

# MICROINSURANCE PRODUCT DESIGN: CONSUMER PREFERENCES IN KENYA

Job Harms

**RESEARCH**  
PAPER No. 4

JUNE 2011

## MICROINSURANCE PRODUCT DESIGN: CONSUMER PREFERENCES IN KENYA<sup>1</sup>

### JOB HARMS

### ABSTRACT

Microinsurance can help low income households to manage risk and facilitate their economic development. Furthermore, insurance markets in developing countries represent a substantial and largely untapped source of potential profits. However, a lack of understanding and appreciation of microinsurance products among potential clients restricts uptake and keeps the sector from reaching its full potential. This paper presents a survey based study on preferences for microinsurance products in rural Kenya. More specifically, the study examines preferences for deductibles and rebates. Similar to consumers in developed countries, the majority of the respondents in this study have a preference for policies without deductibles and for policies with rebates. Risk aversion, financial literacy, health shocks, economic activities and prior experience with insurance affect these preferences. It is suggested that higher uptake of microinsurance might be achieved by

taking these preferences and their determinants into account in the design of microinsurance products.

### GLOSSARY OF KEY TERMS AND ACRONYMS

**Microinsurance** : An insurance that: (i) operates by risk-pooling (ii) is financed through regular premiums and is (iii) tailored to the poor who would otherwise not be able to take out insurance (Churchill, 2006).

**Deductible**: The part of insurance claim(s) that the insured must pay out of his / her own pocket before the insurance company covers the rest of the claim(s). Also known as co-payment.

**Rebate**: The part of an insurance premium that the insured gets back from the insurance company at the end of the insurance term in case the claims do not exceed a certain level.

**ByJ**: Bima ya Jamii, a microinsurance product in Kenya

**SACCO**: Savings and Credit Cooperative: a type of credit union common in Africa

**KSh**: Kenya Shillings (KSh 100  $\approx$  \$ 1.25)

**CIC**: Cooperative Insurance Company, a private insurance company in Kenya

**NHIF**: National Hospital Insurance Fund, a parastatal health insurance scheme in Kenya

### INTRODUCTION

The microinsurance sector is currently facing several challenges that constrain its growth. Limited understanding of the benefits of microinsurance by potential customers is identified as one key constraint (McCord, 2001). Microinsurance uptake has been

<sup>1</sup> Job Harms is at VU University Amsterdam. His email is [jobharms@gmail.com](mailto:jobharms@gmail.com).

I am thankful to a number of people who were involved in this research. This thesis would not have been possible without the support of Jan Willem Gunning, Stefan Dercon and Andrew Zeitlin from the European Development Research Network (EUDN), who allowed me to integrate my thesis research questions in their study and gave me access to additional data. Furthermore, I thank Naureen Karachiwalla from Oxford University for her contributions to the coordination of the data collection in Kenya. In addition, I thank the International Labor Organization (ILO) Microinsurance Innovation Facility for awarding me with a research fellowship in Kenya. The Swedish Cooperative Centre (SCC) office in Nairobi, Kenya provided additional support in this study. I thank all the respondents in Kenya's Central Province who walked long distances to participate in this study. My appreciation also goes out to friends and family who provided useful feedback.

Most of all, I thank my thesis supervisor, Jan Willem Gunning, for his suggestions and valuable time.

shown to be positively related to education levels (Chankova *et al.*, 2008) and people's familiarity with insurance (Gine *et al.*, 2007). Related to this is the means through which potential customers perceive and value specific microinsurance products. Because improving people's understanding and appreciation of insurance through education is costly, there is potential for other strategies to improve uptake. This paper proposes that one such strategy is for insurance companies to experiment with product design in order to better suit potential clients' preferences and perceptions.

In order to design insurance products and schemes, it is important to know not only which types of insurance products people prefer but also how these preferences are shaped. A study on health insurance in Switzerland (Schellhorn, 2001) showed that when insurance companies offered different levels of deductibles for their health insurance products, people with lower healthcare utilization preferred the higher deductible whereas those with higher healthcare utilization preferred a lower deductible. A similar result was achieved for car insurance in Israel (Cohen and Einav, 2005).

Overall, however, little is known about the relationship between microinsurance product design and consumer preference. This study investigates the preferences for deductibles and rebates among a rural population in the Central Province of Kenya. This population was recently introduced to a composite microinsurance product that offers coverage for hospitalization expenditures, funeral costs and workers disability. The main question presented in this paper is how deductibles and rebates affect demand for microinsurance. Through a short questionnaire, information was collected on consumer preferences for microinsurance products with different deductible and rebate levels. Making use of additional data on these respondents and their households, I look at the determinants of these preferences.

## BACKGROUND

As stated in the introduction, limited understanding of the benefits of microinsurance by potential customers is identified as a key constraint on customer demand (McCord, 2001). One study by Chankova *et al.* (2008) found that microinsurance uptake is higher among more educated households. While another study by Gine *et al.* (2007) did not identify education as a significant determinant of uptake for a microinsurance product in India, the authors did show that familiarity with financial products has a significant positive effect on uptake. Many (potential) microinsurance clients have relatively low levels of formal education and have little experience with financial products. As a result, there are a number of challenges in providing potential clients a better understanding and appreciation of financial products, particularly microinsurance. Financial education for low-income markets, while potentially useful in addressing this challenge, requires time and resources. Research by Cole *et al.* (2009) on the uptake of a new banking product in Indonesia and India shows that financial literacy programs only have a small positive impact and that price subsidies are more cost effective in increasing uptake than financial literacy programs.

While financial education programs can improve people's understanding and appreciation of microinsurance and thereby increase uptake, the actual design and marketing of microinsurance is believed to also play an important role. In order to develop microinsurance products that are attractive to the customer, Cohen and Sebstad (2006) noted the importance of studying the needs of the market. It is important that the client can afford the product, as credit constraints have been shown to negatively impact microinsurance uptake (Gine *et al.*, 2007).

However, it is not only the level of insurance premium but also the method of payment that matters to the potential client. Having to pay the premium in one lump-sum may conflict with the client's cash flow and hence constrain the uptake of the product (Cohen and Sebstad, 2006). A case study on a microinsurance product in Kenya revealed that the inability to pay premiums immediately was a key factor in people's decision not to buy the product (Mathauer, 2007). Although no research has been conducted specifically on this topic, this 'cash-flow' factor may also be related to people's preference for deductibles and rebates; whereas the deductible policy spreads the payment over time (i.e. part of the money is paid in premium and part of the money is paid as deductible in case an accident occurs), the rebate policy requires a larger upfront payment.

Consider the following two car insurance policies which both offer the same coverage. Policy A costs \$1600 per person per year and has a \$600 deductible. Policy B costs \$1600 per year and has a \$600 rebate. While the total end-of-year payment will be the same for both policies, the policies differ in terms of the timing of the different payments. For this reason, the valuation by potential clients of these policies will be affected not only by the way in which the different methods of payment match with their cash-flow but also on their "timing preference". Someone who strongly discounts future income will be less likely to prefer the policy with the rebate, since this rebate will only be received later. As a result, this person will be more inclined to choose a deductible policy allowing him/her to save a certain amount of money relative to the rebate policy at the beginning of the year.

In addition to time preference, the valuation of rebates and deductibles is also affected by the way in which people value gains and losses differently. A series of experiments by Kahneman and Tversky (1979) showed that the valuation of a certain level of wealth

depends on whether this level was reached by a gain or a loss. The results from this study were confirmed in later experiments and showed that the direction of the change in wealth plays a role in the valuation of this wealth level. More specifically, it states that an outcome in wealth that is reached through a gain is valued more than an identical outcome that is reached through a loss.

To see how this aversion to losses pertains to insurance decisions, consider again the two car insurance policies. The total costs incurred are the same for both policies, regardless of the size of the loss. These policies differ only in the timing of the payments; for policy A the initial premium payment is \$600 less than for policy B. Furthermore, policy B gives a maximum rebate of \$600 at the end of the year whereas policy A requires the consumer to pay a maximum deductible of \$600 if and when a claim is made. In a laboratory experiment by Johnson *et al.* (1993) respondents were asked to choose between these two policies. The majority of the respondents (67.8%) were willing to buy the policy with the \$600 rebate, whereas only 44% were willing to buy the policy with the \$600 deductible.

Johnson *et al.* suggest that these preferences can be explained by people's aversion to losses. In the car insurance example, for the rebate option, in the case of a \$300 claim, the insured will receive \$300 at the end of the year. On the other hand, in the case of the deductible, he/she has to pay the \$300 deductible when the claim is made. Fischhoff (1993) further suggests that the attractiveness of the rebate relative to the deductible derives from the fact that people perceive the rebate to be a type of forced saving. With the deductible policy one has to exert self-constraint on one's expenses in order to have available funds, at a minimum equal to the sum of the deductible, at all times. On the other hand, with the rebate policy one actually commits the money to the insurance

company at the beginning of the year; one commits to save this money for an emergency.

This preference for policies with low or no levels of deductibles (as compared to policies with lower premiums and higher deductibles) has not only been observed in experiments but also in the insurance market. A study by Sydnor (2006) looked at preferences for home insurance. Historical data was used to estimate the risk of damage to houses during a given year at around 5%. The respective homeowners were given the option of paying \$100 of additional premium to lower their deductible from \$1000 to \$500. However, given the risk, this reduction of \$500 in risk exposure (i.e. the \$500 reduction of the deductible) has a monetary value of only \$25. Nevertheless, 83% of the consumers were willing to pay the additional \$100 to lower their deductible from \$1000 to \$500.

In the context of microinsurance, little is known about consumer preferences for rebates and deductibles. The available studies on this topic are mainly based on experiments in developed countries in academic settings. These studies show a dislike of deductibles and an approval of rebates. It has been proposed that the dislike of deductibles derives from people's aversion to losses. The attractiveness of rebates has been attributed to the way in which they relieve people from the burden of having to have the deductible sum at hand at all times, while at the same time offering a prospect of 'gaining' back their rebate at the end of the period.

Because microinsurance clients differ from insurance clients in developing countries in terms of various socio-economic factors, their preferences for rebates and deductibles cannot be assumed to be identical. More specifically, it cannot be assumed without empirical support that microinsurance clients will have the same preferences for deductibles and rebates. Insight into the preferences of microinsurance clients

can help insurance companies and policy makers in improving the design of their microinsurance products. Through a questionnaire study with potential clients for a recently introduced microinsurance product in rural Kenya, this research aims to map preferences for deductible and rebates.

## DATA

The data for this study was collected in rural Kenya. A short survey was used to map preferences for rebates and deductibles. Additional data from an extensive study about the impact and uptake of new microinsurance products in Kenya was used to investigate the determinants of microinsurance product preferences. The survey interviews were held with members of the Wananchi Savings and Credit Cooperative, a rural credit union which recently started selling a new microinsurance product to their members. Developed by a Kenyan insurance company (CIC) and the Kenyan National Hospital Insurance Fund (NHIF), the Bima ya Jamii (ByJ) product offers coverage for inpatient healthcare, accidental death and disability and funeral expenses. The rationale for NHIF and CIC to combine health insurance with life and accident insurance is to provide low-income households with one comprehensive product to manage the most important risks. The ByJ currently has approximately 15000 active policy holders. Data on insurance preferences was collected through a short survey with questions on preferences for deductibles and rebates. In addition, an extensive household survey was conducted as part of the baseline study

for a large scale evaluation of the determinants of microinsurance uptake and the impact of microinsurance. For this extensive household survey, information was collected on a wide range of topics.

More information is provided in appendices 1 and 2.  
The short survey consists of 9 questions.

For each question respondents were asked to rank 2 different hypothetical health insurance products according to preference (i.e. asked to state which of

Question	Option	Premium (KSh)	Deductible (KSh)	Rebate (KSh)
1	A	4000	n/a	n/a
	B	3500	500	n/a
2	A	5250	n/a	n/a
	B	3500	1750	n/a
3	A	4250	n/a	n/a
	B	3500	500	n/a
4	A	3750	n/a	n/a
	B	3500	500	n/a
5	A	3750	250	n/a
	B	3500	500	n/a
6	A	4000	n/a	500
	B	3500	500	n/a
7	A	4000	n/a	750
	B	3500	500	n/a
8	A	4000	n/a	250
	B	3500	500	n/a
9	A	5000	n/a	1500
	B	3500	1500	n/a

the 2 they prefer). The short survey consists of two parts. The first part contains 5 questions on preferences for varying levels of deductibles as compared to varying levels of premiums. The second part contains 4 questions on preferences for varying levels of deductibles as compared to varying levels of premiums and rebates. These questions are shown in the table above<sup>2</sup>.

For example, in question 1, the respondent is asked which insurance he/she would rather buy:

A) A health insurance policy which costs KSh 4000 per family per year, and covers for all inpatient costs (i.e. no deductible).

<sup>2</sup> The precise formulation of these 9 questions can be found in appendix 3.

Table 42: Insurance Preferences for Sub-Samples

Question	Option	Full Sample	Rational Sample	Irrational Sample
1	A	73.5	71	79.9
2	A	66.4	70.4	58.1
3	A	64.1	67.1	57.9
4	A	68.7	75.3	50.4
5	A	66.7	73.3	54.7
6	A	74.5	86.1	50
7	A	75.5	87.3	50.4
8	A	74.4	85.1	51.5
9	A	75.9	85.8	54.8

Reflects % of respondents preferring option A

B) A health insurance policy which costs KSh 3500 per family per year and obliges the insured to pay the first KSh 500 of claims out of his/her own pocket (i.e. KSh 500 deductible).

Subsequently, in question 6, the respondent is asked which insurance he/she would rather buy:

A) A health insurance policy which costs KSh 4000 per family per year and returns KSh 500 in case no claims were filed (i.e. KSh 500 rebate).

B) A health insurance policy which costs KSh 3500 per family per year and obliges the insured to pay the first KSh 500 of claims out of his/her own pocket (i.e. KSh 500 deductible).

Respondents were not asked if they would be willing to buy either of the 2 hypothetical products in the first place. However, the data from the extensive questionnaire does provide insight in respondents' overall willingness to purchase insurance<sup>3</sup>.

<sup>3</sup> People were asked if they thought they agreed with the statement "I don't need (health) insurance as I don't expect to incur high health costs". This question and the variable which was derived from it were used in the regression and are described in more detail in appendix 5C.

Nevertheless, the conclusions of this study cannot be interpreted as a direct insight in the determinants of uptake, but merely as an insight into preferences. Further empirical research is needed to investigate the relation between these preferences and actual uptake.

## RESULTS

The majority of respondents prefer policies without deductibles. This preference for non-deductible policies is strongest for questions 6 - 9 (the questions in which the rebate is offered). This shows that people not only prefer policies *without* deductibles but that they also have a specific liking for policies *with* rebates. Furthermore, a substantial part of the sample displays inconsistent preference patterns (i.e. a sequence of choices that is considered to be irrational)<sup>4</sup>. Amongst the rational sample, a more pronounced preference for non-deductible policies is observed. For example, in question 9, amongst the rational sample, 85.8% of the respondents prefer option A over option B. For the sample of rational respondents this is 54.8%. Given the relative share of rational respondents in the full sample, this reflects

<sup>4</sup> Appendix 5 provides more information on the definition of irrationality as used here.

75.9% of all respondents preferring 9A over 9B. This irrationality result underlines the relevance of ongoing financial literacy programs.

Furthermore, the data indicates that there are certain limits to the price people are willing to pay to fully cover their risk. For example in question 3, option A has a premium of KSh 4250 (and no deductible) and in question 4, the premium is KSh 3750 (in both options the alternative option is a KSh 3500 policy with a KSh 500 deductible). Whereas in question 3, 67.1% of the rational sample chooses option A, in question 4 this is 75.3%. In addition, the answers for questions 2 and 9 show that most people are willing to pay a relatively high upfront premium if the deductible for the alternative option is also relatively high. For example, in question 2, option A is a KSh 5250 policy and option B is a KSh 3500 policy with a KSh 1750 deductible. As compared with question 1 (option A=KSh 400 without deductible and option B=KSh 3500 with 500 deductible) only 5% of the people switch from option 1A to 2B.

## DISCUSSION

Various regression analyses were conducted to identify factors affecting these preferences. The results of these regressions are found in appendix 4. A number of factors affecting microinsurance preferences were discovered: risk aversion, mathematical and financial literacy, health shocks, prior experience with insurance, trust in insurance companies, entrepreneurial activities and people's perception of their need for insurance. Wealth [indicators] did not show to have a strong effect.

## RISK AVERSION

For questions 6-9 the regression analyses showed risk aversion to have a positive impact on the preference for deductibles (i.e. a negative impact on the preference for rebates). This is contrary to the

hypothesis that risk averse clients would be less attracted to the deductible policy, as the deductible policy basically leaves part of the risk uncovered. It is suggested that a preference for deductibles in question 6-9 was observed because policies with rebates (the alternative option) are perceived as uncertain; whether one gets the rebate returned at the end of the year depends on the insurance company keeping their word. In Kenya there have been many cases of insurance companies going bankrupt and/or not meeting their obligations; this could be one reason that risk averse clients are less attracted to rebates.

It is worth noting that risk aversion was shown to be negatively related with uptake of a weather microinsurance product in India (Gine *et al.*, 2007). This study proposes that people, specifically people with little prior experience with insurance products, are averse to the uncertainty of insurance itself; whether the insurance 'pays off' depends on whether a risk actualizes. In order to test if in my study familiarity with, and trust in insurance (companies) affects the relation between risk aversion and insurance preference I constructed two interactions variables; risk aversion \* trust in insurance and risk aversion \* familiarity with insurance. I conducted a regression with these interactions terms. This regression (see appendix 7, table A7.7) did not show an affect of trust and familiarity on the relation between risk aversion and insurance preference.

## WEALTH AND CREDIT

No strong and consistent impact of wealth indicators on insurance preferences was found. Bank savings only showed a weak impact on rebate preferences in question 7. It was expected that wealth levels (in specific cash constraints) would have a positive effect on preferences for the no-deductible option, since in the questionnaire these policies require a larger upfront premium payment. On the other hand, since a deductible policy also requires that one has a certain



amount of money at hand at all times, if these effects could be cancelled out. In other words, the 'cash-constraint' sword might cut in two opposite directions; whereas the higher upfront premium for a non-deductible policy could lead a cash-constrained person to prefer the deductible option, this person might also dislike the fact that with a deductible policy he/she needs to have access to the deductible amount at all times.

Furthermore, it is also possible that there was response bias in the questions about wealth indicators, as it was observed during the interviews that respondents were not very comfortable answering these questions. It is suggested that respondents might have reported wealth levels that are close to the average because they might have been afraid during the interviews they would 'stand out' if they would report very high/low wealth levels. Such a bias would explain why no wealth effect was observed. Finally, it could also be the case that people keep money at home instead of in their bank account. As a result, the variable on savings simply does not capture actual wealth levels accurately.

Whether someone holds formal and/or informal credit does affect insurance preferences, but only in certain questions. People with informal credit showed a stronger preference for a non-deductible policy in questions 3-4. Although this relation between informal credit and preferences was not significant for the other questions, it is suggested that people who hold informal credit have been confronted with the negative experience of having to borrow money from friends or family, which forced them to make public their financial dependency. For this reason they value more strongly the fact that a policy without deductible eliminates fully the risk of having to borrow money from friends and family in the future, at least for medical emergencies.

On the other hand, people with formal credit are more likely to prefer the deductible option, but this effect is only significant in question 6. It is suggested that people who have credit from an official institution are more confident that in times of a medical emergency which would require them to pay the deductible, they can obtain additional credit from their bank or MFI, instead of having to go through the potentially unpleasant experience of borrowing money from friends or family.

## BUSINESS ACTIVITY

Recent engagement in business activities has a strong impact on the preference for non-deductible policies. For example, for question 1, someone who engages in business activities is 45% more likely to prefer the non-deductible option than a non-business person (according to specification 4<sup>5</sup>). Since entrepreneurial work usually entails regular cash transactions and requires the entrepreneur to keep track of cash flows, it is proposed that this relation derives partly from the fact that entrepreneurs are better able to appreciate how a non-deductible policy takes away the risk of incurring future hospitalization expenses which could distort their cash flow. Furthermore, entrepreneurs are assumed to have more experience with financial planning; for this reason it is suggested that they are better able to envision and appreciate the benefits of receiving a rebate in the future.

## MATHEMATICAL AND FINANCIAL LITERACY

The mathematical and financial literacy score has a very strong impact on the preference for non-deductible policies. In question 1 for example, for regression specification 4, the probability that someone prefers the non-deductible option is 88% higher for someone with the highest possible score ratio for the mathematical and financial literacy quiz

---

<sup>5</sup> This is the regression for the rational sample and with the risk aversion variable included in the list of independent variables.

(equal to 1 if all 7 questions are correct) than for someone with lowest possible score (equal to 0). In other words, for each additional correct answer in the mathematical and financial literacy quiz, the probability that someone prefers the non-deductible option in question 1 increases with 12.5%. For the first 5 questions (except question 4) this relation is particularly interesting since here the deductible option implies lower cost in case of no claim (i.e. hospitalization) and equal cost in case of a claim. It is suggested that higher literacy might translate into a better understanding appreciation of the benefit that no-deductible policy offers; the benefit being certain that all hospitalization expenses will be covered for by the insurance company.

However, there might also be an omitted variable bias that affects these results. The mathematical and financial literacy score could correlate with a certain indicator of wealth that was not captured by the wealth proxies used in this study. Since a wealthier person is assumed to have a higher level of mathematical and financial literacy as well as less financial constraints that could affect the preference for the deductible option (since it requires a lower upfront premium payment) it is speculated that the relation between mathematical and financial literacy and insurance preferences could be partially explained by a wealth indicator that was not included in the list of independent variables for the regression.

## HEALTH SHOCKS

For questions 6-9, people who had someone in their household that went to the hospital in the last year have a stronger preference for the no-deductible policy with a rebate than those without a case of hospitalization in their household (except for question 9). For example, in question 6 the probability that someone prefers the non-deductible option is around 60% higher if they have experienced in their family a case of hospitalization in the last 12 months. It is

proposed that this is the case because people who experienced such a health shock are more likely to see the advantages of being fully covered and not having to worry anymore about future hospitalization expenses, which are relatively high (see appendix 7a). The preference for a no-deductible policy is not affected by health shocks in questions 1 - 5 (where the no-deductible policies does not have a rebate); this suggests that the rebate feature plays a role in making the no-deductible policy more attractive to people who recently experienced a health shock. Overall, these findings are consistent with the literature and show that policies with deductibles are less attractive to individuals and families that face a higher risk of incurring medical costs.

## EXPERIENCE WITH INSURANCE

People who have or have had insurance show a stronger preference for the non-deductible option in all questions (except for question 5, where both options have deductibles). The probability of choosing the non-deductible option is between 25% - 45% higher for someone that has insurance than for someone that does not. It is suggested that people who have or have had insurance have experienced the mental comfort of being protected against risks and are therefore more inclined to appreciate the fact that the non-deductible policy offers full coverage. There might also be a selection bias in that the people who have insurance were already more attracted to the idea of covering as much risk as possible and thus have already purchased insurance.

## TRUST IN INSURANCE COMPANIES

People who trust insurance companies have a stronger preference for deductible policies in questions 1 - 5. However, trust does however not affect preferences in questions 6 - 9. It is suggested that, for someone who does not trust insurance companies, having to pay a deductible in order to get medical treatment might be an undesirable prospect. This would explain the

relation between trust and preferences for questions 1 - 5. It is hypothesized that this relation does not show in questions 6 - 9 because here the non-deductible options include a rebate; whereas people that people that don't trust insurance companies would still not like the prospect of having to pay a deductible (for option A) they might fear that that they won't get their rebate back at the end of the year (option B). These effects could then cancel out. Additional research is needed to test these hypotheses.

## CONCLUSIONS

This study showed that there is a strong preference amongst potential microinsurance clients in rural Kenya for policies without deductibles. This preference is even stronger for no-deductible policies with rebates. This result is similar to insurance preferences in developed countries. Furthermore, a significant share of the respondents exposed irrational preference patterns that cannot be explained by time preference or risk aversion. These high rates of irrational preferences patterns underscore the relevance of ongoing financial education programs.

The findings in this study suggest that higher uptake of health microinsurance products in (rural) Kenya might be achieved if insurance companies offer products without deductibles and/or products with rebates. This finding can be applied in various ways. The most straightforward implication is for insurance companies to pilot-test health microinsurance products with low deductibles and/or rebates to see if there is a higher uptake for such products than for other comparable products with deductibles. In terms of the relation between insurance preferences and individual characteristics, this study shows that people with recent cases of hospitalization in their family have a stronger preference for no-deductible / rebate policies. This implies that such policies, when purchased by this group, would lead to higher costs for the insurance; the data showed hospitalization occurrence

to be more than twice as high amongst the people that experienced illness in their family.

Nevertheless, the no-deductibles policies were also preferred by a large group of people who did not experience a recent case of hospitalization in their household. As such, it is suggested that insurance companies should experiment with offering health microinsurance products with rebates. As people were shown to be willing to pay a significantly higher premium in order not to have a deductible, the costs which an insurance company might incur by attracting more high-risk clients could be offset by the additional premium that people are willing to pay in order not to have a deductible.

The findings from this study also tie into another issue which is often observed by microinsurance practitioners: those microinsurance clients who do not make a claim within the period of the policy want the premium, or a part of it, to be returned. This consideration of wanting 'value for money' is likely to be even more important for a low-income consumer who is used to informal risk management schemes in which the benefits of participating are more evident because the groups are smaller and more geographically concentrated, making that one is more likely to observe first-hand how/that the pooled resources are actually used.

A recent client-satisfaction survey with Bima ya Jamii clients shows that clients considered the absence of a no-claim bonus to have a strong negative impact on their satisfaction with the product. Since rebates can be perceived as a bonus for not making a claim, it is thus suggested that policies without deductible and with rebates are not only more attractive to potential clients, but can improve the satisfaction and retention of the people that have already purchased microinsurance.

In terms of product usage, the rebate might actually create an incentive for people to not use their policy; for example someone who suffers from a mild stomach ache might be inclined to not go to hospital (at least until the end of the insurance term) in order to not 'lose' the rebate which they would have otherwise received. On the other hand, it has also been shown in the literature (Schellhorn, 2001) that people with deductible policies make less use of their insurance. It is however outside of the scope of this paper to establish how the uptake of various microinsurance products would affect profits for the insurance company. This is a matter of actuarial analysis and pilot-testing of insurance products.

Regarding the relation between consumer preferences and microinsurance uptake, it would be relevant to evaluate both the characteristics of the available microinsurance products in a certain area, as well as the characteristics of the people that buy these products. This could for example be done by investigating the customer databases of insurance companies that sell microinsurance. As for the understanding and perception of microinsurance products, this study suggests that there is a significant degree of irrationality in the decision making processes of (potential) microinsurance clients. Future research, in particular experimental research, can contribute to a better understanding of the nature and the impact of this irrationality.

## REFERENCES

- Alessie, R., Lusardi, A., Van Rooij, M. (2007). Financial Literacy and Stock Market Participation, NBER Working Paper No. W13565
- Arena, M. (2008). Does Insurance Market Activity Promote Economic Growth? A Cross-Country Study for Industrialized and Developing Countries. *Journal of Risk and Insurance*, 75(4): 921-946.
- Becker, G., Mulligan, C. (1997). The Endogenous Determination of Time Preference. *The Quarterly Journal of Economics*, 112(3): 729-758
- Bernheim, D. (1998). Financial Illiteracy, Education and Retirement Saving, in: *Living with Defined Contribution Pensions*. University of Pennsylvania Press.
- Chankova, S., Sulzbach, S. and Diop, F. (2008). Impact of mutual health organizations: evidence from West Africa, *Health Policy and Planning*, 23(4): 264-276.
- Churchill, C. (2006). What is insurance for the poor? in C. Churchill (ed.), *Protecting the poor, A microinsurance compendium*, International Labor Organisation, Geneva.
- Cohen, A., Einav, L. (2005). Estimating Risk Preferences from Deductible Choice, *The American Economic Review*, 97(3): 745-788
- Cohen, M., Sebstad, J. (2006). The demand for microinsurance, in C. Churchill (ed.), *Protecting the poor, A microinsurance compendium*, International Labor Organisation, Geneva.
- Cole, S., Sampson, T., Zia, B. (2009). Financial Literacy, Financial Decisions, and the Demand for Financial Services: Evidence from India and Indonesia.
- Dercon, S. (2005). Risk, Insurance and Poverty: A Review, in S. Dercon (ed.), *Insurance against Poverty*, Oxford University Press.
- Elbers, C., Gunning, J.W. and Kinsey, B. (2007). Growth and Risk: Methodology and Micro-evidence, *World Bank Economic Review*, 21(1): 1-20.
- Ferguson, N. (2008). *The Return of Risk, The Ascent of Money: A Financial History of the World*. Penguin Press, 1<sup>st</sup> edition: 176-230

- Fischhof, B. (1993). Transaction Analysis: a Framework and an Application to Insurance Decisions, *Journal of Risk and Uncertainty*, 7:53-69
- Gine, X., Townsend, R.M. and Vickery, J. (2007). Patterns of Rainfall Insurance Participation in Rural India, Policy Research Working Paper Series 4408, the World Bank.
- Hogarth, J., Hilgert, M. (2002). Financial Knowledge, Experience and Learning Preferences: Preliminary Results from a New Survey on Financial Literacy, *Consumer Interest Annual*, 48.
- Holt, C., Laury, S. (2002). Risk Aversion and Incentive Effects, *American Economic Review*, 95 (2): 1644-1655.
- Honohan, P. (2008) Cross-Country Variation in Household Access to Financial Services, *Journal of Banking and Finance*, 32 (11): 2493-2500
- Johnson, E.J, Hershey, J., Meszaros, J., Kunreuther, H. (1993). Framing, probability distortions, and insurance decisions, *Journal of Risk and Uncertainty*, 7 (1): 35-51.
- Kahneman, D., Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk, *Econometrica*, 47 (2): 263-292
- Leftley, R. and Mapfumo, S. (2006). Effective microinsurance programs to reduce vulnerability. Opportunity International Network.
- Mathauer, I., Schmidt, J., Wenyaa, M. (2007). Extending social health insurance to the informal sector in Kenya. An assessment of factors affecting demand, *The International Journal of Health Planning and Management*, 23(1): 51-68
- McCord, M.J. (2001). Health care microinsurance - case studies from Uganda, Tanzania, India and Cambodia, *Small Enterprise Development*, 12(1): 25-38.
- McCord, M., Matul, M., Phily, C., Harms, J. (2010): The Landscape of Microinsurance in Africa. ILO Microinsurance Innovation Platform, working paper no. 4.
- McDermott, R., Fowler, J., Smirnov, O. (2008). On the Evolutionary Origin of Prospect Theory Preferences, *The Journal of Politics*, 70 (2): 335-350
- Preker, A.S., Carrin, G., Dror, D.M., Jakab, M., Hsiao, W. and Arhin, D. (2002). Effectiveness of Community Health Financing in Meeting the Cost of Illness, *Bulletin of the World Health Organization*, 80(2): 143-150.
- Ranson, K.M. (2001). The impact of SEWA's Medical Insurance Fund on Hospital Utilization and Expenditure: A Household Survey. Health, Nutrition and Population Discussion Paper, World Bank, Washington DC.
- Roodman, D., Qureshi, U. (2006). Microfinance as Business. Center for Global Development, Working Paper 101
- Roth J., McCord M., Liber D. (2007). The Landscape of Microinsurance in the World's 100 Poorest Countries, The Microinsurance Centre
- Schellhorn, M. (2001). The effect of variable health insurance deductibles on the demand for physician visits, *Health Economics*, 10: 441 -456
- Sydnor, J. (2006). Abundant Aversion to Moderate Risk: Evidence from Homeowners Insurance (mimeo). University of California, Berkeley, Berkeley.
- Wagstaff, A. and Pradhan, M. (2005): Health Insurance Impacts on Health and Nonmedical Consumption in a Developing Country, World Bank

Policy Research Working Paper 3563. The World Bank.

Ward, D., Zurbrugg, R. (2000). Does insurance promote economic growth? Evidence from OECD countries. *Journal of Risk and Insurance*. 67(4): 489-506

## Appendix 1: Regression Independent Variables

Variable	Values	Description of Variable	Question in Survey
Age (years)	0 - ∞	Age of respondent in years	What is the age of the respondent?
Gender	0,1	Equal to 1 if respondent is male	What is the sex of the respondents? (observed)
At least secondary education	0,1	Equal to 1 if respondent has completed at least secondary school form 1 or higher. Assigned value 1 if yes.	What is the highest school grade that the respondent has completed?
Number of household members	0 - ∞	Number of household members	How many household members are there IN TOTAL?
Log of bank savings (Ksh)	0 - ∞	Log ((Wananchi cash savings + Wananchi shares)/1000)	[What is the current value of all your cash savings with Wananchi?] + [What is the current value of all Wananchi shares that you hold?]
Cultivated land hectare	0 - ∞	Size of the land cultivated by household	What was the total size of all parcels that your household CULTIVATED in the past year?
Is wananchi shareholder	0,1	Whether respondent is a Wananchi shareholder. Assigned value 1 if yes.	Do you hold any SHARES in Wananchi?
Has other bank account	0,1	Whether the respondent has a bank account with another financial institution outside of the Wananchi SACCO. Assigned value 1 if yes.	Do you have a bank account, post office account, savings with a microfinance institution or other form of savings account? [excluding Wananchi savings]
Has insurance	0,1	Whether the respondent's family has, or has had, an insurance product. Assigned value 1 if yes.	Have you or any of your household members ever bought insurance?
Has formal credit	0,1	Whether the respondent had an formal credit in the past 12 months. Assigned value 1 if yes.	Have you borrowed any money from a SACCOS, MFI, or bank in the last 12 months?
Has informal credit	0,1	Whether the respondent (and his/her household) had an informal credit in the past 12 months. Assigned value 1 if yes.	In the past 12 months, did you or anyone else in this household borrow anything in cash or kind from any informal source (moneylender, family member...)
Engages in business activity	0,1	Whether the respondent has recently engaged in business activities. Assigned value 1 if yes.	In the past 12 months, did you invest any time or money in business activity? Include e.g, trading, petty trading, food or drink processing for sale, chicken rearing, tailoring, weaving, mechanic, carpentry or other trades.

## Appendix 1: Regression Independent Variables, Continued

Perceives to be poor	0,1	Whether the respondent perceives his/her household as poor?	Just thinking about your own household circumstances, would you describe your household as poor? For details, see appendix 6B
Does not need insurance	0,1	Whether the respondents thinks he/she does not need insurance. Assigned value 1 if respondent agreed with statement in question.	Can you tell us whether you agree or disagree with the following statement: I don't need insurance as I don't expect to have to pay high health costs"? For details, see appendix 6C
Trusts insurance companies	0,1	Whether the respondents trusts insurance companies. Assigned value 1 if respondent agreed with statement in question.	Can you tell us whether you agree or disagree with the following statement: "Insurance companies have a good reputation and can be trusted"? For details, see appendix 6D
Trust banks	0,1	Whether the respondents trusts banks and other big companies. Assigned value 1 if respondent agreed with statement in question.	Can you tell us whether you agree or disagree with the following statement: "I can trust banks and other big companies in Nyeri to be fair to me"? For details, see appendix 6E
Risk aversion	0.22 - 0.82	The relative risk aversion of the respondent.	For details, see appendix 4
Math & financial literacy score ratio	0-1	The ratio of correct answers (tot total number of questions) in a quiz section on mathematical and financial literacy.	For details, see appendix 6A
Family member inpatient in last 12 months	0,1	Whether a household member was inpatient in the last year. Assigned value 1 if yes.	In the last 12 months, did anyone in the household spent any time as an in-patient in hospital or clinic?
Family member ill in last 12 months	0,1	Whether a household member was ill in the last year. Assigned value 1 if yes.	In the past 12 months, did the household experience illness/accident of anyone in the household?



## Appendix 2: Regression Independent Variables Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Age (years)	1428	55.80	14.88	9.00	105.00
Gender (male=1)	1476	0.67	0.47	0.00	1.00
At least secondary education (1=yes)	1476	0.36	0.48	0.00	1.00
Number of household members	1434	3.69	1.75	0.00	15.00
Log of bank savings (KSh 1000)	1476	8.49	2.70	0.00	14.33
Cultivated land hectare	1476	0.03	0.15	0.00	3.00
Is wananchi shareholder (1=yes)	1476	0.88	0.33	0.00	1.00
Has other bank account (1=yes)	1476	0.27	0.44	0.00	1.00
Has insurance (1=yes)	1476	0.37	0.48	0.00	1.00
Has formal credit (1=yes)	1476	0.41	0.49	0.00	1.00
Has informal credit (1=yes)	1476	0.13	0.34	0.00	1.00
Engages in business activity (1=yes)	1476	0.18	0.39	0.00	1.00
Perceives to be poor (1=yes)	1476	0.33	0.47	0.00	1.00
Does not need insurance (1=yes)	1476	0.11	0.31	0.00	1.00
Trusts insurance companies (1=yes)	1476	0.28	0.45	0.00	1.00
Trusts banks (1=yes)	1476	0.69	0.46	0.00	1.00
Relative risk aversion	818	0.47	0.23	0.22	0.82
Math & financial literacy score ratio	1476	0.51	0.28	0.00	1.00
Family member inpatient in last 12 months (1=yes)	1476	0.09	0.29	0.00	1.00
Family member ill in last 12 months (1=yes)	1476	0.22	0.42	0.00	1.00

### Appendix 3: Enumerator Instructions

Below are shown the instructions which the enumerators were given for the short survey about insurance preferences.

1. Tell the respondent that you would (now) like to ask 9 questions about insurance products. Explain to the respondents that we ask these questions to get a better understanding of the specific insurance products people like. You tell them that, because we want to understand this better, we will ask them a series of 9 questions about different variations on the insurance product. These product can differ on three points:
  - a. The amount of money you pay at the beginning (of the year)
  - b. The amount of money you pay extra in case of having hospitalization expenses
  - c. The amount of money you get back in case of not having hospitalization expenses
2. When explaining these questions to the respondents, make clear they understand that, for each question, they choose between 2 hypothetical insurance products (these products do not really exist): policy A and policy B.
3. Tell the respondent that for all 9 questions, the insurance company only pays money when someone incurs hospitalization costs.
4. Make clear that for each policy, there are 2 things that can happen; either someone in the respondent's family incurs hospitalization costs, or no one in the respondent's family incurs hospitalization costs. If they incur hospitalization costs, the insurance company will pay for these costs.
5. For question 1-5, make clear that they understand that for policy B the respondent has to pay an additional amount to the insurance company when they incur hospitalization costs.
6. For question 6-9, please make clear that they understand that for policy A they will get back a certain amount from the insurance company at the end of the year if they did not incur hospitalization costs.

#### Appendix 4: Questionnaire

The table below show the form that enumerators used to explain the different choices about insurance preferences to the respondents. This is the form for question 1. The same structure was used for questions 2 - 9. These forms were translated into the local language (Kikuyu). For the questions about rebates (6- 9), it was stated for policy A that in case someone does not fall sick he/she will get back from the insurance company at the end of the year a respective rebate amount.

As outlined in this form, the respondents were informed what the total cost for each policy would be under both the condition of hospitalization and no hospitalization. This was done to make sure that respondents would understand correctly the choice they would make. For this reason, it was surprising that a significant number people (still) exposed irrational choice patterns which indicated that they did not correctly understand the questions; it is concluded that rebates and deductibles are difficult concepts to explain and understand.

**Table A4.1:** Questionnaire Instructions

IF YOU BUY POLICY A, 2 THINGS CAN HAPPEN:	At the beginning of the year you pay;	4000 KSH	Then, if you fall sick (either once, or several times) during the year that you are insured, and require hospital treatment	you pay extra	0 KSH	And then you will be treated in the hospital, and the insurance company will pay for the treatment	so the total is	4000KSH
	At the beginning of the year you pay;	4000 KSH	Then, if you don't fall sick during the year that you are insured,	you pay extra	0 KSH		so the total is	4000KSH

IF YOU BUY POLICY B, 2 THINGS CAN HAPPEN:	At the beginning of the year you pay;	3500K SH	Then, if you fall sick (either once, or several times) during the year that you are insured, and require hospital treatment,	you pay extra	500 KSH	And then you will be treated in the hospital, and the insurance company will pay for the treatment	so the total is	4000KSH
	At the beginning of the year you pay;	3500K SH	Then, if you don't fall sick during the year that you are insured,	you pay extra	0 KSH		so the total is	3500KSH

#### Appendix 5: Regression Analysis of Insurance Preferences

This table shows a series of probit regressions on the determinants of insurance preference in q1-5. In these regressions, option B (the deductible option) is assigned value 1. These regressions were run on the sample of people that did not expose irrational preference patterns.

Table A5.1: Probit Regression Question 1 - 5

Dependent variable = 1 if preference respective question is B, 0 if A. Probit Model. Rational sample.

	Q1		Q2		Q3		Q4		Q5	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Age (years)	0	0.9	0	0.493	0.001	0.833	0.001	0.843	0.002	0.619
Gender (male=1)	0.074	0.596	0.074	0.593	0.13	0.34	0.032	0.823	0.014	0.923
Secondary education	0.037	0.795	0.038	0.791	0.069	0.62	-0.03	0.833	0.113	0.436
HH members	0.051	0.162	0.01	0.792	0.048	0.178	0.04	0.289	0.026	0.475
Log of bank savings	0.012	0.737	0.039	0.247	0.009	0.792	0.002	0.962	-0.01	0.866
Cultivated land	1.466	0.113	1.307	0.12	1.335	0.135	1.542	0.095	1.262	0.137
SACCO shareholder	-0.21	0.396	-0.36	0.135	-0.2	0.4	-0.26	0.298	-0.16	0.517
Other bank account	-0.07	0.603	-0.05	0.719	-0.11	0.435	0.039	0.796	0.064	0.657
Has insurance	<b>-0.35***</b>	<b>0.01</b>	<b>-0.25*</b>	<b>0.064</b>	<b>-0.3**</b>	<b>0.023</b>	<b>-0.35**</b>	<b>0.013</b>	-0.14	0.292
Has formal credit	-0.02	0.854	-0.05	0.719	0.126	0.306	0.02	0.882	0.127	0.323
Has informal credit	0.265	0.126	0.173	0.323	<b>0.382**</b>	<b>0.023</b>	<b>0.301**</b>	<b>0.094</b>	0.148	0.411
Business activity	<b>-0.45***</b>	<b>0.008</b>	<b>-0.42**</b>	<b>0.013</b>	<b>-0.32**</b>	<b>0.039</b>	<b>-0.56***</b>	<b>0.002</b>	<b>-0.51***</b>	<b>0.003</b>
Perceives to be poor	-0.04	0.735	0.051	0.694	-0.01	0.91	-0.02	0.884	0.035	0.79
Doesn't need insurance	0.189	0.336	<b>0.318*</b>	<b>0.1</b>	0.178	0.359	0.126	0.537	0.237	0.23
Trusts ins. companies	<b>0.333***</b>	<b>0.01</b>	<b>0.378***</b>	<b>0.003</b>	<b>0.289**</b>	<b>0.023</b>	<b>0.47***</b>	<b>0</b>	<b>0.367***</b>	<b>0.005</b>
Trust banks	-0.01	0.912	-0.15	0.249	-0.05	0.716	0.052	0.708	-0.04	0.781
Risk aversion	0.403	0.12	0.257	0.325	<b>0.505*</b>	<b>0.045</b>	0.43	0.11	<b>0.454*</b>	<b>0.085</b>
Math & fin. literacy	<b>-0.88***</b>	<b>0.001</b>	<b>-0.95***</b>	<b>0.001</b>	<b>-0.78***</b>	<b>0.004</b>	<b>-0.7**</b>	<b>0.014</b>	<b>-0.68**</b>	<b>0.015</b>
Fam. ill	0.014	0.928	0.012	0.938	-0.03	0.818	-0.03	0.847	-0.27	0.094
Fam. inpatient	-0.22	0.323	-0.24	0.278	-0.13	0.527	0.004	0.988	0.074	0.736
Constant	-0.38	0.398	-0.07	0.881	-0.54	0.22	-0.65	0.167	-0.68	0.132
Number of observations	562		562		562		562		562	
Pseudo R <sup>2</sup>	0.0878		0.0891		0.0714		0.0933		0.0708	

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Table A5.2 shows a series of probit regressions on the determinants of insurance preference in 6-9. In these regressions, option B (the deductible option) is assigned value 1. These regressions were conducted on the sample of rational clients.

Table A5.2: Probit Regression Question 6 - 9

Dependent variable = 1 if preference respective question is B, 0 if A. Probit Model. Rational sample.

	Q6		Q7		Q8		Q9	
	Coef.	P>z	Coef.	P>z	Coef.	P>z	Coef.	P>z
Age (years)	-0	0.942	-0	0.85	-0	0.877	-0	0.397
Gender (male=1)	0.026	0.88	0.01	0.955	-0.05	0.771	-0.09	0.568
Secondary education	0.162	0.366	0.129	0.473	0.163	0.341	0.147	0.383
HH members	-0.02	0.705	-0.01	0.841	0.007	0.871	0.051	0.221
Log of bank savings	<b>0.072*</b>	<b>0.093</b>	0.069	0.107	0.044	0.27	0.032	0.418
Cultivated land	0.331	0.316	0.357	0.279	0.299	0.37	0.288	0.391
SACCO shareholder	-0.25	0.38	-0.27	0.353	-0.2	0.478	-0.17	0.53
Other bank account	0.047	0.79	0.061	0.73	0.158	0.346	0.11	0.508
Has insurance	<b>-0.47***</b>	<b>0.009</b>	<b>-0.45**</b>	<b>0.012</b>	<b>-0.42**</b>	<b>0.014</b>	<b>-0.45***</b>	<b>0.007</b>
Has formal credit	<b>-0.3*</b>	<b>0.059</b>	-0.29	0.077	-0.17	0.262	-0.12	0.437
Has informal credit	0.281	0.187	0.286	0.179	0.176	0.401	0.093	0.654
Business activity	<b>-0.67***</b>	<b>0.007</b>	<b>-0.67***</b>	<b>0.008</b>	<b>-0.64***</b>	<b>0.006</b>	<b>-0.7***</b>	<b>0.003</b>
Perceives to be poor	0.08	0.613	0.046	0.77	0.065	0.669	-0.03	0.865
Doesn't need insurance	0.266	0.234	0.183	0.421	0.265	0.224	0.201	0.357
Trusts ins. companies	0.168	0.296	0.196	0.225	0.144	0.353	0.079	0.611
Trust banks	0.067	0.687	0.111	0.511	0.039	0.806	-0.01	0.942
Risk aversion	<b>0.72**</b>	<b>0.023</b>	<b>0.743**</b>	<b>0.02</b>	<b>0.61**</b>	<b>0.047</b>	<b>0.536*</b>	<b>0.076</b>
Math & fin. literacy	<b>-0.91***</b>	<b>0.008</b>	<b>-0.98***</b>	<b>0.005</b>	<b>-0.9***</b>	<b>0.006</b>	<b>-0.79**</b>	<b>0.016</b>
Fam. ill	-0.14	0.46	-0.14	0.483	-0.18	0.343	-0.16	0.399
Fam. inpatient	<b>-0.62*</b>	<b>0.086</b>	<b>-0.61*</b>	<b>0.088</b>	<b>-0.67**</b>	<b>0.059</b>	-0.43	0.156
Constant	<b>-1.23</b>	<b>0.03**</b>	<b>-1.19</b>	<b>0.036**</b>	<b>-0.96</b>	<b>0.07*</b>	-0.7	0.174
Number of observations	562		562		562		562	
Pseudo R <sup>2</sup>	0.1298		0.1276		0.1095		0.0965	

\* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

Table A5.3 and A5.4 show various robustness checks. In order to check for both the first and second part of the questionnaire, these checks were conducted for question 1 and 6. The regression in panel 4 was used for the analysis reflected in the previous tables (A5.1 and A5.2)

**Table A5.3:** Probit Regression Question 1

Dependent variable = 1 if preference for deductibles, 0 if otherwise. Probit Model. Z-statistics in parentheses.					
	Full Sample			Rational Sample	
	1	2 <sup>1</sup>	3	4	5
Age (years)	-0.003 (0.363)	-0.002 (0.429)	-0.001 (0.82)	-0.001 (0.9)	0.002 (0.544)
Gender (male=1)	0.04 (0.643)	0.037 (0.624)	0.099 (0.338)	0.074 (0.596)	0.032 (0.749)
Secondary education	0.026 (0.76)	0.034 (0.691)	0.026 (0.8)	0.037 (0.795)	-0.019 (0.847)
Number of hh members	-0.006 (0.802)	-0.004 (0.838)	0.008 (0.755)	0.051 (0.162)	0.01 (0.718)
Log of bank savings	-0.013 (0.54)	-0.013 (0.556)	-0.009 (0.719)	0.012 (0.737)	-0.014 (0.571)
Cultivated land hectare	0.141 (0.54)	0.145 (0.506)	0.255 (0.33)	1.466 (0.113)	0.218 (0.394)
Is wananchi shareholder	0.106 (0.492)	0.107 (0.47)	-0.086 (0.648)	-0.211 (0.396)	-0.08 (0.674)
Has other bank account	0.034 (0.698)	0.027 (0.759)	-0.078 (0.453)	-0.075 (0.603)	-0.11 (0.283)
Has insurance	<b>-0.153* (0.061)</b>	<b>-0.158* (0.071)</b>	<b>-0.195** (0.045)</b>	<b>-0.35*** (0.01)</b>	<b>-0.227** (0.019)</b>
Has formal credit	-0.123 (0.111)	<b>-0.127* (0.083)</b>	-0.053 (0.572)	-0.023 (0.854)	-0.061 (0.512)
Has informal credit	<b>0.285*** (0.006)</b>	<b>0.287*** (0.004)</b>	<b>0.431*** (0)</b>	0.265 (0.126)	<b>0.407*** (0.001)</b>
Business activity	<b>-0.246** (0.014)</b>	<b>-0.242** (0.016)</b>	<b>-0.37*** (0.003)</b>	<b>-0.446*** (0.008)</b>	<b>-0.395*** (0.001)</b>
Perceives to be poor	0.041 (0.605)	0.043 (0.58)	-0.064 (0.501)	-0.044 (0.735)	-0.048 (0.609)
Does not need insurance	<b>0.238** (0.035)</b>	<b>0.238** (0.029)</b>	<b>0.566*** (0)</b>	0.189 (0.336)	<b>0.601*** (0)</b>
Trusts insurance companies	<b>0.25*** (0.002)</b>	<b>0.251*** (0.005)</b>	<b>0.23** (0.017)</b>	<b>0.333*** (0.01)</b>	<b>0.212** (0.027)</b>
Trust banks	-0.128 (0.112)	<b>-0.132* (0.089)</b>	<b>-0.194** (0.045)</b>	-0.015 (0.912)	<b>-0.224** (0.019)</b>
Risk aversion				0.403 (0.12)	
Math & financial literacy	<b>-0.478*** (0.004)</b>	<b>-0.473*** (0.003)</b>	<b>-0.551*** (0.006)</b>	<b>-0.88*** (0.001)</b>	
Family member ill	0.049 (0.581)	0.052 (0.579)	0.059 (0.585)	0.014 (0.928)	0.074 (0.492)
Family member inpatient	-0.092 (0.467)	-0.091 (0.503)	-0.195 (0.195)	-0.22 (0.323)	-0.184 (0.221)
Contant	-0.175 (0.499)	-0.193 (0.441)	-0.028 (0.93)	-0.379 (0.398)	-0.332 (0.262)
Number of observations	1428	1427	985	562	985
Pseudo R <sup>2</sup>	0.0369	0.0375	0.0691	0.0878	0.0627
Z-statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%					

Table A5.4: Probit Regression Question 6

<sup>1</sup> This regression accounts for intraclass correlation by using the STATA 10.0 function "robust(cluster)."

Dependent variable = 1 if preference for deductibles, 0 if otherwise. Probit Model. Z-statistics in parentheses.							
	Full Sample			Rational Sample			
	1	2 <sup>2</sup>	3	4	5		
Age (years)	-0.003 (0.287)	-0.003 (0.229)	-0.002 (0.619)	0 (0.942)	0.001 (0.872)		
Gender (male=1)	<b>0.186** (0.032)</b>	<b>0.187** (0.024)</b>	0.183 (0.14)	0.026 (0.88)	0.115 (0.335)		
Secondary education	-0.045 (0.6)	-0.047 (0.602)	0.072 (0.565)	0.162 (0.366)	0.022 (0.854)		
Number of hh members	-0.023 (0.306)	-0.023 (0.356)	-0.049 (0.142)	-0.017 (0.705)	-0.048 (0.151)		
Log of bank savings	<b>0.036* (0.078)</b>	<b>0.037* (0.082)</b>	0.043 (0.139)	<b>0.072* (0.093)</b>	0.04 (0.172)		
Cultivated land hectare	0.079 (0.725)	0.077 (0.743)	0.131 (0.622)	0.331 (0.316)	0.102 (0.699)		
Is wananchi shareholder	-0.195 (0.197)	-0.195 (0.182)	-0.241 (0.257)	-0.253 (0.38)	-0.241 (0.262)		
Has other bank account	-0.033 (0.707)	-0.031 (0.738)	-0.09 (0.478)	0.047 (0.79)	-0.113 (0.366)		
Has insurance	-0.083 (0.31)	-0.081 (0.33)	<b>-0.339*** (0.006)</b>	<b>-0.472*** (0.009)</b>	<b>-0.374*** (0.002)</b>		
Has formal credit	<b>-0.138* (0.077)</b>	<b>-0.137* (0.087)</b>	<b>-0.303*** (0.007)</b>	<b>-0.304* (0.059)</b>	<b>-0.311*** (0.006)</b>		
Has informal credit	0.168 (0.114)	0.167 (0.151)	<b>0.422 (0.003)</b>	0.281 (0.187)	<b>0.398 (0.005)</b>		
Business activity	<b>-0.183* (0.068)</b>	<b>-0.184* (0.066)</b>	<b>-0.33** (0.036)</b>	<b>-0.672*** (0.007)</b>	<b>-0.353** (0.023)</b>		
Perceives to be poor	-0.013 (0.871)	-0.013 (0.871)	0.013 (0.909)	0.08 (0.613)	0.03 (0.789)		
Does not need insurance	0.186 (0.104)	<b>0.186* (0.1)</b>	<b>0.457*** (0.003)</b>	0.266 (0.234)	<b>0.488*** (0.001)</b>		
Trusts insurance companies	0.08 (0.34)	0.079 (0.33)	<b>0.196 (0.086)*</b>	0.168 (0.296)	0.181 (0.112)		
Trust banks	-0.127 (0.118)	<b>-0.125* (0.098)</b>	-0.171 (0.137)	0.067 (0.687)	-0.202 (0.075)		
Risk aversion				<b>0.72** (0.023)</b>			
Math & financial literacy	<b>-0.56*** (0.001)</b>	<b>-0.561*** (0)</b>	<b>-0.539*** (0.024)</b>	<b>-0.913*** (0.008)</b>			
Family member ill	0.102 (0.254)	0.101 (0.227)	0.06 (0.641)	-0.143 (0.46)	0.067 (0.6)		
Family member inpatient	<b>-0.276** (0.039)</b>	<b>-0.276** (0.02)</b>	-0.261 (0.176)	<b>-0.618* (0.086)</b>	-0.251 (0.193)		
Contant	-0.239 (0.36)	-0.234 (0.35)	-0.588 (0.115)	<b>-1.231** (0.03)</b>	<b>-0.882** (0.012)</b>		
Number of observations	1428	1427	985	562	985		
Pseudo R <sup>2</sup>	0.0305	0.0305	0.0880	0.1298	0.0816		

<sup>2</sup> This regression accounts for intraclass correlation by using the STATA 10.0 function "robust(cluster)."



Z-statistics in parentheses, \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%

### Appendix 6: Irrational Answer Patterns

It was found that approximately 32% of the respondents made 1 or more inconsistent switch between preferences between questions. For example, when someone chooses option B in question 1 he/she prefers a policy with a KSh 3500 premium and a KSh 500 deductible (option B) over a policy with a KSh 4000 premium and no deductible (option A). When this person then switches to option A in question 3, he/she actually prefers policy with a KSh 4250 premium and no deductible (option A) over a policy a policy with a KSh 3500 premium and a KSh 500 deductible (option B)!

**Table A6.1:** Example of Irrational Choice Pattern

Question	Option	Premium (KSh)	Deductible (KSh)	Rebate (KSh)
1	A	4000	n/a	n/a
	B	3500	500	n/a
3	A	4250	n/a	n/a
	B	3500	500	n/a

This choice is classified as irrational because for both questions, option B is the same, whereas option 3A is simply a more expensive version of 1A; both offer the same coverage and do not offer any rebates. In other words, if someone prefers option A in questions 3, he / she should have also preferred option A in question 1. A total of 9 irrational choice patterns could be made. Table 5.1.5 shows for each of the possible 9 irrational choice patterns the percentage of the respondents that exposed these. For example, 3.8% of the respondents made the irrational switch from 1B to 3A.

**Table A6.2:** List of Irrational Choice Patterns

Switch (= 1 if respondent made this switch)	Mean	Std. Dev.
1B to 3A	0.038	0.191
1A to 4B	0.124	0.330
1A to 6B	0.182	0.386
1A to 8B	0.000	0.000
3A to 4B	0.068	0.253
3A to 6B	0.098	0.298
6A to 7B	0.062	0.241
6B to 8A	0.073	0.261
7B to 8A	0.060	0.238

### Appendix 7: Risk Aversion

The risk aversion variable was derived from the results of a 'risk game' played as a part of the extensive baseline survey. In this game, which is a variation on a similar experiment conducted by Holt and Laury (2002), respondents make a series of 12 choices in so-called 'paired lottery'. For each of the 12 choices, respondents specify which of the 2 lotteries they prefer to play.

The lotteries consist of the respondent picking a bead out of a bag. There are 2 bags, and each bag contains 2 colours of beads (blue and red). In total there are 10 beads in each bag and for each of the 2 bags, a certain colour represents a certain value. The values assigned to the beads differ between the two bags. In bag 1, the red and blue beads are worth KSh 0 and 300 respectively. In bag 2, these beads are worth KSh 50 and KSh 100 respectively.

For example, in the first question (see table A7.1), respondents are asked to choose between 2 bags. The first bag (blue) contains 8 blue beads worth KSh 300 and 2 red beads worth KSh 0. The other bag (purple) contains the same amount of blue and red beads, but here the blue bead is worth KSh 100 and the red KSh 50. As such, when one would randomly take a bead out the blue bag the average gain would be  $((8*300) + (2*0))/10 = 240$ , whereas the average gain for the purple bag = 90 (i.e.  $((8*300) + (2*0))/10$ ).



Source: Holt and Laury (2002)



International  
Labour  
Office  
Geneva

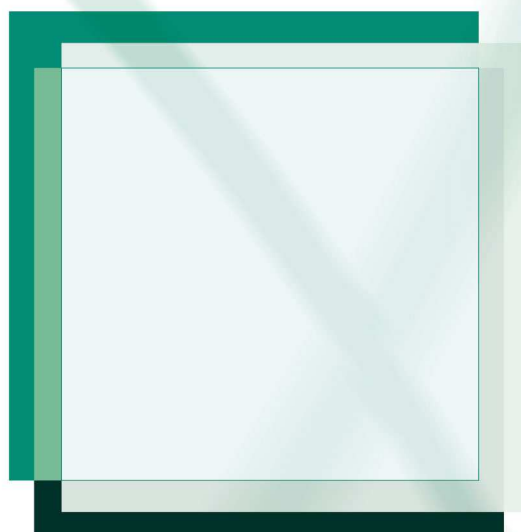
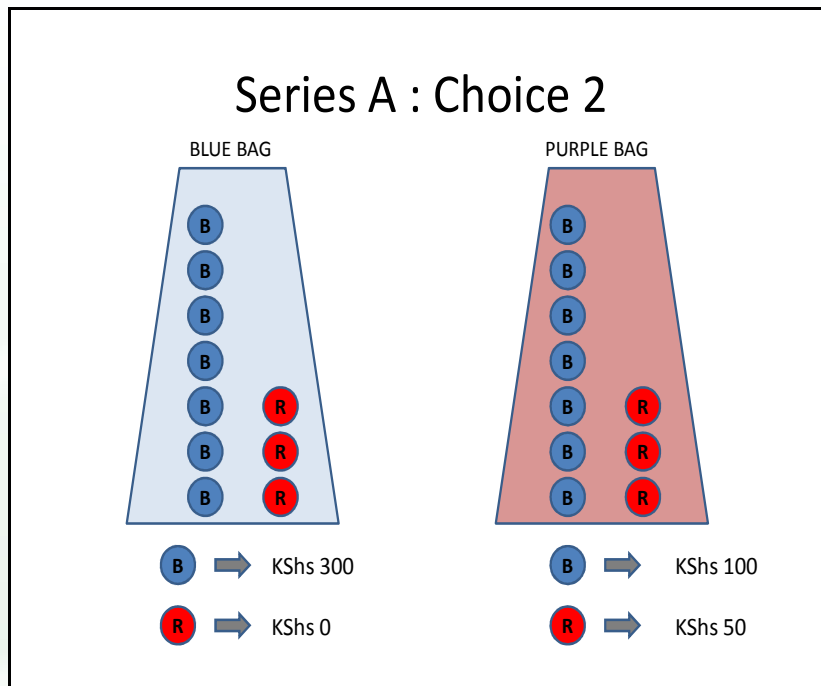


Table A7.2: Risk aversion A2



Source: Holt and Laury (2002)

Subsequently, respondents are asked to choose between 5 additional pairs of bags with different ratios of blue and red beads. For example, in the second question there are 7 blue beads and 3 red beads (see table A7.2). Here the expected outcome of randomly taking a bead out of the blue bag and red bag is KSh 210 and 85 respectively. As such, as the questions progress, the difference between the average gains for the two options decreases.

In the second part of this game, respondents are presented with a variation to the first 6 choices. The difference here is that they are asked to imagine that before playing the game, they will first receive KSh 300. Subsequently, the beads do not represent gains, but losses. For example in series B1, the blue beads in the blue bag represent a *loss* of KSh 300, and the blue bead in the purple bag represent a *loss* of KSh 100. Whereas the average gain in each of these 6 choices in series B is identical to the respective choices in series A, the difference is that series A is presented as a gain, whereas series B is presented as a loss.

After having given their preferences for these 12 choices, 1 of these 12 'games' is randomly selected and the respondents actually play this selected game. For example, if game A1 is randomly selected and the respondent had chosen the blue bag, he/she got to take a bead out of this bag (which was opaque, so the respondents could not see which bead he/she would take) and the corresponding price is paid. For example, if the person would draw a blue bead in bag A1, he/she would receive KSh 300 in cash. In case someone would be randomly assigned to play a game from the second series, he/she would first receive KSh 300 and then play the game which would determine how much he/she would have to return.

Table A7.3: Risk Game Preferences, Series A

Series 1: all Blue?	Series 1: all Purple?		
	No	Yes	Total
No	1,061	133	1,260
Yes	282	0	294
<b>Total</b>	1,343	133	1,476

In this table we see that 1061 people make at least 1 switch in the first series (choice 1-6) of the risk game (i.e. they move from choosing the blue bag in one question to choosing the purple bag in another question and vice versa (from purple to blue). Furthermore, 282 people chose the blue bag in all 6 questions, and 133 chose the purple bag in all 6 questions.

Table A7.4: Risk Game, Series A, Consistent Patterns

Variable	Answer (% of total sample)
All Blue	19.1
Blue in q1, afterwards Purple	3.4
Blue in q1-2, afterwards Purple	5.0
Blue in q1-3, afterwards Purple	7.2
Blue in q1-4, afterwards Purple	7.5
Blue in q1-5 afterwards Purple	4.5
All Purple	9.0
<b>Total</b>	55.7

This table shows the percentage of respondents that exposed various consistent answer patterns in the risk game. Consistent is defined as making a series of choices with a maximum of 1 switch between questions, the switch being from choosing blue in 1 question to choosing purple in the subsequent question. For example, when someone chooses the blue bag in Series A1 (table A7.1) and switches to the purple bag in series A2 (table A7.2) this can be considered as a consistent switch since the difference in expected outcomes between the blue and purple bag has decreased in A2.

However, when this person would then switch back in series A3 (not shown) to the blue bag, this would not be consistent. Furthermore, it is consistent to choose the purple (or blue) bag for all 6 questions. As is shown in table A7.4, 55.7% of the respondents exposed a consistent preference in their choices in the risk game. The other 44.3% however made inconsistent switches. It is shown in table A7.5 that over 40% of the entire sample made 2 or more switches

within the first series of 6 questions. Furthermore, the group of 424 people that made 1 switch includes 21 people that switched from choosing the purple bag in one question to choosing the blue bag in the subsequent question.

**Table A7.5:** Switches in Preference Risk Game

Number of Switches in Series A	Freq	Percent
0	415	28.12
1	424	28.73
2	256	17.34
3	247	16.73
4	100	6.78
5	34	2.30
Total	1,476	100

On the basis of these findings I assume that there is a group of 818 people that have understood this risk game properly; the people that made no switch or 1 switch (from blue to purple in the consecutive question). I use their results from the risk game to estimate the impact of risk aversion on insurance preferences. In order to do so, I calculate the relative risk aversion (RRA) of the people in this group on the basis of their answer pattern. To do so, I assume constant relative risk aversion (CRRA):

$$Utility_{(\text{expected outcome})} = \text{expected outcome}^{1-r} / (1-r).$$

Using this formula, I estimate the RRA based on the point in the series at which the respondent switches (from blue to purple). For example, if someone would choose blue in question 1 and then switch to purple in question 2 (and stay with purple throughout the series), we can calculate the range of his/her RRA. When someone is indifferent between the blue and purple bag in question 1, RRA is calculated as follows:

$$0.8 \cdot (300)^{1-r} / (1-r) = 0.8 \cdot (100)^{1-r} / (1-r) - 0.2 \cdot (50)^{1-r} / (1-r)$$

, this yields;

$$r_{\text{question1}} = 0.82$$

When someone is indifferent between the blue and purple bag in question 1, RRA is calculated by:

$$0.7 \cdot (300^{1-r} / (1-r)) = 0.7 \cdot (100^{1-r} / (1-r)) + 0.3 \cdot (50^{1-r} / (1-r))$$

, this yields;

$$r_{\text{question2}} = 0.72$$

As such, I establish for each consistent preference pattern a range of the RRA for a certain switch. However, in order to arrive at a specific value for the RRA in order to use this variable in the regression analysis, I calculate the RRA value as the middle point of this range. For example, for someone who switches from blue in 1A to purple in 1B, the RRA range for this person is 0.72 - 0.82. For the purpose of including this variable in the regression analysis I then assume this person's RRA to be 0.77 (i.e.  $(0.72+0.82)/2$ ). For the answer patterns 'All Purple' and 'All Blue' I have assumed that in A6 and A1 respectively, the respondent was indifferent between the two choices. For the other 5 patterns I have assumed that the RRA lies exactly in the middle of the range.

**Table A7.6:** Relative Risk Aversion, Series A

Answer Pattern	Answer (% of total sample)	Range of Relative Risk Version for $U(x) = x^{1-r} / (1-r)$	Assumed Relative Risk Version for $U(x) = x^{1-r} / (1-r)$
All Purple	18.9	$0.82 < r$	0.82
Blue in q1, afterwards Purple	3.4	$0.72 < r < 0.82$	0.77
Blue in q1-2, afterwards Purple	5	$0.62 < r < 0.72$	0.67
Blue in q1-3, afterwards Purple	7.2	$0.51 < r < 0.62$	0.57
Blue in q1-4, afterwards Purple	7.5	$0.51 < r < 0.38$	0.45
Blue in q1-5 afterwards Purple	4.5	$0.38 < r < 0.22$	0.3
All Blue	9.6	$r < 0.22$	0.22

It was somewhat counterintuitive to find that risk aversion positively affects the preference for deductibles, since policies with a deductible actually leave part of the risk uncovered. A study by Gine *et al.* (2007) showed that uptake of insurance was negatively affected by risk aversion for people without prior experience with insurance, but positively for people with such prior experience. Because in my study the preference for rebates and deductibles was shown to be affected by trust and prior experience with insurance, I test if the effect of risk aversion on insurance preferences is



affected by people's prior experience and their trust insurance companies. In order to do so, I construct 2 interaction terms:

- risk aversion \* 'has insurance'
- risk aversion \* 'trusts insurance'

I include these interaction terms in the list of independent variables and test with a probit model if these interaction terms affect preferences in question 6. The table below shows how the effect of risk aversion on the preference for the deductible option (option B) does not depend on whether one has (or has had) insurance, or whether one trusts insurance companies. I thus conclude that the effect of risk aversion on insurance preferences is not affected by experience with insurance and trust in insurance companies.

**Table A7.7:** Relative Risk Aversion, Interaction Effects

Probit regression, dependent variable = 1 if preference q6 is option B. Regression includes same variables as baseline regression results (other results omitted; similar to table 5.3.3). Z-statistics in parentheses.			
	Combined	Regression Terms Added Individually	
Risk aversion	0.749* (0.078)	0.634* (0.083)	0.836** (0.029)
Risk aversion * has insurance	0.354 (0.63)	0.360 (0.631)	
Risk aversion * trust insurance	-0.359 (0.593)		-0.365 (0.587)
Pseudo R <sup>2</sup>	0.1310	0.1303	0.1305
Number of Observations:	562	562	562
* significant at 10%; ** significant at 5%; *** significant at 1%			



## MICROINSURANCE INNOVATION FACILITY

Housed at the International Labour Organization's Social Finance Programme, the Microinsurance Innovation Facility seeks to increase the availability of quality insurance for the developing world's low income families to help them guard against risk and overcome poverty. The Facility was launched in 2008 with the support of a grant from the Bill & Melinda Gates Foundation.

See more at: [www.ilo.org/microinsurance](http://www.ilo.org/microinsurance)

## EUROPEAN DEVELOPMENT RESEARCH NETWORK

The European Development Research Network (EUDN - [www.eudnet.net](http://www.eudnet.net)) links members of different development research institutions, particularly in the field of development economics, from Europe with the rest of the world. EUDN research fellows have an extensive background in investigating risks, poverty and vulnerability issues in developing countries.

## RESEARCH PAPER SERIES

The *Research Paper series* seeks to stimulate further knowledge on microinsurance. The Facility has provided a number of research grants for academics, particularly from developing countries, to conduct research on microinsurance and answer key questions in the Facility's research agenda. The Research Papers present results from those research grants as well as other working papers from relevant studies conducted by partnering organizations.

