an insurance policy. These were delivered through a coupon or scratch card.

Discounts for higher coverage: This treatment offered discounts for purchasing multiple policies. The discounts were: 'buy two get one free', 'buy three get one free', or 'buy one get the second 50 per cent off'.

Willingness to Pay / BDM: We used an incentive-compatible Becker-DeGroot-Marschak (BDM) mechanism to measure respondents' willingness to pay (WTP) for insurance policies. Households were randomly assigned to report their maximum WTP for one policy or for a bundle of four policies. Once this 'bid' is recorded, the BDM offer price is revealed. If the offer price turns out to be less than the respondent's bid, the respondent is expected to purchase the policy at the revealed offer price. If the offer turns out to be more than the bid, the respondent doesn't get a chance to purchase the policy at the offer price. Purchases at full price were permitted at any time. In 2010, some households were randomly assigned BDM incentive-compatible elicitation with premium payment due in November (meaning, the insurance premium could be borrowed). More detail on the BDM procedure can be found in Cole *et al.* (2015).

B2: Description of key outcome variables

This section describes the key outcome variables used in the analysis in further detail. All agriculture-related data was collected during the household surveys conducted every year. Data on financial costs is obtained from the administrative marketing data collected by CMF staff during door-to-door marketing visits by SEWA each year, while financial revenues data is taken from administrative data provided by the insurance company. All outcome variables are calculated for the kharif season only every year.

Agricultural revenues are calculated as the product of price and quantity produced for all crops grown in the kharif season, aggregated across plots. If the respondent does not provide the breakdown of price and/or quantity but reports overall value earned from the sale of a crop, we use this value, aggregated across crops, instead. If a respondent

reports 100 per cent loss of output, we assume that they earned zero agricultural revenues. Agricultural revenues are winsorised at the top (one per cent). All agricultural revenues are reported in Indian rupees.

Financial revenues refers to the total payout received from every weather insurance policy owned by a household. Financial revenues are always zero for the control group, since they were never offered insurance. All financial revenues are reported in Indian rupees.

Total revenues is the sum of agricultural revenues and financial revenues, reported in Indian rupees.

Irrigation costs refers to the total reported expenditure of a household on irrigation by year, aggregated across plots. Irrigation costs are winsorised at the top (one per cent). All costs are reported in Indian rupees. (Note that these include both fixed and variable irrigation costs, as the survey questions did not differentiate between the two in the first years of the study.)

Hired labour costs refers to the total reported expenditure on hired labour (wages) for each household by year, aggregated across plots. Hired labour costs are winsorised at the top (one per cent). All costs are reported in Indian rupees.

Other input costs refers to money spent on agriculture (other than on irrigation and hired labour) reported by a household, aggregated across plots. These include pesticides, fertilisers, seed purchases, etc. (Note that they are aggregated here as the survey did not differentiate between these expenditures in the first years of the study). Other input costs are winsorised at the top (one per cent). All costs are reported in Indian rupees.

Agricultural costs is the sum of the reported sub-costs, namely irrigation costs, hired labour costs and other input costs. All costs are reported in Indian rupees.

Financial costs is the total amount spent by a household on insurance policies every year. Financial costs are always zero for the control group, since they were never offered insurance. All costs are reported in Indian rupees.

Total costs is the sum of agricultural costs and financial costs, reported in Indian rupees.

Agricultural profit is the difference between agricultural revenues and agricultural costs, reported in Indian rupees.

Total profit is the difference between total revenues (the sum of agricultural and financial revenues) and total costs (the sum of agricultural and financial costs), reported in Indian rupees.

Hired labour days are calculated as the product of the number of days worked and the total number of hired workers, each kharif season. Hired labour days are winsorised at the top (one per cent).

Family labour days are calculated as the product of the number of days worked and the total number of family members that perform agricultural labour for their own household. Family labour days are winsorised at the top (one per cent).

Total labour days refers to the sum of hired labour days and family labour days.

Fraction of high yielding variety crop grown refers to the reported area cultivated with high-yielding seed varieties, as a fraction of total land cultivated by the household.

Fraction of cash crops grown refers to the fraction of total land cultivated with only cash crops, as reported by a household. Here, cash crops refer to cotton, castor and groundnut.

Area cultivated refers to the total land cultivated by a household, aggregated across plots every year. Here, data on area cultivated is reported in hectares (1 bigha = 0.16 hectare).

Wage revenue from agricultural labour (only in Table A5) is the wage income from hired agricultural labour reported by a household. This is reported for both kharif and rabi seasons, which is why we do not include it in the main regressions. Total revenues and profits are recalculated to include this variable when it is included in regressions.

Savings refers to the total annual balance in all savings accounts of a household in Indian rupees. Information on this outcome variable was not collected in 2007. When reported in rupees, savings are winsorised at the top (one per cent).

Lending refers to the annual value of all loans given out by a household in rupees. Information on this outcome variable was not collected in 2007 and 2008. When reported in levels, lending is winsorised at the top (one per cent).

Borrowing refers to the annual value of all loans incurred by a household in Indian rupees. Information on this outcome variable was not collected in 2007 and 2008. When reported in levels, borrowing is winsorised at the top (one per cent).

Expenditure on food refers to annual expenditure on food including cereals, pulses, milk products, edible oil, vegetables, fruits, nuts, eggs, fish and meat in Indian rupees. Information is collected for the last 30 days, and then annualised. When reported in levels, expenditure on food is winsorised at the top (one per cent).

Expenditure on non-food items includes annual expenditure on tobacco, intoxicants, fuel, light, entertainment, rent, medical expenses, commuting and other miscellaneous goods and services in Indian rupees. Information is collected for the last 30 days, and then annualised. When reported in levels, expenditure on food is winsorised at the top (one per cent).

Expenditure on durables includes annual expenditure on clothing, footwear, furniture, utensils, kitchen equipment, hospitals, television, radio, other household appliances, repair and maintenance, etc. Information was collected for the last six months in the initial years and for both half-year and the entire year in 2011–2013. We apply a scaling factor (ratio of the aggregate annual expenditure on durables and the aggregate half-yearly expenditure on durables for the last three years of the study) to half-yearly

expenditure on durables across all waves. When reported in levels, expenditure on durables is winsorised at the top (one per cent).

Expenditure on events is the annual expenditure on weddings, funerals and festivals. When reported in levels, information on events is winsorised at the top (one per cent).

Gifts/transfer made is the total value of all gifts and transfers that a household makes in the past year in Indian rupees. Information on this outcome variable was not collected in 2007 and 2008. When reported in levels, value of gifts or transfers made is winsorised at the top (one per cent).

Gifts/transfer received is the total value of all gifts and transfers that a household has received in the past year in Indian rupees. Information on this outcome variable was not collected in 2007 and 2008. When reported in levels, value of gifts or transfers received is winsorised at the top (one per cent).

Income refers to annual income earned from agriculture – own cultivation and labour, own-farm enterprise, casual labour, wage labour, non-agricultural enterprises, livelihood projects, employment generation schemes, rent, remittances, interests, dividends, pension and other sources reported in Indian rupees. When reported in levels, income is winsorised at the top (one per cent).

Food sufficiency for children indicates that a child had enough food in the past year, specifically that a child's meal was never cut nor was the size of the meal reduced.

Financial situation reports the standardised value on a scale ranging from 1 to 10 indicating how comfortable the financial situation of the household is, with a value of 10 indicating a very comfortable financial situation.

Outlook towards life reports the standardised value on a scale ranging from 1 to 10 which indicates the extent to which the respondent agrees to the following statement – 'Good things tend to happen more to me and my family, than to other people'. A value of 1 indicates that they would strongly disagree with this statement, while a value of 10 would mean they strongly agree. This variable was not included in the household surveys of 2007–2009.

Control over life reports the standardised value of a scale ranging from 1 to 10 which indicates the extent to which the respondent agrees to the following statement – 'I have a lot of control over what will happen to me in my life'. A value of 1 indicates that they would strongly disagree with this statement, while a value of 10 would mean they strongly agree. This variable was not included in the household surveys of 2007–2009.

B3: Summary of insurance terms

The insurance policies offered to SEWA members varied each year, as SEWA desired to pick the most effective and affordable policy available in the marketplace each year. From 2006–2009, there were three policies offered, one for each district in our sample. These policies were evaluated based on the district-level weather stations that are part of the network of the Indian Meteorological Department (IMD), or private weather stations run by National Collateral Management Services Limited (NCSML). From 2010–2013, additional weather stations were added in order to have more localised rainfall

readings, therefore decreasing basis risk. The additional weather stations were part of the network of the Gujarat State Disaster Management Agency (GSDMA). This section gives a brief overview of the policies offered in each year. The full term-sheets for each weather station can be found in the supplementary online materials.

In 2006, the policies were underwritten by ICICI-LOMBARD. Customers were offered coverage for deficit rainfall early in the monsoon season, and for excess rainfall late in the season. In Ahmedabad and Anand districts, they could choose between policies that offered high and low coverage offers. In Patan district, only one policy type was offered.

In 2007, the policies were underwritten by IFFCO-TOKIO. They offered deficit coverage throughout the entire monsoon season.

In 2008, the policies were again underwritten by ICICI-LOMBARD. They offered coverage for deficit and excess rainfall over the entire monsoon season.

From 2009–2013, the policies were underwritten by AICI. They offered coverage for deficit rainfall early in the season, and excess rainfall late in the season. The exact structure of the payouts varied from year to year.

B4: Attrition analysis

As discussed in the text of the paper, attrition is non-negligible in this study. In this Appendix, we describe a series of tests for non-random attrition, and we replicate the main text's analysis applying attrition corrections.

We begin with descriptive statistics. Figures A1a, A1b, A3a and A3b plot attrition over time by village-level treatment status. There is no consistent visual difference between the attrition trends among the control and treatment groups. Tables A1a and A7a compare the baseline characteristics of non-attritors and the original sample in each treatment group. While we note, in Table A1a, some differences between attritors and non-attritors for the sample used to study investment outcomes, these differences appear to be consistent across treatment groups. To confirm this, we report in Tables A1c and A7c the results from mean equality tests on a set of baseline characteristics for attritors across treatment and control groups. We do not find any significant differences here either, suggesting the composition of attritors did not vary with treatment assignment.

To go beyond simple descriptives, we run two main sets of tests and corrections, in light of two different considerations.

One consideration is the possibility of biased estimates if attrition occurs differentially across treatment groups. As mentioned above, preliminary investigation did not suggest there was cause for worry here. We still investigate this issue further, proceeding as follows. We create two dummy variables. *Exit(i,y)* equals 1 if household *i* did not respond to the survey pertaining to year *y*'s cultivation decisions, but did respond to every prior survey. We let *Exit(i,y)* be missing if *Exit(i,y-1)* is 1 or missing. Ever-attrite is a dummy equal to 1 if a household ever dropped out from the sample (even if only for one year), and 0 otherwise.

We then run specifications analogous to our main Table 3 impact estimates, with successively each of these two attrition dummies on the left-hand-side in place of our outcome variables of primary interest. For this purpose, we consider both village-level and individual-level variation in treatment status, and we focus on the specifications without individual-level fixed effects. We first run reduced-form specifications to directly examine the possible effect of treatment assignment. We then present IV specifications where the number of policies purchased is instrumented by a full set of treatment indicators so as to examine the potential effects of treatment uptake. (When assessing possible attrition confounds for the main effects of interest, it is valuable to examine the local average treatment effects on attrition itself which are identified by the same variation.) To prevent predicted probabilities outside of the [0,1] interval, we run once more the same two specifications, but using probit and IV probit models. Of course, the number of observations differs with this approach from that in Table 3, since we include all households until the year (inclusive) when they attrite. We repeat this procedure to study attrition for the sample used to study additional outcomes in Table 8.

We present the results of this first step, separately for the samples considered in Table 3 and in Table 8, in Panel A of Table A16. For readability purposes, we present only the results (F-stats and associated p- values) from tests of joint significance of the coefficient estimates for the treatment indicators.

In the IV specifications, we find no evidence of differential attrition across randomly assigned treatment groups. (The joint significance of coefficients in columns 6 and 8 of Table A16 is driven by the significantly negative coefficient on the treatment expansion dummy. It makes sense for these treatment expansion households to have lower overall attrition rates as they had relatively fewer years to attrite, and we therefore do not find this surprising or concerning.) Lack of differential attrition in these specifications is good news, as they correspond exactly to the specifications used in Table 3 and Table 8. The reduced-form specifications show some evidence of differential attrition being driven by individual-level marketing treatments. Looking at the full results table (not reported here, but available on request), these reveal that the average probability to attrite in a particular year is significantly reduced by higher discounts offered on insurance policies. We include these reduced-form specifications in attrition corrections below to investigate whether this effect could impact our main results.

We correct for attrition using inverse probability weighting, following the method in Duflo, Dupas, and Kremer (JPubE 2015). We undertake this by taking the predicted attrition rates from the tests above, and adopting their inverses as weights in replications of Tables 3 and 8. To avoid predicted rates outside of the [0,1] interval, we use probit and IV probit specifications to obtain these predicted attrition rates. The results are presented in Tables A17a and A17b, A19a and A19b, A21a and A21b, and A24a and A24b. Overall these tables show consistent results with Tables 3 and 8, supporting the view that bias due to differential attrition is small for our estimates.

The second broad consideration is simply that attrition over such a long study is high. Even though this does not impact the internal validity of our estimates, there could still be value in understanding potential determinants of attrition, especially when thinking of the relevance of our results if this programme was to be scaled. We proceed by regressing the 'ever-attrite' dummy described above on a full set of baseline characteristics. Again,

we do this separately for the sample considered in Table 3 and the one considered in Table 8, and report joint significance results in Panel B of Table A16. The results for the sample used to study outcomes in Table 8 reveal no significant predictor of attrition. The results for the sample used in Table 3 show that households headed by men, counting more members, and growing cash crops tended to attrite more often on average (full regression table available on request). We do not propose any particular interpretation of this result, but once more reproduce our main Tables 3 and 8 using inverse predicted attrition rates as weights.

Results from these weighted regressions are presented in Tables A22 and A25; the results are qualitatively very similar to the ones presented in our main tables, and suggest that our initial conclusions survive these attrition corrections.

Finally, for completeness, we include a third set of attrition corrections where we now allow attrition to be affected by both treatment assignment and baseline characteristics. We follow the same procedure as above, and report joint significance results in Panel C of Table A16. Attrition corrected replications of Tables 3 and 8 are presented in Tables A18a and A18b, A20a and A20b, A23a and A23b and A26a and A26b. Again, the impact results are not qualitatively affected by these corrections.

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