Unshrouding product-specific attributes through financial education*

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Abstract

Financial education interventions are considered successful when they help households make better financial decisions. However, this fails to account for the general equilibrium consequences of such an intervention. We redefine successful financial education as one where such interventions result in large enough effect sizes to move the market to an equilibrium where firms find it in their interest to unshroud product features to all consumers. We then assess a new product-specific rules of thumb-driven consumer financial education program in India. Our intervention improves knowledge and outcomes for newly-educated consumers. It is, however, a Pareto-improvement only under a narrow set of conditions. Positive treatment effects for a small fraction of retail consumers may come at the cost of other uninformed consumers. They are not enough to move the market to an unshrouded equilibrium, questioning the effectiveness of such an intervention.

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1 Introduction

The retail market for financial products has exploded in the last two decades. The financial literacy required for households to make welfare-improving decisions has, however, not kept pace with this increasingly complex product market environment (Lusardi and Mitchell 2014, 2011). This situation is made worse in the face of complex product structures that are often shrouded by financial firms and commission-motivated sales agents with little incentive to unpack product features in the interest of the customer (Guiso et al. 2021, Gomes et al. 2020, Anagol et al. 2017, Sane and Halan 2017). Poor consumer outcomes have led to calls for financial education interventions and regulation to offset the inability to discern the exact product offering by financial firms (Campbell 2016). In a meta-analysis of 76 randomized experiments, Kaiser et al. (2021) show that financial education programs have, on average, positive causal treatment effects on knowledge and financial behavior.

In this paper, we ask whether even a positive and economically meaningful treatment effect is sufficient to deem financial education successful. There are two associated considerations when thinking about financial education. The first is what is the nature of financial education that can make a difference in markets where product attributes are shrouded. When product features are shrouded, firms profit from the choices of uninformed customers, who also cross-subsidize informed consumers (Gabaix and Laibson 2006). Most financial education interventions discussed in the literature provide elementary knowledge and do not give contextual lessons to make specific purchase decisions. Contextual knowledge is necessary to enable households to unshroud relevant product features, evaluate them in terms of households' needs, and infer from high-powered incentives for brokers and agents that the product may be sub-optimal (Anagol et al. 2017).

The second consideration is the extent to which financial education can create discerning customers such that firms are incentivized to unshroud product attributes and move the market to a different equilibrium. Thus far, financial education interventions have only focused on inducing better financial behavior and decision-making for a given consumer. While the welfare gains to a newly educated household are noteworthy and illustrated in Lusardi et al. (2015), such interventions may unwittingly make other uninformed consumers pay a greater price. In a market where firms extract rents from less informed consumers' mistakes and can hold on to the demand from informed consumers through cross-subsidies, the equilibrium will only move when *enough* customers have

been educated (Kosfeld and Schüwer 2017). Increasing the share of informed consumers could lead to a higher required cross-subsidy and thereby higher costs for less-educated consumers. It is, therefore, useful to ask what is the threshold effect size for financial education that enables an unshrouded equilibrium?

In this paper, we address these considerations. First, we adapt the Gabaix and Laibson (2006), Kosfeld and Schüwer (2017) framework of shrouded market equilibrium to the insurance market setting in India. We focus on *endowment insurance*, a product that combines term insurance with a savings instrument. The contracts pay a lump-sum when the policy matures or on death. Products like endowment insurance are costly to individuals. They provide neither insurance at actuarially fair prices nor the market returns on a risk-free savings instrument. Even though the exit cost is always substantial, more than 50% of the consumers in India terminate their contracts within five years. Even so, endowment insurance products make up a large portion of the life insurance market in India (Halan 2020). The dominance of endowment insurance is likely a consequence of strong incentives for insurance companies and their agents to maximize profits, coupled with the lack of financial knowledge among potential consumers.[1] We formally derive the fraction of newly educated consumers needed to sway firms into unveiling true product value and setting unshrouded prices in equilibrium. The analysis shows that the higher the *ex-ante* fraction of uninformed consumers in a market, the larger the intervention effect needs to be to ensure "effective financial education", i.e., one that does not adversely affect consumers who remain uneducated.

Second, we design and test a financial education intervention that equips consumers with rules of thumb to evaluate an insurance product in terms of their needs and infer from high-powered incentives for brokers and agents that the product may be sub-optimal. Our setup only considers consumers to either be uninformed or informed by design.[2] Our experiment consists of showing two types of videos to potential consumers of an endowment insurance product. The first treatment (T1) provides consumers with the rules of thumb. The second treatment (T2), in addition to the rules of thumb, shows an alternative set of products that provide better outcomes at a cheaper cost.

[1] In the Indian context, Anagol et al. (2017) study the role of commission motivated agents and find that agents overwhelmingly recommend unsuitable, strictly dominated products and cater to the beliefs of uninformed consumers.

[2] We do not consider rationally inattentive consumers in this study. However, it may be useful to note that should consumers be rationally inattentive to the shrouded value in this product market, a policy intervention may be unwarranted in the first place.

After the education intervention, we replicate the standard endowment insurance contract in the market and its marketing materials and elicit *intention to purchase* from a large field experiment involving 2,838 households sampled across Delhi, India. Our first treatment with rules of thumb results in a 2.9 percentage point decline in the intention to purchase endowment insurance or an 8.3% increase in the base rate of rejecting endowment insurance observed in the control group. Consumers in the first treatment are more likely to have a higher knowledge of the product features and to be able to identify and discover specific characteristics of the endowment insurance presented to them in the experiment. The second treatment with an explicit product evaluation produces similar magnitudes of decline in the intention to purchase endowment insurance, though not statistically significant at conventional levels.

We follow up with a second round outside the experiment and elicit the intention to purchase term insurance - a more suitable financial product - over a telemarketing conversation with trained surveyors. We design the follow-up round to be as close as possible to a real sale. This research design allows us to evaluate our financial education intervention's effect without violating our ethical and legal responsibilities.[3] We find that participants from the first treatment are significantly more likely to demand term insurance – a better product in the market. In contrast, the second treatment participants are no different from the control group in their potential demand for term insurance. Thus, introducing rules of thumb leads to the possible substitution of the suboptimal product with a good product, consequently improving the welfare of newly educated consumers.

Overall, the results of our experiment suggest that product-specific rules of thumb have the potential to improve purchase decisions by meaningful magnitudes, especially in light of Kaiser et al. (2021), who show that financial education interventions with insurance decisions have thus far not been effective. Additionally, our estimates are consistent across different rounds of outcome elicitation, and we document positive treatment effects with changes in knowledge and unshrouding of product features, standard measures in the study of information intervention effects. Our intervention is scalable, inexpensive,

[3]A careful assessment and review of the ethics for an actual sale of a grossly unsuitable product to potential consumers guides our experimental design. As a result, we stop short of measuring realized demand for the product. In addition to the ethical considerations, selling insurance products without being a registered agent is illegal, and as highlighted in Anagol et al. (2017), no insurance company nor its agents have any incentive to collaborate with researchers to undo this dominant feature of the Indian insurance markets.

and easy to roll out, making it a feasible approach to enable product-specific financial-education.

Finally, we combine the theoretical framework and the experiment to evaluate the market implications of effective financial education. We evaluate whether the treatment effect size would likely result in an unshrouded equilibrium. We calibrate our theoretical model given the market parameters, such as the ex-ante share of financially sophisticated consumers, the cost of substitution from a sub-optimal to an optimal product, and the maximum overpricing possible in this context. In this setting, we find that the minimum effect size required is about a 13% increase in the share of informed consumers to result in an unshrouded equilibrium. Even though our education has a large effect size of 8.3% – by the standards in the current literature – it is not sufficient to lead to market improvements. Extending this theoretical benchmark to other interventions in the literature, we find that many financial education interventions are indeed unsuccessful by this new refined definition of success in financial education.

The experiment and the theoretical benchmark suggest that positive treatment effects are necessary to improve the welfare of newly educated consumers, but may not be sufficient to achieve a Pareto improvement in the market. In a market with an ex-ante high share of uninformed consumers, as in many financial product markets across various countries globally, financial education needs to deliver a substantial treatment effect – magnitudes guided by calibrating our model.[4] Even effective financial interventions are very likely to lead to costly negative externalities, given that they do not educate a sufficient number of consumers, the fact that the literature has mostly overlooked.

The rest of the paper is organized as follows. Section 2 presents the insurance market in India and its characteristics as a market for products with shrouded features. Section 3 describes our adaptation of Gabaix and Laibson (2006) to evaluate product-specific financial education in this market. Section 4 documents the setting for the experiment, details the intervention, experimental design, empirical strategy, and results. Section 5 combines the theoretical model and the intervention results and discusses the market implications of our treatment effects. Section 6 concludes.

[4]Guiso et al. (2021) find that financial literacycampaign in the market with "steering" customers as a practice would be always beneficial for the welfare of the naïve households. However, the effect size of the education in Guiso et al. (2021) is assumed to be equal to 50 %, a large effect compared to 12% average from Kaiser et al. (2021). The presumed size of the effect can be a driver for the conclusion on the welfare effects documented in their work.

2 The setting: Endowment insurance in India

Our experiment is designed to address shrouded attributes in the Indian insurance market. The first feature that characterizes the market for products with shrouded features is the product itself. The main focus of our paper and educational intervention is the endowment insurance product, which offers a combination of life insurance and saving. These are bundled products designed to respond to consumer misperception of the product's objective (Bar-Gill 2007). However, they dominate the Indian insurance market. Typically, such products are marketed as perfect substitutes for term insurance with additional "worry-free" safe investment and annual or lumpsum bonus. However, endowment insurance products shroud important features such as the rates of return on the risk-free savings component and the likelihood of bonus payouts and overstate the product's true value. All of these make endowment products over-priced or equivalently products with shrouded true (lower) realized value.

The extent of shrouding can be demonstrated by comparing an endowment insurance product and its replicating portfolio. We construct a replicating portfolio with the same insurance coverage and saving potential and compare the returns. The replicating portfolio consists of a term insurance plan with the same maturity and payout as the insurance component of the endowment plan. The savings component is obtained by investing in the public provident fund (PPF) product.[5] Important to note that the transaction cost of obtaining a combined product is low; for example, it is listed as a different option on the same webpage as the endowment product if you were to purchase online. Additionally, the costs of purchasing the endowment contract as opposed purchasing the two separate products are not nearly as small to be attributed to convenience.

We obtain information on the premiums required by a male, non-smoking adult for an endowment insurance product, term insurance product, and the PPF investments. Holding the payout in the event of death to be the same (₹600,000), we compute the gains from the strategy of investing the difference between endowment and term products premiums in the PPF scheme for 15 years. Online Appendix A presents the details of the specific products from the Indian market used to arrive at this representative estimate.

Figure 1 plots the resulting implied rates of return for the endowment product and the term insurance plus PPF products for 30-, 40-, 50-year-old male with and without

[5]The Public Provident Fund is a fifteen-year savings product offered by the Government of India and provides a guaranteed rate of return.

a bonus. The figure shows that at no point in the age distribution the guaranteed gains without a bonus (in grey) from investing in the endowment product are higher than the returns from investing in a replicating portfolio. The differences in the internal rates of return are non-trivial. At 30, 40, and 50, these are 6.56%, 6%, and 4.74% per annum, respectively.[6]

Endowment insurance plans often promise additional benefits in the form of a simple annual bonus. The size of the bonus depends on the sum assured. The bonus is not guaranteed and not compounded. In Figure 1, the simple bonus is equal to ₹43 for every ₹1,000 of the sum assured (or 4.3% of the amount assured). Assuming that the bonus accrues for every year of the policy's life, at the maturity of the endowment contract, the bonus would amount to ₹387,000, substantially improving the returns from the endowment insurance. With the bonus, the internal rate of return from endowment insurance increases to 6.19% for a 30-year old individual, which is still 1.8 percentage points lower than the return from the combination of term insurance and PPF savings. Importantly, however, the bonus payments are not guaranteed and should be heavily discounted, if not excluded, from the endowment product return calculations. Overall, the example shows that the endowment product is overpriced and sub-optimal compared to its replicating portfolio. All of the above makes endowment insurance a product with at least one shrouded feature - its true value.

Another important component of the market of products with shrouded features is asymmetric information among consumers. Sophisticated consumers know about the shrouding and pay less for the products than myopic investors, who are unaware of it. Different types of individuals populate the demand side of the Indian insurance market. However, we can not explicitly measure the level of sophistication among consumers.[7] Instead, we provide the evidence confirming the asymmetry of information among consumers and the fact that firms exploit it.

The main sales channel for the endowment insurance products in India is commission-incentivized agents.[8] Anagol et al. (2017) show, that agents are incentivized to sell

[6]The gap in gains shrinks due primarily to an increase in the term insurance premiums with age and, consequently, a reduction in a PPF investment.

[7]The financial sophistication measures vary significantly in India. According to NCFE (2019), 89% of consumers in India can answer the three financial literacy questions correctly, measuring the general financial literacy at a very high level. However, knowledge of insurance products is at a much lower level, with only 35.9 % of individuals in our control sample saying rejecting to buy sub-optimal insurance products

[8]In 2020, individual agents sold about 60% of all endowment products (IDRAI 2020).

unsuitable, strictly dominated insurance products such as endowment insurance and that they cater to the beliefs of uninformed or myopic consumers, even if their beliefs are wrong. At the same time, sophisticated consumers are more likely to buy term products directly, from online retailers, or through the web aggregators (Halan 2020), with direct and online sales summing up to about 9 % of all sales in 2020 (IDRAI 2020). Given that myopic consumers are more likely to receive and are more susceptible to worse financial advice (Mullainathan et al. 2012, Sane et al. 2013, Hoechle et al. 2018), they are likely to follow commission-motivated agents' advice and buy overpriced products. As a result, myopic consumers are more likely to pay more than sophisticated consumers. Hence, myopic consumers are worse off than sophisticated agents and potentially provide a cross-subsidy for firms' unrealized profits from the sophisticated investors purchasing term insurance instead.

Finally, the Indian insurance market is in shrouded price equilibrium, with firms charging high premiums for sub-optimal products. The shrouding is stable over time. Consumers learn eventually about the true quality of the products, and only about 50% of the policies surviving the five-year mark and less than 20% still in place after 12 years (Sane and Halan 2017). However, insurance firms keep shrouding the prices. The resulting lapsation fees only add to the insurance firms' profits, and the demand for policies keeps growing. While it is entirely feasible that consumers learn about the shrouded attributes over time, firms possess the ability to "reshroud" the features in different ways. Such a possibility makes it even harder to design education interventions to achieve an unshrouded equilibria. While this makes the case for regulation as a tool for intervening in financial markets (Campbell 2016, Anagol and Kim 2012) the attendant consequences of regulation on achieving unshrouded equilibrium remain unclear.

The competition structure of the Indian insurance market supports price shrouding with Life Insurance Corporation of India (LIC), a state-owned entity being a monopoly and the main seller of endowment products. Furthermore, regulatory efforts such as improvement in disclosure or adjustment of fee structures do not divert insurance firms from selling overpriced products (Anagol and Kim 2012). The Indian insurance market is thus a market for products with shrouded features, thus an apt setting for our study.

3 The model: Value shrouding and financial education

In this section, we describe the adaptation of Gabaix and Laibson (2006) to the insurance market setting. Firms in the market hide true product value but charge high premiums while providing a sub-optimal return. For example, firms can present the product's gross return or an absolute value of the final pay-out without providing total costs, making product evaluation more difficult.[9] There are two types of consumers in the market. The first type, the myopic consumer, is unaware of the value shrouding and lacks financial knowledge to unveil the product's true value. The second type, the sophisticated consumer, is aware of the overpricing and can avoid it at a non-zero cost. Firms choose whether to shroud or unshroud the product's true value depending on the share of informed consumers. Shrouding the product's true value allows financial firms to extract profits from consumers with no financial knowledge and keep the demand from sophisticated consumers by subsidizing the unbundled product. Consequently, firms keep shrouding the true value if myopic consumers' share is large enough in equilibrium without an educational intervention.

In this market, a financial education intervention increases the share of sophisticated consumers and, therefore, improves newly-informed consumers' welfare. Besides, by raising the share of informed consumers, the intervention can create incentives for firms to stop shrouding the product's true value and set up the unshrouded equilibrium prices, resulting in welfare improvement for all consumers in the market. However, unshrouding happens *only* when the effect of education is large enough. Smaller educational effects could lead firms to continue shrouding and increasing costs for uninformed consumers to cover the excess loss of profit from the newly-informed.

The model is populated by a finite number of profit-maximizing firms selling a financial product. The total price of the product on the market is P. The product promises a total pay-out of V. Firms can decide to shroud the actual value of the product by declaring that its value is equal to V_s, when the actual pay-out is lower by a non-zero amount q, so $V_s - V = q > 0$.[10] Therefore, q is a hidden loss or a *"hidden value-discount"*

[9] The firms are technically and legally correct in such a presentation as they do not hide that they compute returns on the annual premium rather than the total product cost. Often, uninformed consumers do not realize that they calculate returns in an unhelpful manner.

[10] We use the pay-out from the product as a characteristic of its quality. The overpriced product would be considered lower in quality and therefore sub-optimal.

for the consumer. This loss can emerge, for example, if firms present the final pay-out in nominal terms instead of real terms and a consumer can not distinguish between the two. Similarly, it can also emerge when the rate of return presented does not take time-value into account and consumers lack the knowledge to consider, for example, the impact of inflation over time. By shrouding the quality of the financial product, a firm makes an additional profit q.

The hidden value discount, q, is not directly revealed to the consumers by firms, but some consumers know about it *ex-ante*. Let us assume the mass of consumers in the economy is normalized to 1, and all consumers aim to invest in the financial product. There are two types of consumers: a fraction α of all consumers are myopic and only consider the stated price of the product P, and the presented pay-out V_s. The remaining fraction $(1-\alpha)$ are sophisticated consumers and consider the contract price, P, the expected pay-out, V, and the value-discount, q, imposed by the firm.[11] In a real-world setting, myopic consumers would, for example, evaluate the product using nominal returns when sophisticated consumers consider the real rate of return.

The division between sophisticated and myopic consumers in the economy is common knowledge. However, while pricing the product, firms cannot distinguish between sophisticated and myopic individuals, making price discrimination impossible. Many financial product market sellers, even when receiving a signal about the type of a customer, do not offer different pricing or alternative products (Anagol et al. 2017, Kosfeld and Schüwer 2017).

Sophisticated investors know about the value-discount of the product, q. They infer that it is different from zero ($q > 0$) and can potentially opt-out of paying it by substituting the product with a replicating portfolio with the same price and pay-out V_s. However, the substitution comes at a cost, e. [12]

All consumers in the economy have a maximum tolerance for the hidden value-discount, $\overline{q}$, which sets an upper bound for q, i.e., $q \leq \overline{q}$.[13] In the case of endowment products, the difference between the actual and the fair market price, the price of replicating portfolio, can be an example of the maximum value discount. The cost of substitution

[11] When the information is unshrouded, the expectation for the hidden loss, q, is equal to its true value. When the information is shrouded, sophisticated consumers anticipate perfectly the value of q that the firm sets in equilibrium.

[12] In the model, the firms are homogenous: thus, the cost of substitution is the same for all firms.

[13] Gabaix and Laibson (2006) call $\overline{q}$ the maximum willingness to pay for the add-on. The value of $\overline{q}$ can correspond to legal and regulatory constraints limiting the penalties/ fees that firms can charge.

is lower than or equal to the maximum possible value discount, $e \leq \overline{q}$.[14]

The solution and derivations of the model largely follow Gabaix and Laibson (2006) and are described in Appendix B. Firms would decide to shroud or unshroud the product's true value depending on the share of myopic consumers in the economy, α.

Let

$$\alpha^{\dagger} = \frac{e}{\overline{q}} \quad \text{and} \quad \mu = \frac{D(0)}{D'(0)}$$

where μ measures the degree of competition in the industry or the average profit per consumer and equals to $\mu = \frac{D(0)}{D'(0)}$.

If the fraction of myopic individuals, α, is greater than $\alpha^{\dagger}$, there exists a symmetric equilibrium in which firms keep the true value of the product hidden. We call this equilibrium Shrouded Value Equilibrium.

If the fraction of myopic individuals, α, is less than $\alpha^{\dagger}$, there exists a symmetric equilibrium in which firms do not hide information and disclose the true product value to all consumers. The above constitutes Unshrouded Value Equilibrium.

The type of equilibria matters for the economy. In Shrouded Value Equilibrium, the firms are not only hiding the information from consumers; myopic consumers are also strictly worse-off and subsidize the sophisticated consumers (Gabaix and Laibson 2006, Kosfeld and Schüwer 2017). In the shrouded equilibrium, firms exploit the lack of knowledge by myopic consumers. A firm can offer a better product to the sophisticated consumer, the product with higher realized value, and compensate its losses by setting the product value-discount q for the myopic consumers at the highest level, $\overline{q}$. In Shrouded Value Equilibrium, myopic consumers subsidize sophisticated consumers.[15]

In Unshrouded Value Equilibrium, all consumers face the same prices, i.e., myopic and sophisticated consumers have the same surplus. Sophisticated consumers are not worse of in an unshrouded equilibrium. Put differently, the set of choices that sophisticates could make remain valid in an unshrouded equilibrium and the price of these choices are not any higher than it will have been without the cross-subsidy. Furthermore, when product values are unshrouded, sophisticated consumers do not need to exert any effort to bargain for a better deal. Thus, in Unshrouded Value Equilibrium, there is no inefficiency, and all consumers are equally well-off.

[14] If $e > \overline{q}$, sophisticated consumers will never opt-out of the product.
[15] Derivations for the equilibria comparison are described in Appendix B.3.

Unshrouded equilibrium is a Pareto improvement compared to Shrouded Value Equilibrium and a desirable equilibrium for consumers. There are two ways in which the market can achieve Unshrouded Value Equilibrium. First, firms can unshroud the values themselves. However, Gabaix and Laibson (2006) show that firms do not have an incentive to unshroud the value of the product themselves.[16]

Another possible way to accelerate unshrouding or to make firms reveal true product values is to provide third-party education, therefore decrease their share in the population, and remove the incentive for firms to shroud information (Kosfeld and Schüwer 2017, Gabaix and Laibson 2006). The main aim of such education would be to increase the ex-ante number of sophisticated consumers, thus moving α below $\alpha^{\dagger}$ and, consequently, making firms choose the unshrouded equilibrium.

3.1 Introducing financial education

Suppose a policymaker can educate a fraction of myopic consumers before firms decide on their information and pricing strategy (Kosfeld and Schüwer 2017). This intervention increases the share of sophisticated consumers in the population from $1-\alpha$ to $(1+\gamma)(1-\alpha) = 1-\alpha^{\S}$ before, and independent of, any potential educational effect of a firm's unshrouding strategy.[17]

In the presence of a third-party financial education, the price equilibria are no longer the same. A detailed description of the new equilibria is provided in the Appendix B.4. It is important to note that if the effect of education is not sufficient and the share of myopic consumers is still large (or $\alpha^{\S} > \alpha^{\dagger}$), the market will stay in the Shrouded Value Equilibrium and myopic consumers would become worse-off than before the education intervention. Given that $\alpha > \alpha^{\S}$, the myopic surplus after insufficient education is lower than before. Sophisticated consumers are also worse-off after the education if the market stays in Shrouded Value Equilibrium.[18]

It is important to understand what effect magnitude makes a third-party education

[16] More details and Gabaix and Laibson (2006) proofs with new notation are described in Appendix B.

[17] Gabaix and Laibson (2006) raise a concern that such an education would be costly and its provider might have biased incentives. To abstract from implementation costs, we assume that the cost of educating individuals is negligibly low and that the policymaker is a non-profit organization with well-designed incentive structures independent of financial firms.

[18] Kosfeld and Schüwer (2017) show that unless education moves the market to Unshrouded Value Equilibrium, myopic consumers bear higher losses compared to the time before education.

effective at the market level. To guarantee the Unshrouded Value Equilibrium, the education provider needs to make sure that the new share of myopic consumers in the economy is lower than the threshold, i.e. $\alpha^{\S} < \alpha^{\dagger} < \alpha$. Thus, the effect of education should satisfy the following condition:

$$1 + \gamma \geq 1 + \gamma^{\star} = \frac{1}{1-\alpha}\left[1 - \frac{e}{\overline{q}}\right] \quad \text{s.t.} \quad \frac{\alpha}{1-\alpha} \geq \gamma \geq 0 \tag{1}$$

The value of γ is constrained from above because the intervention can educate at most all the myopic investors.[19] If the effect of the intervention is large enough, the losses suffered by a firm become greater than the profit from shrouding. Thus, firms have an incentive to reveal the product's true value.

Some key facts emerge from Equation (1). The increase in the cost of substitution e leads to lower gain from shrouding, thus making unshrouding more likely after the education intervention. The higher tolerance for the hidden value-discount, $\overline{q}$, on the other hand, increases the gains from hiding the true values, requiring a higher effect of education to change a firm's pricing. Lastly, the threshold value increases in the "ex-ante" share of myopic consumers in the economy, α. If the starting level of sophistication is low, the education intervention has to be more effective to change market equilibrium.

Figure 3 presents the equilibria at all possible levels of e, $\overline{q}$, and α. On the $x-$axis, this figure plots the fraction of myopic consumers. As this value increases, the likelihood of an unshrouded equilibrium without any financial education is reduced to zero. On the $y-$axis, figure 3 plots $1 - \frac{e}{\overline{q}}$, firms' relative profits from one myopic consumer. As this value increases, the likelihood of an unshrouded equilibrium without any financial education is reduced to zero. For example, when 60% of the consumers in a product market (or an economy) are myopic, and the relative profit is equal to 60% cheaper, the required effect of the intervention is about 50%. Financial education has to increase the share of informed consumers by 50% of the initial level to achieve an unshrouded equilibrium.

The goal of financial education is to increase the region of unshrouded equilibrium for various parameters values. The shaded regions from dark blue toward yellow map the value of $\gamma^{\star}$ (the minimum effect size required from financial education) to move away

[19] Note that the threshold $\gamma^{\star}$ is invariant to equilibrium prices and does not depend on the level of competition in the economy.

from a shrouded equilibrium. Beyond yellow, the sky-blue color maps the region where the education effect has to be greater than 100%, i.e., the education has to double the fraction of at least informed consumers to achieve unshrouded equilibrium.

4 The financial education intervention

Section 3 provides a framework to assess how large the effects of financial education ought to be for it to generate positive welfare effects. However, before evaluating the externalities of the financial education intervention, it is important to guarantee that it provides the necessary skill and knowledge to consumers who become educated. The evidence on the effectiveness of financial education is mixed, with education leading to improvements in knowledge but failing when decision-making is involved.[20]

Most financial education interventions provide elementary financial knowledge and do not provide contextual lessons required to make specific purchase decisions. Such knowledge is necessary to enable households to unshroud relevant product features, evaluate the products in terms of households' needs, and infer from high-powered incentives for brokers and agents that the product may be sub-optimal (Anagol et al. 2017, Sane and Halan 2017). We present a new, product-specific education intervention that provides consumers with rules of thumb to help them easily evaluate a financial product with shrouded value.

4.1 The Experiment

The experiment is a randomized control trial with one control group (Group C) and two treatments (Groups T1 and T2). The intervention is financial education delivered through an information video and a sheet distributed in-person at the household's residence. The video is in Hindi, the language all our households are most comfortable speaking. The contents of the video and the sheet vary across the three groups. The marginal difference in the information provided to Groups C, T1, and T2 of the households in our research design allows us to identify the effect of rules of thumb (T1) separately from rules of thumb alongside an explicit product evaluation (T2).[21]

[20] An extensive review of the work on the effects of financial education on decisions can be found in the meta-analysis in Kaiser et al. (2021) and Fernandes et al. (2014).

[21] Ethics approval was sought and obtained from the University of Warwick: Approval Number HSS 56/18-19 AM01. AEA RCT Registry details: https://www.socialscienceregistry.org/trials/4224.

The control group receives general information on why insurance matters and that one should pay more attention to the standard disclosure made during a sale. In addition to the information provided to Group C, the first treatment group (T1) receives information on specific questions that they should ask before making purchase decisions. The questions concern the size of insurance coverage, guaranteed and non-guaranteed components of endowment insurance contracts, nominal and real returns for bundled insurance products, and surrender clauses. The second treatment group (T2) receives the information provided to Groups C and T1 and a direct comparison of the endowment product to alternatives in the market.[22] Additionally, T2 is provided with a direct example explaining the replicating portfolio and unshrouding the product value with an explicit evaluation. Online Appendix C documents the details of the information content in each experimental group. Broadly, if the interventions are successful, an endowment product will seem less attractive to households. Moreover, a term insurance product will attract greater interest from consumers. By using these rules of thumb, consumers can unshroud product features when a product is presented, thereby adjusting their purchase decisions.

After receiving the assigned education video and sheet, all the groups are offered the same endowment insurance product by an information brochure and as a video.[23] This product is called "Jeevan Mitr", mimicking a popular endowment product sold in India, and it is presented in the same way insurance agents would sell it in India.[24]

The experiment consists of the following key stages: baseline survey, randomization, information intervention, end-line survey, and follow-up phone survey. The baseline survey took place over four weeks, after which we randomized households into three groups (C, T1, and T2). The intervention and the end-line survey took place in one visit after the households were randomized into different treatment groups. The experiment concluded with the phone survey. Appendix Section D presents the procedures followed in conducting the experiment, respondent recruitment, sample size, attrition, and other

[22]The control group intervention video can be viewed at https://youtu.be/E_HNgVSQCKo. The T1 group intervention video is available at https://youtu.be/CGy8lOGfG_Y. The T2 group intervention video is available at https://youtu.be/j7uBg2sobkI.

[23]The product video is available at https://youtu.be/bT24YnlfyfY.

[24]To design the video, we researched how insurance agents sell their product by asking an agent in Delhi to pitch the product. The information brochure uses the same typeset, colors, language style, and information as the video. All households were given a copy of the information sheet and could review the video and the sheet even after the household visit was complete. The intervention video was 1:00, 3:34, and 4:50 minutes long for C, T1 and T2, respectively. The product video was 3:50 minutes long for every household. A copy of the brochure was left with the household at the end of the intervention.

details on the actual fieldwork conducted for this paper. We find that the randomization achieved balance across the groups, and the attrition was not selective. The final sample size is 2,838 households across C, T1, and T2 in our study.

We follow up with all respondents via a phone survey pitching a term insurance product widely available on the market without ascribing the call to the project. After recording the responses over the phone, the interviewers mentioned this was a follow-up call as a part of the same study the individuals had consented to participate in.[25] This design allows us to measure household responses independently of the baseline and end-line visits and creates a test closest to a real-world setting. Furthermore, the phone survey allows us to check whether our intervention could improve the demand for an objectively better insurance product in the market. Finally, the phone interviewers documented whether the household was distracted, busy, or in a noisy environment during the conversation, which enables us to measure participation and attrition in a precise manner.

4.2 Estimation strategy

The estimation strategy is an intention-to-treat (ITT) – that is, all households are analysed with the assumption that they remained in the intervention group to which they were initially assigned. The impact of the two treatments can be evaluated by comparing outcomes across groups in a simple regression framework. For each household-level outcome, the main specification is given by:

$$y_i = \alpha + \beta_1 t_{1i} + \beta_2 t_{2i} + \gamma X_i + \sum_s \delta_s I(S = s) + \epsilon_i \tag{2}$$

where y_i denotes the outcome for household i; t_{1i} is a dummy variable equal to 1 for households in the T1 group; t_{2i} is a dummy variable equal to 1 for households in the T2 group, with the reference group as the control group C; and ϵ_i is a robust error term. The randomization is stratified on some variables.[26] δ_s measures the randomization stratum fixed-effect; X_i represents household or respondent level controls that could potentially explain the outcome but are not influenced by the intervention, such as age, education level, occupation, number of dependents/children, number of earning members,

[25] Interviewers for the follow-up phone survey did not make the first two visits and were trained separately.

[26] Appendix Section D.2 details the variables by which the randomization was stratified.

geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences.

For each outcome variable, we present regression results with and without controls. We use the ordinary least squares (OLS) estimator for all outcomes.[27] Although questions of whether the ITT effects vary by *ex-ante* levels of conditioning variables (such as levels of general financial literacy) and by other characteristics (such as age or income) are of interest, our experiment was not powered to yield answers along these dimensions. We, therefore, relegate such investigation to future research.

4.3 Main empirical result: Purchase decisions

The ultimate aim of most financial literacy programs, as well as of our intervention is to enable households to make sensible, informed purchase decisions. In our setting, this would be to decrease the purchase (stated and revealed) of the endowment insurance product and to increase the purchase of the term insurance product. We measure these main outcomes through responses to the following two questions at the end-line and follow-up survey, respectively:

1. Having been introduced to "Jeevan Mitr", would you be interested in purchasing this product?
2. Having been introduced to this term insurance product, would you be interested in purchasing this product?

Table 1 presents the results. We observe a decrease in the intention to purchase the endowment insurance (larger share of "No" responses). Furthermore, we observe an increase in the intention to purchase the term insurance product (larger share of "Yes" responses). The results are well-aligned with our hypotheses. We find that the rules of thumb intervention, T1, leads to a 2.9 percentage point increase in households saying "No" to purchasing the endowment product compared to the control group. In Column 1, without any controls, we note that this effect is based on the control group having 14% households that say "No", making it a sizeable effect. The effect on the T2 intervention group is statistically insignificant, mainly due to a small downward revision in the magnitude of the treatment effect.

[27] For binary outcomes, we also run the logit estimator and find that the results are no different from that of the OLS estimator.

Columns 3 and 4 of Table 1 present the treatment effect on the intention to purchase the term product from the follow-up survey. We find that the T1 group has a 5.2 percentage points increase in saying "Yes" to buying the term product than the control group. Although the effect is larger than the effect on purchase propensity for the endowment product, we note here that, as a percentage of the base rate of intention to purchase, the effect sizes are similar.[28] We observe no significant effect for the explicit product comparison (T2). However, the treatment effect magnitude is nearly zero for "Buy Term = Yes".

4.4 Mechanism: Knowledge

Given that our intervention leads to a change in purchase probabilities, we should see an improvement in the knowledge of our sample. We use three methods of testing whether knowledge has improved. Estimating changes in knowledge would confirm whether the interventions had a significant impact on the decision to purchase (or not purchase) the insurance products.

First, we test if the respondents understood how much coverage should be purchased and how to calculate real returns. We measure insurance knowledge gained right after the intervention with the following questions:

1. If your income is ₹300,000 per annum, what would be the minimum amount of insurance you would need for your family?
2. If inflation is 4% and an insurance product gives you 6%, what would be the rate of return be after deducting inflation?

Both these concepts of minimum cover and the real rate of return are explained in the T1 and T2 videos but are not mentioned in the video for control households. Based on the videos, the appropriate answers are "*greater than ₹3,000,000*" and "*2%*" respectively.

According to results in Table 2, T1 intervention leads to an 11.2 percentage point increase in correct answers on minimum cover relative to the control group – a 36.6% increase from the base rate of correct answers. Similarly, the T2 intervention results in an 8 percentage point increase, albeit a much smaller increase as a percent of the base

[28]The difference in sample size for the estimates between Columns 1 and 2 and Columns 3 and 4 stem from the fact that our interviewers could not engage in a clear phone conversation with the respondents. However, this concern equally affected respondents across all treatment arms, laying to rest concerns of selective compliance and attrition in our data.

rate of correct answers. Consistent with our other results, the difference between T1 and T2 is not statistically significant. On the real rate of return (Column 2, Table 2), we do not observe any statistically or economically significant increases in correct answers. This finding may be because the answer required a simple arithmetic calculation on the part of households that was easy to compute in the first place. This is reflected in the fact that 91.7% of the control group also answered correctly. While we set out to measure an increase in "knowledge", this measure is at best a noisy proxy because households may give a correct answer despite not understanding the significance of returns net of inflation.

Second, we measure what features are important to households when buying insurance and whether these changed after the intervention. In our study, we ask households both at the baseline and at the end-line survey the following question:

1. If/when you were to buy a life insurance policy, what product features would you look out for?

Question 1 allows us to assess whether the intervention has affected households' perception of the importance of various features of the insurance contract. Table 3 assessment of the importance of four features: cover, surrender terms, bonus return, and guaranteed *before* the intervention. We note here that all the coefficients on T1 and T2 are statistically insignificant across all features. Nearly no household selected cover as an important feature during the baseline survey. However, 39.1% and 64.7% of the households in the control group considered surrender terms and guaranteed return, respectively, as relevant features. Lastly, nearly no household considered the non-guaranteed "bonus return" a feature they would look out for. This result suggests that households tend to be blindsided by contracts like endowment insurance, where the most salient returns as "bonus returns" are not guaranteed by the insurance company.

Results in Table 4 demonstrate that after the intervention in the control group, no households consider all four features important. This finding occurs primarily because the control group video urges households to pay attention to *all* product features; hence households recognize that these are likely to be important when presented as features of insurance products.

Column 1 of Table 4 documents a 3 percentage points for T1 and 4.1 for T2 percentage point increase in the share of households considering "cover" an important feature. While the increase is only $\approx 5\%$ of the base rate relative to the benchmark results *before*

the intervention presented in Table 3, this is a substantial increase in the knowledge of insurance features. Additionally, the importance of surrender increases by 2.1 and 1.9 percentage points for T1 and T2, respectively, although it is statistically insignificant. Lastly, T1 and T2 interventions cause meaningfully large increases in the importance of looking out for bonus returns (Column 3), with 5.1 and 2.4 percentage points, respectively. However, the T2 intervention effect is statistically insignificant and substantially lower than the effect for the T1 group, suggesting that the product comparison may not have helped households recognize the importance of the bonus feature in insurance products. Correspondingly, the role of guaranteed return is negative, though statistically insignificant. Households recognize that all the action may be in the bonus feature instead of the guaranteed return feature highlighted and marketed in endowment insurance contracts.

Finally, we test whether households could correctly choose a term insurance product over an endowment product right after the intervention. After the educational video and *before* we introduce "Jeevan Mitr", we measure whether households can discern an endowment insurance product from a term insurance product before measuring the knowledge gained by households. We ask the household to choose between an endowment and term product when cover, guaranteed return at maturity and the premium costs are clearly highlighted. The question asked is as follows:

1. If you were in a situation where you could choose to buy only one of the following products (endowment or term), what would you pick? (answers: endowment, term, do not know)

	Endowment	Term
Cover	₹185,000	₹2,500,000
Guaranteed money at end	₹170,000	₹0
Policy term	15 years	15 years
Annual premium	₹15,600	₹4,300
No. of years to pay	10	15
Total premium	₹156,000	₹64,500

Columns 1 and 2 of Table 5 shows that T1 intervention led to a 6.4 percentage points *decrease* in endowment insurance being the preferred choice – 13.7% of the base rate of preference for endowment insurance. The T2 intervention led to a 6.6 percentage points reduction in endowment insurance being the preferred choice – 14.1% of the base rate of

preference for endowment insurance. The difference in treatment effects between T1 and T2 in Column 1 are not statistically or economically meaningful. However, the difference is large but statistically insignificant once controls are introduced (Column 2). The lack of difference in treatment effects between T1 and T2 suggests that product comparison – the only component that differentiates the first intervention from the second – has little role in the estimated effects.

Columns 3 and 4 of Table 5 present the results on the preference for term insurance. Households in T1 group show 4.9 percentage points (11% of the base rate) higher interest in a term insurance product. T2 group households increase their interest in term insurance product by 6 percentage points (Column 3). However, the difference between T1 and T2 is not statistically significant, even with additional controls (Column 4). It is also important to note that the percentage of households in the control group preferring term insurance is higher than the unconditional estimates of insurance ownership in India. This, in part, reflects the conditional sample used for the study (due to our eligibility criteria) and the fact that our video for the control group provides generic information about insurance that is otherwise unavailable to a large majority of Indian households.

Two distinct and relevant facts emerge from these estimates. First, we observe that our intervention videos help a reasonably meaningful fraction of households reject endowment insurance and be more inclined to purchase term insurance. Second, we observe that additional explicit product comparison does not meaningfully enhance the effect of the rules of thumb treatment, suggesting that providing detailed product comparison does not improve knowledge beyond that which could be achieved using the rules of thumb intervention.

This observation is consistent with the literature in that financial education does improve knowledge. However, our object of interest goes beyond just generating knowledge, but whether such knowledge, in the face of a well-pitched shrouded financial product, can aid consumers to make better purchase decisions. In the next section, we measure whether our intervention aids consumers to unshroud product features when presented to them.

4.5 Mechanism: Unshrouding

Our theory of change assumes that, once the consumer has gained knowledge on insurance, she will be better able to understand an insurance product and potentially unshroud the

exact product features. We test this hypothesis by asking questions regarding the features of our product, "Jeevan Mitr".

Table 6 shows whether respondents were able to uncover five specific product features included in the product description. The T1 group focuses on bonus return, return net of inflation, cover, and surrender terms, consistent with treatment effects on knowledge. The T1 group is 5.7 percentage points and 4 percentage points more likely to get correct answers on bonus return and overall return net of inflation compared to the control group. In contrast, the T2 group does not show a significant effect. Column (6) shows that households in the T1 group are more likely to successfully unshroud product features than households in the T2 group, relative to the control group. However, while households seem to effectively uncover features such as bonus return and return net of inflation, the effects of treatments on unshrouding the cover and surrender terms, though positive, are not statistically significant.

The fact that households in the T2 intervention see no significant unshrouding raises important questions about the role of detailed product evaluation. One may argue that such an explicit comparison of products is meant to bypass the need for households to evaluate the implications of unshrouded features by themselves, thereby lowering their cognitive expectations. However, we believe that the opposite may be true: T2 is more cognitively demanding or too complex for households to process while making purchase decisions.

To summarize, the results show that the T1 intervention effectively decreases the demand for the endowment insurance product and increases the demand for term insurance. It significantly improves the knowledge of consumers and helps them understand and unshroud the product features. The T2 intervention, although it generates knowledge fails to unshroud "Jeevan Mitr" product features, and has no significant effect on the intention to purchase the product.

5 Estimating effectiveness

The results of the experiment show that our financial education intervention leads to a significant improvement in the financial decision-making for consumers. Besides, based on the evaluation framework set up by Kaiser et al. (2021), our intervention proves to be scalable, inexpensive, and easy to roll out, making it a feasible approach to product-

specific financial education.[29] In this section, we evaluate our education design along the lines of the additional requirement set out in Section 3.1.

The threshold for effective financial education intervention, $\gamma^\star$, as well as equilibria in the economy before the education depends on two parameters: the ratio between the price of substitution and the maximum possible value discount, $\frac{e}{\overline{q}}$, and the ex-ante share of myopic consumers, α.

As described earlier in Figure 3, the goal of financial education is to increase the region of unshrouded equilibrium for various parameter values. Our experiment demonstrates that educational intervention increases the number of individuals not buying a suboptimal product by 2.9 percentage points, equivalent to $\gamma = 0.083$ or 8.3% increase in the share of sophisticated consumers. Figure 4 marks in red the region of the effect of that size. The figure shows that the increase of 8.3% in the share of informed consumers can help move away from a shrouded equilibrium and toward an unshrouded equilibrium. However, education would be effective in a narrow set of market characteristics, such as ex-ante level of sophistication and substitution cost.

At what effect size would firms in the insurance market in India move away from value shrouding and be transparent about pricing? To answer this question, we undertake a simple exercise. To determine the educational effect threshold $\gamma^\star$ we need to define the values for three parameters (equation (1)). We use measures of financial literacy and sophistication in India to define the ex-ante level of sophistication in the population, $1 - \alpha$ and an example of the product "Jeevan Labh" (Plan: 836) and its replicating portfolio (Section 2) to find proxies for the cost of substitution, e, maximum willingness to pay, $\overline{q}$.

The level of sophistication can be defined in several ways. In 2019 financial literacy in the central region in India was 21%, with 41% of individuals demonstrating financial knowledge, 51% showing good financial behavior, and 88% presenting with positive financial attitude (NCFE 2019).[30] The level of sophistication can also be defined as the ex-ante share of consumers who can unshroud product characteristics. In our experiment, 35.9% of individuals from the control group said "No" to the endowment insurance product,

[29] More details regarding the intervention evaluation can be found in Appendix E.

[30] Our experiment took place in Delhi that is located in the Central region. The estimated levels for all India are slightly larger but comparable to the measures for the Central region: overall financial literacy is 27%, 49% of individuals demonstrating financial knowledge, 53% showing good financial behavior, and 89% presenting with positive financial attitude

which can be considered as a baseline level of sophistication. To account for differences in proxies for sophistication, we are using a range of values from 21% to 89%.

The substitution cost is equal to the cost of effort, for example, effort to cut back withdrawals facing high minimum balance fees (Gabaix and Laibson 2006). We ask survey participants about how much they will be willing to pay an advisor to make these decisions, which arguably represents the best proxy for the substitution costs. However, our findings are that the price that agents are willing to pay is no different between the treatment and control group and way below the market price of financial advice in India.[31] To search for other proxies we look deeper into the endowment contracts market in India.

First, we consider the market price of financial advice in Dehli, India as a proxy for cost of substitution. According to the most recent guidelines from Securities and Exchange Board of India (SEBI) financial advisory fee per year per client can not be larger than 2.5% of AUM or ₹125,000, whether a percentage or a flat fee is applied (SEBI 2020). In our experiment the AUM is equal to ₹600,000. The alternative investment strategy to endowment insurance is mostly passive, since it does not require portfolio rebalancing or annual review. We can assume that the minimum cost of financial advice would be equal to the cost of one-time fee, which is 2.5% of ₹600,000 or ₹15,000. We will also consider the cost of ₹125,000 as an upper-bound for the price of financial advice.

In the case of endowment insurance products Anagol et al. (2017) show that agents selling the products are motivated by the large commissions they receive from it. Thus a sophisticated consumer needs to compensate for the agents' forgone commission to gain access to the term insurance contract only, i.e., pay the agent a difference between her commission from the endowment product and the term-insurance product. Such compensation would be the second proxy for the cost of effort or substitution. We use the "Jeevan Labh" (Plan: 836) product example to calculate the commission that an agent would receive for selling the product and its survivorship till the maturity date. The commission schedule is the same for all endowment products: agent receives 35% of the premium in the first year, 7.5% for the second and third years, and 5% per year from the fourth year onwards. Given the premium structure of the "Jeevan Labh" (Plan: 836) product, the agent commission sums up to ₹41,380. The commission structure for the

[31] According to Securities and Exchange Board of India (SEBI) guidelines financial advisory fee per year per client can not be larger that 2.5% of AUM or ₹125,000, whether a percentage or a flat fee is applied (SEBI 2020).

term insurance product is identical, and the commission amounts to ₹2,207. We calibrate the cost of substitution to about ≈ ₹40,000.

Finally, we define the proxy for the maximum willingness to pay parameter, $\overline{q}$. The maximum willingness to pay arises from legal and regulatory constraints limiting the penalties/ fees that firms can charge. In the case of the endowment product, we use the mispricing of the product as the measure of maximum value discount that firms can hide. We define the difference between the price of the endowment product and its replicating portfolio with the same return and risk-coverage as an upper bound for the overpricing, $\overline{q}$. The idea is that insurance firms would be attracting much attention from a regulator if they outrageously overprice the endowment product. Admittedly, it is the weakest proxy in this calibration. Figure 5 presents the premium-payment structures for the "Jeevan Labh" (Plan: 836) product with ₹600,000 sum assured and 15 years maturity and a replicating portfolio with the same return and risk-coverage after 15 years.

The maximum willingness to pay or maximum overpricing in our example for a 30-year-old male is equal to ≈ ₹223,000, which constitutes a bit more than a third of the sum-assured.

Table 7 describes the parameters and the resulting threshold for financial education to be effective in unshrouding the market prices, $\gamma^\star$, calculated according to the equation (1). Figure 6 demonstrates the calibration results. When the *ex-ante* share of sophistication is equal to 89% (Figure 6c) the market should be in unshrouded equilibrium when cost of substitution is above ≈ ₹25,000, $\alpha > \frac{e}{\overline{q}}$. With cost of substitution below ₹25,000, our intervention would be effective at unshrouding the market. Note, however, the Indian insurance market is in shrouded equilibrium since endowment products remain the dominant product among insurance contracts. It, therefore, is natural to bound our threshold at zero.

Figure 6a shows calibration results for the sophistication level at 21%. The education effect in this case must at least double the number of informed consumers in the market (over 100% effect size) to be effective in unshrouding. This level corresponds to the maximum cost of financial advice of ₹125,000. Our intervention as in Figure 6a would be ineffective. Kaiser et al. (2021) record the average effect of 12% for financial education intervention, which in our framework is equivalent to a $\gamma = 33\%$. Thus on average financial education interventions analyzed in Kaiser et al. (2021) are ineffective in Indian insurance market set up.

In our setting, the share of sophisticated investors who can ex-ante identify sub-optimal products equals 35.9%. For this share, Figure 6b shows that the required level of educational effect is equal to $\approx$ 130% if the cost of substitution is equal to ₹40,000, the amount of comission compensation required, which is also unrealistic. At the maximum level of financial advice prices, however, the effect of education required to unshroud the insurance market is about 25%. With the lower bound for financial education effect, our intervention remains ineffective, but the average intervention from Kaiser et al. (2021) may be effective.

Given the maximum overpricing of ₹223,000 and cost of substitution of ₹40,000, our educational intervention with 8.3% effect would work if the ex-ante share of sophisticated consumers in the economy is equal to $\approx$ 76%.

We now measure substitution cost through the cost of financial advice and the commission compensation needed for the insurance-agent to become indifferent between offering and endowment product and traditional insurance product. For our experiment, however, we can also calculate the value of the substitution cost that would make our intervention effective in transforming the market from shrouded into unshrouded equilibrium. By rewriting equation (1), we find that ex-ante share of sophisticated investors, α, the maximum overpricing, $\overline{q}$, and the effect of the intervention, γ, the lower bound of substitution cost ensuring the unshrouded equilibrium, $e^{\star}$, is equal to:

$$e \geq e^{\star} = \overline{q}(1 - (1 + \gamma)(1 - \alpha)) \tag{3}$$

According to equation (3), for our intervention with the effect of 8.3%, the lower-bound of substitution costs is equal to about $\approx$ ₹136,000 if the share of sophisticated consumers is 35.9%, is equal to $\approx$ ₹8,000 if the share is 89%, and is equal to $\approx$ ₹172,000 if the level of sophistication is at 21%.

All of the analysis above shows that although our intervention significantly improves financial education in the population, is scalable, and affordable, it might not be *enough* to induce firms to unshroud product values. Appendix Section E.1 conducts this analysis for the set of experiments in insurance markets in Gaurav et al. (2011), Cole et al. (2013), Giné et al. (2013), Bonan et al. (2017), Kaiser and Menkhoff (2018), Carpena et al. (2019) – the broad insight from our study remains relevant even in other contexts and experimental setups discussed in the literature.

6 Conclusion

In this paper, we question the market implications of a financial education intervention, especially when consumers who remain unaffected by the education continue to exist. We adopt a model of a financial product market with shrouded value. Using the model, we defined how large the educational impact should be to change the market pricing and the consequences of "not enough" education.

We then conduct an RCT with two financial education treatment arms – the rules of thumb intervention (T1) and the rules of thumb intervention with product comparison (T2) – in Delhi, India. Our intervention focuses on bundled insurance products that provide both savings and insurance. Our T1 treatment resulted in a 2.9 percentage point decline in the intention to purchase (the inferior) endowment insurance relative to the control group. It also resulted in a 5.6 percentage point increase in the intention to purchase the (superior) term product. Our T2 treatment resulted in similar magnitudes of a decline in the intention to purchase endowment insurance, although not statistically significant on the margin. The product-specific rules of thumb approach can improve purchase decisions by meaningful magnitudes.

We conclude with an evaluation of our intervention and the most effective interventions on insurance markets from the existing literature with our theoretical benchmark. The model suggests that the magnitude of our intervention can potentially change the equilibrium in the market, albeit marginally. However, it also shows that insufficient education, even with statistically significant effects, can be harmful to the market – that is, for those that get left behind. This group is worse-off. The nature of changes to equilibrium information provision in markets is an important consideration when evaluating the role of financial education.

What are other measures that can be used to resolve the shrouding problem? The easiest answer is regulation, which would limit firms' ability to shroud the values of the products. However, the experience of the Indian insurance market shows that measures such as forcing firms to disclose fees or fixing the commission structures do not work Anagol et al. (2017). A combination of education and regulation could be most effective. Regulation can lower the cost of substitution – a key parameter that governs the required effect level for education interventions. This combination of regulation and financial education is a promising avenue for future research.

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Tables

Table 1 Purchase Decisions

	Dependent Variable			
	Buy Endow = No		Buy Term = Yes	
	(1)	(2)	(3)	(4)
T1	0.029*	0.030**	0.052*	0.056**
	(0.015)	(0.015)	(0.027)	(0.027)
T2	0.025	0.023	−0.005	−0.005
	(0.015)	(0.015)	(0.026)	(0.026)
Constant	0.140**	0.359***	0.292***	0.157
	(0.054)	(0.096)	(0.082)	(0.158)
Controls	No	Yes	No	Yes
Observations	2,838	2,838	1,650	1,650
Adjusted R^2	0.089	0.096	0.022	0.019

This table presents the results for OLS estimation of Treatment 1 (T1) and Treatment 2 (T2) effects on purchase of the insurance product. Columns (1) and (2) present the results for intention to purchase the endowment product. The dependent variable is equal to 1 if a household responded "NO", and 0 otherwise. Columns (3) and (4) present results from the follow-up survey for intention to purchase the term product. The dependent variable is equal to 1 if a household responded "YES", and 0 otherwise. Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 2 General Insurance Knowledge

	Dependent Variable	
	Minimum Cover	Real Rate of Return
	(1)	(2)
T1	0.112***	0.023
	(0.022)	(0.015)
T2	0.080***	0.018
	(0.021)	(0.015)
Constant	0.306**	0.917***
	(0.135)	(0.096)
Controls	Yes	Yes
Observations	2,838	2,838
Adjusted R^2	0.135	0.100

This table presents the results for OLS estimation of Treatment 1 (T1) and Treatment 2 (T2) effects on knowledge of cover (Column 1), and the real rate of return (Column 2). Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 3 Insurance Features Importance at Base-line

	Dependent Variable			
	Cover	Surrender	Bonus Return	Guaranteed Return
	(1)	(2)	(3)	(4)
T1	0.003	0.002	0.015	−0.001
	(0.023)	(0.017)	(0.020)	(0.022)
T2	0.017	−0.018	0.020	−0.022
	(0.022)	(0.017)	(0.019)	(0.022)
Constant	0.668*	0.391*	−0.103	0.647*
	(0.140)	(0.106)	(0.122)	(0.140)
Controls	Yes	Yes	Yes	Yes
Observations	2,838	2,838	2,838	2,838
Adjusted R^2	0.038	0.119	0.079	0.083

This table presents OLS estimation results for the perceived importance of four product features before the intervention. The dependent variable is 1 if you consider a feature important before the intervention and 0 otherwise. The four features are Cover (Column 1), Surrender Terms (Column 2), Bonus Return (Column 3), and Guaranteed Return (Column 4). Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 4 Insurance Features Importance at End-line

	Dependent Variable			
	Cover	Surrender	Bonus Return	Guaranteed Return
	(1)	(2)	(3)	(4)
T1	0.030	0.021	0.051***	−0.015
	(0.023)	(0.015)	(0.015)	(0.022)
T2	0.041*	0.019	0.024	−0.033
	(0.022)	(0.015)	(0.015)	(0.022)
Constant	0.563***	0.298***	0.327***	0.242*
	(0.141)	(0.094)	(0.094)	(0.137)
Controls	Yes	Yes	Yes	Yes
Observations	2,838	2,838	2,838	2,838
Adjusted R^2	0.032	0.010	0.019	0.036

This table presents OLS estimation results for the effect of Treatment 1 (T1) and Treatment 2 (T2) on the perceived importance of four product features. The dependent variable is 1 if you consider a feature important after the intervention and 0 otherwise. The four features are Cover (Column 1), Surrender Terms (Column 2), Bonus Return (Column 3), and Guaranteed Return (Column 4). Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 5 Choice Between Endowment and Term Insurance

	Dependent Variable			
	Choose = Endowment		Choose = Term	
	(1)	(2)	(3)	(4)
T1	−0.064***	−0.059***	0.049**	0.048**
	(0.022)	(0.022)	(0.020)	(0.020)
T2	−0.066***	−0.067***	0.060***	0.061***
	(0.022)	(0.022)	(0.020)	(0.020)
Constant	0.466***	0.382***	0.410***	0.506***
	(0.079)	(0.138)	(0.072)	(0.126)
Controls	No	Yes	No	Yes
Observations	2,838	2,838	2,838	2,838
Adjusted R^2	0.074	0.095	0.056	0.074

This table presents the results for OLS estimation of Treatment 1 (T1) and Treatment 2 (T2) effects on the choice for the preferred type of insurance. Columns (1) and (2) present the results for endowment insurance as the preferred choice. The dependent variable is equal to 1 if a household responded "Endowment Insurance" when asked about the preferred insurance product and 0 otherwise. Columns (3) and (4) present results for term product as the preferred choice. The dependent variable is equal to 1 if a household responded "Term Insurance" when asked about the preferred insurance product and 0 otherwise. Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 6 Unshrouding Product Information

	Dependent Variable					
	Guaranteed Return	Bonus Return	Return Net of Inflation	Cover	Surrender	Total
	(1)	(2)	(3)	(4)	(5)	(6)
T1	−0.018	0.057**	0.041*	0.022	0.011	0.048**
	(0.021)	(0.022)	(0.022)	(0.022)	(0.020)	(0.020)
T2	0.006	0.022	0.014	0.010	0.002	0.024
	(0.021)	(0.022)	(0.022)	(0.022)	(0.020)	(0.020)
Constant	0.305**	0.675***	0.570***	0.610***	0.040	1.053***
	(0.133)	(0.139)	(0.137)	(0.139)	(0.125)	(0.124)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,838	2,838	2,838	2,838	2,838	2,838
Adjusted R^2	0.156	0.041	0.095	0.068	0.065	0.109

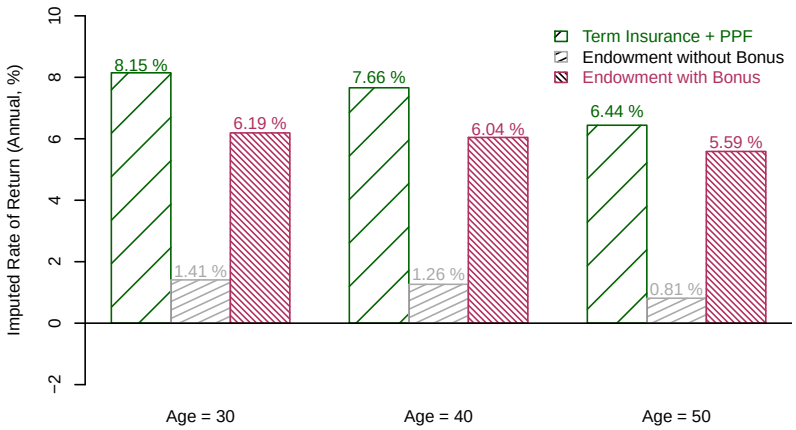
This table presents the results for OLS estimation of Treatment 1 (T1) and Treatment 2 (T2) effects on the ability of respondents to unshroud five specific product features included in the product description. In Columns 1–5, the dependent variable is equal to 1 if a household defines the product feature correctly and 0 otherwise. The product features include Guaranteed Return (Column 1), Bonus Returns (Column 2), Return Net of Inflation (Column 3), Cover (Column 4), and Surrender Terms (column 5). Column 6 of the table presents treatment effects on the ability to unshroud all features at the same time. In Column 6, the dependent variable is a logarithm of the total number of features respondents find important plus 1. Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Table 7 Calibration Parameters

	Value
Share of Sophisticated Consumers, $(1-\alpha)$	[0.21, 0.89]
Cost of substitution 1: Financial advice, e	[₹15,000, ₹125,000]
Cost of substitution 2: Agent compensation, e	₹40,000
Maximum Overpricing (Willingness to Pay)	₹223,000
Threshold for the education effect	[0, 290%]

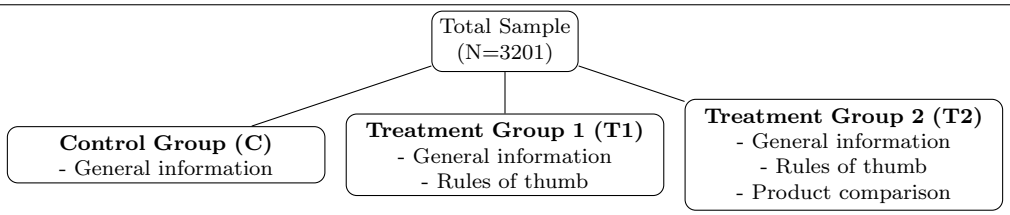
Figures

Figure 1 Internal rate of return comparison: Endowment Insurance vs. Term + PPF



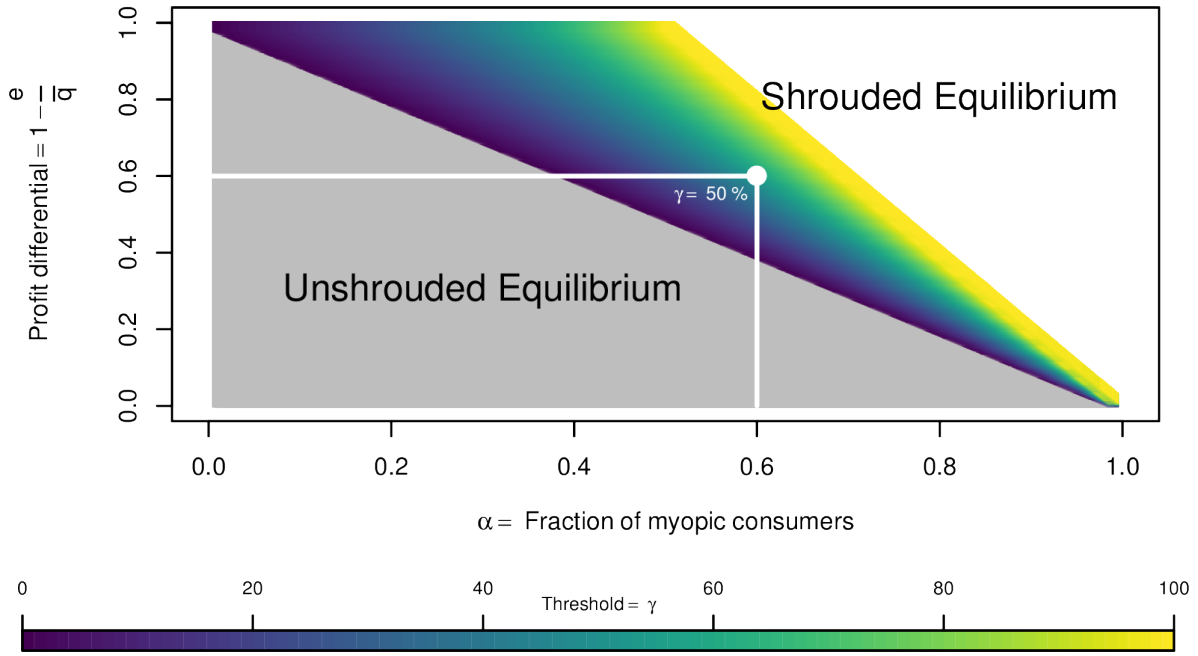
This figure presents the comparison of internal rate of return for an endowment product with bonus (in red), an endowment product without bonus (in gray), and a combination of term insurance and risk-free savings product, Public Provided Fund (in green) for a 30, 40, and 50-year-old non-smoking male with ₹600,000 sum assured and 16 years of coverage. The endowment product is modeled after the "Jeevan Labh" product from the Life Insurance Corporation of India, the largest retail insurance company in India.

Figure 2 Experimental Design and Intervention Content



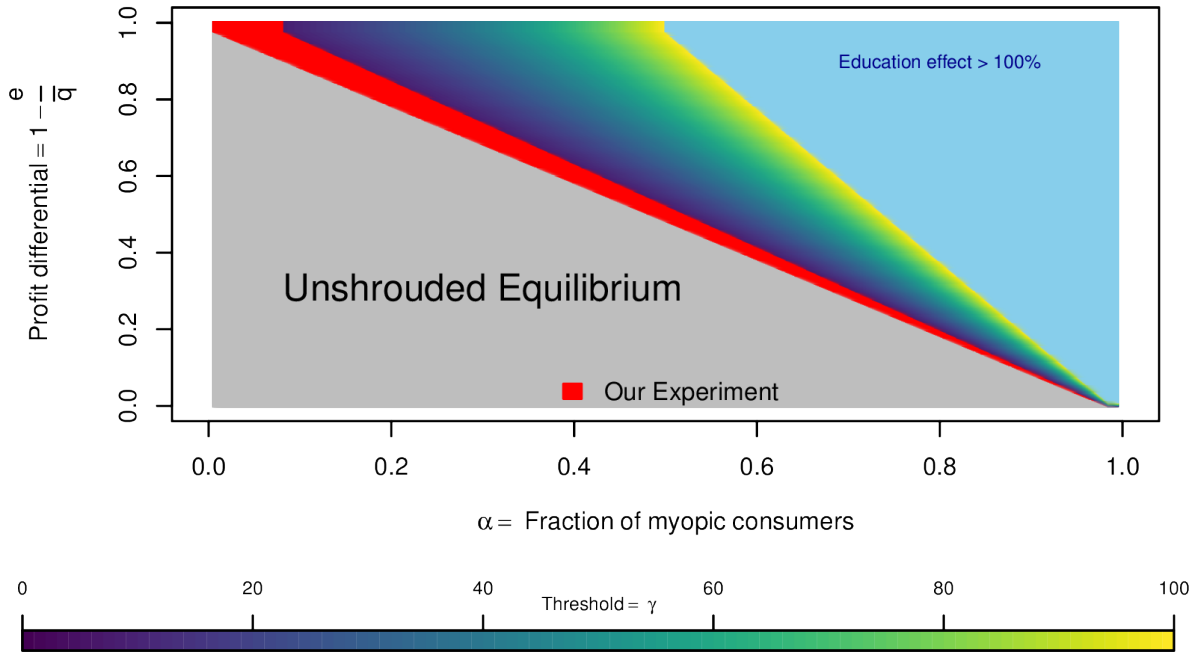
This figure presents the experimental design and the intervention content across three groups: Control Group (C), Treatment Group 1 (T1), and Treatment Group 2 (T2).

Figure 3 Effect of Financial Education and the Resulting Equilibria



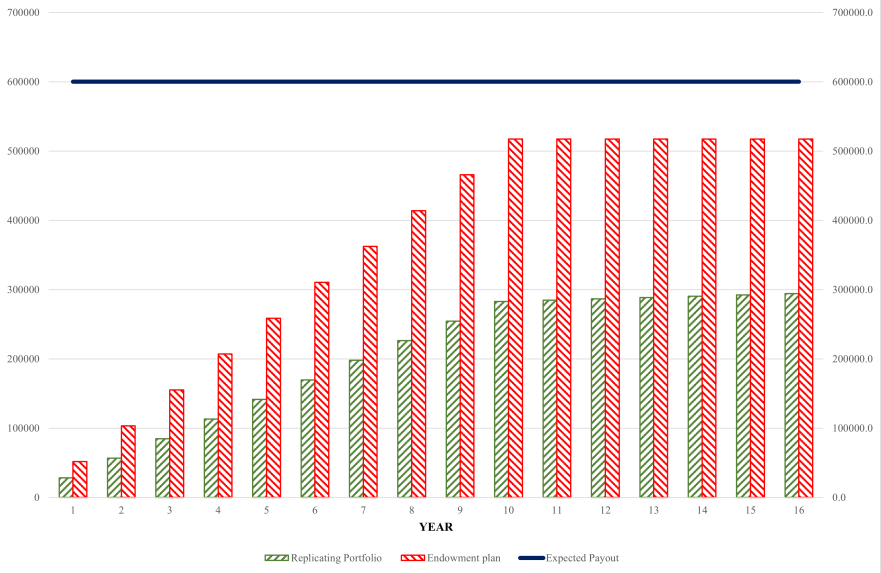
This figure presents a heatmap, with the colors indicating the magnitude of the intervention effect required to achieve unshrouded equilibrium in the market. The area below the 45-degree line corresponds to Unshrouded Prices Equilibrium; the area above corresponds to Shrouded Prices Equilibrium. The heatmap is constructed in the parameter space of our model: *ex-ante* level of sophistication, α - horizontal axis, and profit differential. $1 - \frac{e}{q}$ - vertical axis. The range for the possible effect is provided in the legend at the bottom of the graph.

Figure 4 Effect of Financial Education and the Resulting Equilibria



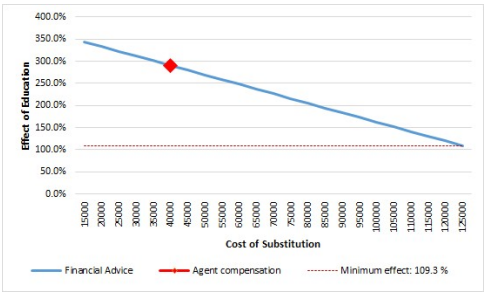
This figure presents a heatmap, with the colors indicating the magnitude of the intervention effect required to achieve unshrouded equilibrium in the market. The area below the 45-degree line corresponds to Unshrouded Prices Equilibrium; the area above corresponds to Shrouded Prices Equilibrium. The heatmap is constructed in the parameter space of our model: *ex-ante* level of sophistication, α - horizontal axis, and profit differential. $1 - \frac{e}{q}$ - vertical axis. The range for the possible effect is provided in the legend at the bottom of the graph. The effect of our intervention is shown in red.

Figure 5 Maximum Overpricing

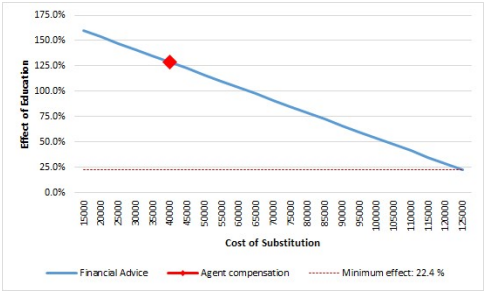


This figure presents accumulated cost of two products. In red are the accumulated annual premiums for "Jeevan Labh" (Plan: 836) for a 30-year-old male with ₹600,000 sum-assured and 15 years till maturity. In green are the accumulated sum of premiums the life-insurance constract for 15 years with ₹600,000 sum-assured and annuity payments to PPF that guarantees a saving of ₹600,000 after 15 years. The blue line signifies the value of the payment at the maturity of the contract. Discount factor assumed to be equal to one.

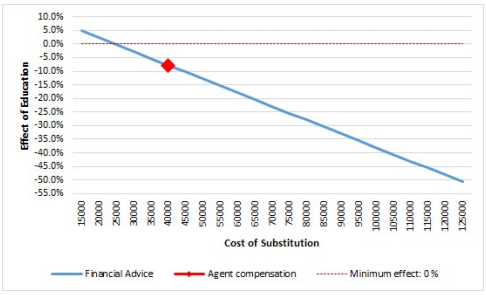
Figure 6 Calibrations: Substitution costs VS Effect of Education



A: 21% of sophisticated consumers



B: 35.9% of sophisticated consumers



C: 89% of sophisticated consumers

This figure presents the relationship between the cost of substitution parameter (x-axis) and the resulting minimum effect of education required to move the market from shrouded to unshrouded equilibrium (y-axis). Panel A demonstrates calibration results with ex-ante share of sophisticated consumers of 21%; Panel B - 35.9%; Panel C - 89%. The red diamond in each panel represents the effect size required for unshrouding if one uses commission compensation as a proxy for the cost of substitution. Blue line plots the various effect sizes required when the cost of substitution is proxied by the cost of financial advice. Red dotted line demonstrates the minimum effect of financial education required, which corresponds to the maximum cost of financial advice - ₹125,000.

Internet Appendix

A Replicating Portfolio for Endowment Insurance

Consider the "Jeevan Labh" (Plan: 836) endowment plan of the Life Insurance Company of India (LIC), a government entity that is the largest insurance provider in India. Jeevan Labh is a premium-paying plan, where individuals can choose the number of premium-paying years depending on coverage periods. For example, 16 years of coverage implies premium payments for 10 years. Based on the cash flow, the internal rate of return from this product for a 30-year-old non-smoking adult with a sum assured of ₹600,000 is 1.41% at maturity, in addition to the insurance cover of ₹600,000 before maturity.[32]

The insurance component of "Jeevan Labh" can be replicated by the purchase of the term insurance plan Anmol Jeevan II (Plan: 822) from the same firm.[33] To obtain a relevant comparison to *Jeevan Labh*, we choose a life-cover sum of ₹600,000 for 16 years.

As an alternative for the savings component, we consider the Public Provided Fund (PPF) scheme of the Government of India, which allows individuals to invest from ₹500 to ₹150,000 per financial year either as a lump sum or through a maximum of 12 installments per year. The original duration of this scheme is 15 years, extendable for one or more blocks of three years each.[34] The PPF provides tax benefits along the same lines as endowment insurance, with a guaranteed annual interest rate of 7.9%.[35]

B Adaptation of Gabaix and Laibson (2006): Details

B.1 Timeline

The timing of the model is as follows.

Period 0: The firm decides on how to present the information about the financial prod-

[32]The return calculations do not take into account any bonus returns that may accrue for an individual. Bonus payments are described as "participation in profits" benefits and are not guaranteed.

[33]The Anmol Jeevan II Plan (Plan: 822) has a minimum sum assured of ₹600,000, with a minimum age of entry of 18 and maximum age of entry of 55. The policy term can vary from 5 to 25 years, and premiums can be paid at either yearly or half-yearly intervals.

[34]To replicate the term of the endowment product, we invest the differential between premiums in the PPF for 15 years and then keep the accumulated investment in the account for one more year.

[35]This was the rate of interest as of October 2019. However, this is subject to change with the Government of India annual budgets presented in February every year.

uct. It chooses whether to shroud the true value of the product by showing $V_s > V$ or present the product's true value V and sets the price P. Unshrouding is free for the firm: it simply needs to show $V_s - q$ to all consumers. The total value of the product is presented as V when unshrouded, and $V_s = V + q$ when shrouded.

Period 1: Sophisticated (informed) and myopic (uninformed) consumers make decisions. Sophisticated consumers recognize that the financial product's value can be too high for its price. While evaluating their decision to purchase, sophisticated consumers always take the true value, V, and the presented value $V_s > V$ into account. If the information is shrouded, they form Bayesian posteriors about this unobserved information - i.e. they consider $\mathbb{E}q$.

If the value of the product is shrouded, sophisticated consumers have the option to purchase a replicating portfolio with the final pay-out equal to V_s. The cost of substitution from the product is equal to e. The net gain for the sophisticated consumer is equal to:

$$\text{Net Gain}_{sophisticated} = -P + (V_s - min\{\mathbb{E}q, e\}) \tag{4}$$

Myopic consumers only consider the value of the product revealed by the firm. When the true value is shrouded, all myopic consumers stay uninformed and only observe the total reported gain from the product. The expected net gain for myopic consumers is equal to:

$$\text{Exp Net Gain}_{myopic} = -P + V_s, \tag{5}$$

whereas the realised net gain would be:

$$\text{Net Gain}_{myopic} = -P + V_s - q, \tag{6}$$

If a firm decides to unshroud the true product value, it effectively educates λ fraction of myopic consumers, who become informed at that point. These newly-informed myopic consumers behave just like sophisticated consumers toward all firms. Nonetheless, the rest of myopic consumers, a fraction $(1 - \lambda)$, remain uninformed.

Period 2: Myopic consumers pay the full price and get the product. Sophisticated consumers and newly-educated consumers pay their prices and get the product or its fairly-priced equivalent. In the case of shrouding, sophisticated consumers bargain with firms for the fairly priced pay-out and purchase the product. In the case of unshrouded

values, both myopic and sophisticated consumers are presented with fair prices and purchase the product from the firm.

B.2 Price Equilibria

Let x_i represent the difference of a consumer's average gain from the purchase of the financial product from firm i and a consumer's average gain from the best alternative firm. For a sophisticated consumer, x_i is equal to[36]:

$$x_i = [-P_i + V_{s,i} - min\{q_i, e\} + P^\star - V_s^\star + min\{q^\star, e\}] \tag{7}$$

For a myopic consumer, it is:

$$x_i = [-P_i + V_{s,i} + P^\star + V_s^\star]. \tag{8}$$

$D(x_i)$ represents the probability that an individual buys the product from firm i or the demand of one type of the consumers for the product sold by firm i.[37] The degree of competition in the industry can be defined as $\mu = \frac{D(0)}{D'(0)}$ or the average profit per consumer.

The firms would decide to shroud or unshroud the true value of the product depending on the share of myopic consumers in the economy, α. Thus we have:

Proposition 1:

Let

$$\alpha^\dagger = \frac{e}{\overline{q}} \quad \text{and} \quad \mu = \frac{D(0)}{D'(0)}$$

If the fraction of myopic individuals, α, is greater than $\alpha^\dagger$, there exists a symmetric equilibrium in which firms keep the true value of the product hidden. We call this

[36] Following Gabaix and Laibson (2006), throughout the paper we use starred variables to represent the (symmetric) prices set by other firms.

[37] The demand function D is strictly increasing, bounded below by zero, and bounded above by one. The assumptions in Gabaix and Laibson (2006) are valid for our case and are described in their Appendix.

equilibrium Shrouded Value Equilibrium.[38] The equilibrium prices are respectively:

$$P = -\alpha\overline{q} + V_s + \mu \quad \text{and} \quad q = \overline{q} \tag{9}$$

If the fraction of myopic individuals, α, is less than $\alpha^{\dagger}$, there exists a symmetric equilibrium in which firms do not hide information and disclose the true product value to all consumers. This constitutes Unshrouded Value Equilibrium. The equilibrium prices are respectively:

$$P = -e + V_s + \mu \quad \text{and} \quad q = e \tag{10}$$

Proof:

The proof follows closely Gabaix and Laibson (2006), with the notation adjusted for our set-up. All assumptions from Gabaix and Laibson (2006) hold true.

Case 1: $\alpha > \alpha_{\dagger}$ and Shrouded Value Equilibrium.

If Firm i shrouds the value of the product, its profit is equal to

$$\pi = (P - V_s + \alpha q \mathbb{1}_{q \leq \overline{q}}) D(P^{\star} - P),$$

as the beliefs are $q = q^{star} = \overline{q}$ and the demand for the financial product of all consumers depends only on $P^{\star} - P$. This profit is maximised when $q = \overline{q}$ so that

$$\pi = (P - V_s + \alpha\overline{q}) D(P^{\star} - P).$$

The prices that maximize a firm's profit are the following: $P = -\alpha\overline{q} + V_s + \mu$ and $q = \overline{q}$.

Firm i can decide to unshroud the true value of the products. To do so, Firm i informs consumers that the true value of the savings in the product, $V_s - q$, is lower than the value stated before, V_s.

If Firm i unshrouds the true value, it educates some myopic consumers and the new share of myopes becomes $\alpha' = (1 - \lambda)\alpha$. By revealing the hidden loss, Firm i aims to

[38] In Gabaix and Laibson (2006) framework an equilibrium of this type is called Shrouded Prices Equilibrium.

attract sophisticated consumers, who in their turn will tolerate the loss only if it is lower than the cost of effort, $q \leq e$.

- If $q \leq e$, the unshrouding firm's profit is equal to

$$\pi = \underbrace{(1-\alpha')(P - V_s + q)D(P^\star + e - P - q)}_{\text{sophisticated demand}} + \underbrace{\alpha'(P - V_s + q)D(P^\star - P)}_{\text{myopic demand}}$$

  The demand of the sophisticated share of consumers, $(1-\alpha')$, is equal to $D(P^\star + e - P - q)$, where $P^\star + e$ is the cost that a sophisticated consumer pays to a shrouding firm by choosing to substitute and $P+q$ is the cost that she faces at the unshrouding firm. The profit is maximised at $q = e$. Hence, the profit is equal to

$$\pi = (P - V_s + e)D(P^\star - P)$$

  The following is true in the market:

$$\text{If } \alpha > \alpha^\dagger$$
$$\underbrace{(P - V_s + e)D(P^\star - P)}_{\text{Unshrouded Profit}} < \underbrace{(P - V_s + \alpha\overline{q})D(P^\star - P)}_{\text{Shrouded Profit}}$$

  If the share of myopic consumers is large enough, firms do not have an incentive to reveal the true values of the products and educated consumers.

- If $q > e$, the profit of the unshrouding firm is equal to

$$\pi = (P - V_s + \alpha'\overline{q})D(P^\star - P)$$

  which is strictly smaller than $(P - V_s + \alpha\overline{q})D(P^\star - P)$, the profit firm i could achieve by choosing to shroud and price at $q = \overline{q}$.

We conclude that the best response of firm i is to shroud the value of the product.

Case 1: $\alpha < \alpha_\dagger$ and Unshrouded Value Equilibrium.

Firm i can unshroud. Then:

- If $q \leq e$, the unshrouding firm's profit is equal to

$$\pi = \underbrace{(1-\alpha')(P - V_s + q)D(P^\star + e - P - q)}_{\text{sophisticated demand}} + \underbrace{\alpha'(P - V_s + q)D(P^\star - P)}_{\text{myopic demand}}$$

  The profit is maximised at $q = e$. Hence, the profit is equal to

$$\pi = (P - V_s + e)D(P^\star - P)$$

- If $q > e$, the profit of the unshrouding firm is equal to

$$\pi = (P - V_s + \alpha'\overline{q})D(P^\star - P)$$

  which is strictly smaller than $(P - V_s + e)D(P^\star - P)$, the profit firm i could achieve by choosing to unshroud and price at $q = e$.

If Firm i shrouds the value of the product, its profit is equal to

$$\pi = (P - V_s + \alpha' q \mathbb{1}_{q \leq \overline{q}})D(P^\star - P),$$

as the beliefs are $q = q^{star} = \overline{q}$. One needs α' rather than α in the profit expression above because the other firms in the market unshroud, so they educate a fraction, λ, of the myopic consumers. This profit is maximised when $q = \overline{q}$ and is equal to $\pi = (P - V_s + \alpha\overline{q})D(P^\star - P)$, which is strictly smaller than the profit firm i could achieve by choosing to unshroud and price at $q = e$.

The best response of firm i is to unshroud and price at $P = -e + V_s + \mu$ and $q = e$. □

B.3 Comparing Equilibria

Proposition 2a: In Shrouded Value Equilibrium, sophisticated consumers are better-off than myopic consumers. The surplus differential between myopes and sophisticates is equal to $\overline{q} - e > 0$.

Proof: First, let us compare the net gains of sophisticated and myopic consumers in different types of equilibria.

Consider the case of Shrouded Value Equilibrium in which a sophisticated consumer gives her business to a firm, which shrouds the true product value. The consumer negotiates the pay-out and purchases the product while receiving V_s as a pay-out. In that case, sophisticated consumer's surplus will be:

$$\begin{aligned} Sophisticated\ Surplus\ Shrouded &= -P + V_s - e \\ &= \alpha\overline{q} - \mu - e \end{aligned} \tag{11}$$

At the same time, the myopic consumer ends up with the largest value-discount $\overline{q}$. The myopic consumer's surplus is the following:

$$\begin{aligned} Myopic\ Surplus\ Shrouded &= -P + V_s - \overline{q} \\ &= \alpha\overline{q} - \mu - \overline{q} \end{aligned} \tag{12}$$

The difference between surpluses is equal to $\overline{q} - e$ and is greater than zero. In this case, firms exploit the lack of knowledge on the part of myopic consumers. A firm can offer a better product to the sophisticated consumer, the product with higher realised value, and compensate its losses by setting the product value-discount q for the myopic consumers at the highest level, $\overline{q}$. In Shrouded Value Equilibrium, myopic consumers subsidize sophisticated consumers. □

Proposition 2b: In Shrouded Value Equilibrium, the welfare loss is $(1 - \alpha)e$. In Unshrouded Value Equilibrium, there is no inefficiency and all individuals are equally well-off.

Proof: The cost of effort from sophisticated consumers, $(1 - \alpha)e$, constitutes the dead-weight welfare loss, since for firms the cost of shrouding the information about the true product value is equal to zero.

In Unshrouded Value Equilibrium, all consumers face the same prices, i.e. myopic and sophisticated consumers have the same surplus. Furthermore, when product values are unshrouded, sophisticated consumers do not need to exert any effort to bargain for a better deal. Thus, in Unshrouded Value Equilibrium, there is no inefficiency and all consumers are equally well-off. □

From **Propositions 2a** and **2b**, we know that Unshrouded Equilibrium is a Pareto improvement compared to Shrouded Value Equilibrium and a desirable equilibrium for the market for a product with shrouded value. There are two ways in which the market can achieve Unshrouded Value Equilibrium: firms can unshroud the values themselves or a third party can educate myopic consumers, therefore decrease their share in the population, and remove the incentive for firms to shroud information.

The proof of **Proposition 1** shows that if $\alpha > \alpha^{\dagger}$, in other words, the share of myopic consumers is large enough, a firm does not have an incentive to unshroud the true value of the product by itself. This is true no matter how many consumers a firm can educate by unshrouding product values. Firm education does not change the demand for the term insurance, $D(P^{\star} - P)$, therefore it does not affect the profit of the unshrouding firm when $q \leq e$ and strictly decreases the profit when $q > e$.

B.4 Introducing Financial Education

Educational intervention increases the share of sophisticated consumers in the population from $1 - \alpha$ to $(1 + \gamma)(1 - \alpha)$ before, and independent of, any potential educational effect of a firm's unshrouding strategy.

In the presence of a third-party financial education, the price equilibria are no longer the same. Now the share of myopic consumers is equal to:

$$\alpha^{\S} = 1 - (1 + \gamma)(1 - \alpha)$$

Shrouded Value Equilibrium exists if $\alpha^{\S} > \alpha^{\dagger}$ and firms set up the following prices

$$P^{\S} = -\alpha^{\S}\overline{q} + V_s^{\S} + \mu \quad \text{and} \quad q^{\S} = \overline{q}. \tag{13}$$

Unshrouded Value Equilibrium exists if $\alpha^{\S} < \alpha^{\dagger}$ and the prices are the following

$$P^{\S} = -e + V_s^{\S} + \mu \quad \text{and} \quad q^{\S} = e. \tag{14}$$

After "not enough" education, myopic surplus is equal to:

$$-\mu - \overline{q}(1 - \alpha^{\S})$$

The myopic surplus in Shrouded Value Equilibrium before education was equal to:

$$-\mu - \overline{q}(1-\alpha)$$

Given that $\alpha > \alpha^{\S}$, the myopic surplus after *not-enough* education is lower than before the education:

$$\underbrace{-\mu - \overline{q}(1-\alpha)}_{\text{Myopic Before Education}} > \underbrace{-\mu - \overline{q}(1-\alpha^{\S})}_{\text{Myopic After Education}} \tag{15}$$

Sophisticated consumers are also worse-off after *not-enough* education when the market stays in Shrouded Value Equilibrium:

$$\underbrace{(\alpha\overline{q} - e) - \mu}_{\text{Sophisticated Before Education}} > \underbrace{(\alpha^{\S}\overline{q} - e) - \mu}_{\text{Sophisticated After Education}} \tag{16}$$

C Information Content in the Treatment

The Indian insurance markets govern the information contained in each of our treatment arms. The rules of thumb provided in the treatment should help households unpack the essential features of insurance contracts in India. Broadly speaking, the information provided to Groups T1 and T2, in addition to the general information provided to Group C, can be used to uncover distinct aspects of endowment insurance.

Cover: The sum of money available when the insured risk occurs is at the heart of any insurance contract. Any individual considering a life insurance contract needs to assess how much coverage he or she needs. The cover depends on the number of dependents, the number of income producers in the family, and whether the household has liabilities such as mortgages that may not be affordable if such earnings are no longer available. As a rule of thumb, we urge that households consider a cover of at least 10 times the individual's annual income while assessing insurance products.

Returns: Guaranteed and Real Returns are a vital component of decision-making in finance. Previous studies suggest that purchase decisions are significantly affected by how

returns are disclosed (Shaton 2017). In guaranteed products such as endowment insurance, firms compute returns with the premium amount or the sum assured as the base. The advertised returns tend consistently to show whatever results in a higher number, typically on the annual premium. Gross returns, without any inflation adjustment, are the mainstay in such information materials. Considering that the minimum time-horizon of investment is at least 16 years, inflation adjustments are sizeable and non-trivial.

While market-linked financial products have an additional component of risk adjustment to returns, we aim to keep the experiment simple; hence we only study products that have "guaranteed" returns, with no risk associated with such an investment. Being a state-run firm, the government of India fully guarantees LIC's liabilities. The "bonus" component of endowment insurance contracts depends on how "well" the company does and therefore is not a guaranteed cash flow for a contract holder. The PPF enjoys the same level of guarantee from the government as LIC. Therefore, the extent of risk in these products is the same.

As a rule of thumb, we suggest that households enquire about the nature of returns (guaranteed or not) and think about whether such returns are nominal or real.

Early Exit: The provisions related to early exit may make it very expensive to quit the product before its duration is over. This feature is vital as there may be occasions when the customer is unable to pay for a few years or wants to surrender the product entirely. The repercussions of missed payments or early exit should be known to the customer.

There are generally two costs associated with an early exit. First, the policy-holder loses the tax deduction if the product is redeemed earlier than the prescribed lock-in. Second, he or she faces additional costs in the form of surrender charges in the case of an early exit. In an endowment product, the policy-holder would lose the tax benefit if he or she lapses the policy after two years for policies with a tenure of 10 years or less, and after three years for longer-term plans. Polices lapsed in the first two years generally return nothing. Policies surrendered after year two years could return between 30% and 40% of premiums paid until year four. As a rule of thumb, we highlight that households should enquire and learn about penalties for an early exit, as well as surrender terms and conditions.

Explicit Product Evaluation: Individuals may need to consider alternative products with the same (if not a better) outcome along the shrouded dimensions, risk coverage,

and savings than the bundled product. Such alternatives are hardly discussed during the sale of any endowment insurance product. While agents are typically trained to talk about similar products sold by competitors, they do not veer into other types of financial products or a combination of products that could provide the same outcome.

In the case of the endowment insurance, the alternatives are straightforward: a combination of term insurance and a guaranteed deposit of some kind with the same risk coverage and a pay-out at the maturity as the bundled product. Clarifying such an alternative may help individuals recognize the cost of shrouded attributes for a bundled product.

D Experiment Details

This section presents the details of how the experiment was designed, and conducted in Delhi, India.

D.1 Recruiting Households and Base-line Survey

We divided Delhi into four zones – North, South, East, and West. In each of the zones, households were recruited based on a random sampling strategy, with each surveyor following a right-hand rule in a given location and knocking at every fifth household on his path. In the recruitment conversation, surveyors were asked to determine whether they fulfilled the eligibility criterion with appropriate consent. Household heads that were between 20 and 55 years old with a net individual salary of between ₹250,000 and ₹500,000 per annum and had dependents (currently married, or at least one under-18 child, or at least one retired parent) were recruited for the study. At this stage, we also ensured that these households would be available in the city during the period of study.

Once a household was eligible, we conducted the base-line survey and gathered information on household composition, demographics, income band, investment and asset market participation, general financial literacy, and specific questions on experience with retail insurance markets such as past and current participation, understanding of insurance, risk preferences, and rate of time preference.

Sample size: The minimum effect size, i.e. the difference in the probability of insurance take-up between any two groups, detectable by the experiment was 0.035 (3.5 percentage points). Based on our power calculations, we needed 1,000 households in each group to

detect an effect of 3.5 between any two groups. In the power calculations, the probability of take-up in the control group in our target population was 0.10 – the unconditional insurance take-up rate in the All India Debt and Investment Survey as of 2012 (Badarinza et al. 2016).

Our final recruited sample was 3,201 households, over-sampled by 6.2%, to allow for potential attrition in the subsequent stages of the experiment.

D.2 Randomization and Balance Across Treatment Arms

We divided all households equally into three treatment arms – C, T1, and T2 – by randomly allocating households using base-line data. We followed a household-level randomised control trial design and did not cluster treatment, as there are minimal spillover concerns in our design.

The randomization exercise was stratified by geographical zone, age, prior insurance ownership, stated preference for insurance, and an index of household type. This index of household type consisted of the first principal component of low/high financial literacy score, low/high risk preference, low/high time preference, income bins, a self-reported measure of financial stability, employment type (self-employed or salaried), gender, education, number of dependents, and number of earning members in the household.

A critical element of a well-designed randomised experiment is the element of balance across the various groups. Panel A of Table D.1 presents the OLS estimates of predicting treatment using an array of respondent characteristics. The overall model fit suggests that the experiment was well-randomised. Panel B, Table D.1, conducts an alternative test of whether there was significant predictability of treatment assignment using a multinomial logit estimator. The probability of rejecting the null of no differences between a model with survey covariates compared to a base-line model without any covariates (last row of Panel B, Table D.1) suggests there was no significant predictability in the treatment assignment. The randomization design was robust and the treatment effects estimated in this study were indeed causal.

D.3 End-line and Follow-Up Phone Survey

After randomization, the second visit to households took place. During the second visit, households in the three treatment arms watched the appropriate intervention video. Sur-

Table D.1 Balance Test

Panel A: Joint Test of Orthogonality (OLS)

	Dependent Variable	
	Treatment 1	Treatment 2
Age (in years)	−0.001 (0.002)	0.001 (0.002)
I(Female)	0.043 (0.085)	0.003 (0.087)
Education: UG	−0.009 (0.026)	−0.010 (0.026)
Education: Diploma	−0.060 (0.078)	−0.054 (0.077)
Education: Postgraduate or above	0.008 (0.055)	0.026 (0.053)
Occupation: Self-employed	0.024 (0.025)	0.005 (0.025)
Zone: North	0.031 (0.041)	0.066 (0.040)
Zone: South	0.007 (0.036)	−0.014 (0.036)
Zone: West	−0.011 (0.036)	0.006 (0.036)
Zone: East		
No. of dependents in family	0.001 (0.013)	−0.016 (0.012)
No. of earning members in family	−0.016 (0.016)	−0.003 (0.015)
Asset Index: Low	0.001 (0.028)	−0.001 (0.028)
Asset Index: Medium	0.007 (0.044)	−0.041 (0.044)
Financial Assets Index: Low	0.012 (0.030)	0.020 (0.030)
Financial Assets Index: Medium	−0.012 (0.038)	0.013 (0.037)
I(Own Insurance)	−0.003 (0.029)	−0.002 (0.029)
Financial Stability: Unstable	−0.085 (0.074)	−0.030 (0.076)
Financial Stability: Somewhat stable	−0.077 (0.075)	−0.019 (0.076)
Financial Stability: Stable	−0.034 (0.073)	−0.042 (0.076)
Financial Stability: Very stable	−0.017 (0.086)	−0.105 (0.090)
I(Has a loan)	0.044 (0.036)	0.068* (0.036)
Financial Literacy Score	−0.139 (0.294)	−0.516 (0.360)
Insurance Knowledge: 'Not Term'	−0.034 (0.026)	−0.022 (0.026)
Insurance Knowledge: 'Term'	−0.051 (0.039)	−0.030 (0.039)
Insurance Knowledge: 'Cover is important'	−0.028 (0.028)	0.009 (0.028)
Risk loving: Yes	0.006 (0.024)	0.021 (0.024)
Patient: Yes	−0.052 (0.035)	0.024 (0.034)
patient1	−0.033 (0.025)	0.003 (0.025)
Constant	0.615*** (0.118)	0.474*** (0.116)
Observations	1,864	1,898
R^2	0.011	0.011
Adjusted R^2	-0.004	-0.004
Residual Std. Error	0.501 (df = 1835)	0.501 (df = 1869)
F Statistic	0.721 (df = 28; 1835)	0.730 (df = 28; 1869)

Panel B: Joint Test of Orthogonality (Multinomial Logit)

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Resid. df	2	5,646.000	39.598	5,618	5,632	5,660	5,674
Resid. Dev	2	6,211.697	32.034	6,189.045	6,200.371	6,223.023	6,234.349
Df	1	56.000		56.000	56.000	56.000	56.000
LR stat.	1	45.303		45.303	45.303	45.303	45.303
Pr(Chi)	1	0.846		0.846	0.846	0.846	0.846

This table presents test results for how balanced the experiment was across the various groups. Panel A presents the OLS estimation predicting the type of treatment (T1 or T2) using respondent characteristics. Panel B presents the results for a multinomial logit estimation of treatment assignment predictability. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

veyors then documented their responses to questions designed to test on the video contents.

After the intervention and the questionnaire on the video contents, "Jeevan Mitr" was introduced. The product pitch focused more on the returns of the product (as is typical in sales practices in India) without specifying what was guaranteed and without emphasizing the amount of cover accompanying the product. The last set of questions measured households' interest in purchasing the product and whether they were able to unshroud the product features.

At the end of the second visit, the surveyors were required to fill in "exit forms" where they took notes on whether the household had watched the intervention video in its entirety and whether there were any notable distractions (disturbances) during the intervention.

As a last step in the study, households were followed up with a phone survey pitching a term product available widely in the market without ascribing the call to the project. This interaction for three to four minutes on the phone was with surveyors who did not make the first two visits, were trained separately, and had not had any direct prior contact with the respondents. Once the phone surveyor had recorded the household responses, they mentioned this was a follow-up call as part of the same study in which the households had consented to participate. This design allowed us the benefit of measuring household responses independently of the first two visits, as a test closest to a real-world setting. Not only did this have the advantage of being very close to a real-life setting; it also allowed us to check whether our intervention could improve demand for what was objectively a better insurance product on the market. Finally, the phone surveyors also documented whether the household was distracted, were in a noisy environment, or were busy, which enabled us to measure participation and attrition in a precise manner.

D.4 Sample Attrition

Table D.2 Phone Survey: Compliance Test

	Dependent Variable			
	Treatment 1		Treatment 2	
Compliance	0.00005	−0.010	−0.005	−0.004
	(0.026)	(0.027)	(0.025)	(0.027)
Constant	0.494***	0.590***	0.515***	0.571***
	(0.021)	(0.193)	(0.020)	(0.187)
Controls	*No*	*Yes*	*No*	*Yes*
Observations	1,674	1,660	1,733	1,721
Adjusted R^2	-0.001	-0.040	-0.001	-0.044

This table presents the results for OLS estimation of the effect of participation in the phone survey on the treatment group assignment. Column Treatment 1 shows the results for the assignment for Group Treatment 1 (1 – assigned, 0 – otherwise) with and without controls. Column Treatment 2 shows the results for the assignment for Group Treatment 2 (1 – assigned, 0 – otherwise) with and without controls. Controls include age, education level, occupation, number of dependents/children, number of earning members, geographical zone, household income, assets, financial investments, insurance ownership, personal financial stability, financial literacy score, understanding of insurance, and risk and time preferences. The significance levels are described in the following way: *p<0.1; **p<0.05; ***p<0.01.

Our study required multiple visits to the household: first at base-line, then at end-line, and finally at the time of the phone survey. The attrition between base-line to end-line was 10.6%; between base-line to phone survey it was 41%. We tested whether this attrition was selective, i.e. whether it affected either of the treatment arms more significantly than other. The attrition between base-line to end-line, and between end-line and the follow-up survey, did not affect any of the treatment arms disproportionately more than the other. We tested whether participating in the phone survey additionally predicted treatment assignment and found that compliance was not selective across the treatment arms. Table D.2 documents a statistically insignificant coefficient on a dummy variable "Compliance" that takes the value of 1 if the respondent participated without any distraction in the phone survey, and 0 otherwise.

E Intervention Evaluation based on Kaiser et al. (2021) scheme

In their meta-analysis of the financial education literature Kaiser et al. (2021) describe the criteria to determine whether programs are effective, based on recent work on education interventions (Kraft 2020). First, only the results of studies with a causal interpretation (e.g. RCTs) can be evaluated by the "effect sizes". Second, the "effect size" interpretation

depends on what, when, and how the outcomes are measured, with larger effects on outcomes that are easier to change, proximal to the intervention, administered soon after the intervention is completed, and measured with more precision. Third, effect sizes from lower-cost interventions are more impressive than similar effects from costlier programs. Fourth and last, programs that are easy to scale up are more likely to maintain their effectiveness.

Based on these factors, we can evaluate the effectiveness of our experiment. The experiment is a randomised control trial, a research design that guarantees a casual interpretation of the results. The experiment targets a very specific problem associated with an insurance product. However, that problem is widespread among the Indian population and causes significant loss in wealth.[39] The outcomes are measured close in time to the intervention and we do not evaluate the long-term effects of the education. According to Kraft (2020), our study should provide results with a relatively large "effect size".[40] Our intervention is low-cost. For studies discussed in Kaiser et al. (2021), the mean and median cost per participant was \$60.40 and \$22.90 respectively. The total cost of our intervention amounts to \$40,000, which is equivalent to \$14 per participant, with 2,800 individuals taking part. Finally, the main instrument of our interventions is the set of videos in detailed and easy-to-understand language describing a well-known product and providing rules of thumb for unveiling some of its hidden features. These videos are easily scalable, not just in terms of reaching a greater proportion of the population, but also in producing a targeted intervention for other retail products in India.

According to the criteria described above, our intervention is effective. As highlighted by Kaiser et al. (2021), the RCT design leaves little debate regarding the internal validity of the study. In this context, the effect of financial education on the treated consumers is positive and welfare-improving. In the next section, we attempt to set up a new criterion that would allow us to evaluate the market equilibrium implications of financial education interventions and apply it to our case.

[39] Over 80% of the retail insurance revenue for firms in India stems from similar bundled products.

[40] Kraft (2020) also provides a schema for interpreting effect sizes from causal studies of education interventions. Kraft (2020) suggests that effects larger than 0.20 standard deviations are "large", effects between 0.05 and 0.20 standard deviations are "medium", and effects under 0.05 standard deviations are "small". The effect of the intervention on purchase education falls into the "medium" category, as it is 0.14 standard deviations. According to this schema, our intervention is a low-cost easy-to-scale program with a medium "effect size".

E.1 Comparison with Interventions from Meta-Analysis by Kaiser et al. (2021)

The evaluation criteria developed in this paper are applicable to a setting where an educational intervention affects the demand for a financial product, improving the demand for a "good" product and lowering the demand for a "bad" product. Using our criteria, we evaluate the papers from Kaiser et al. (2021). We concentrate on interventions concerning the insurance market or insurance products. We exclude outcomes related to the knowledge about insurance and concentrate on demand for insurance products. Among six papers (12 outcomes), only two (three outcomes) describe statistically significant effects of the interventions.[41]

Figure E.7 represents the financial sophistication in the markets before and after the interventions in light blue and dark blue respectively. The graph also uses yellow dots to display the lower bound of the ratio between the substitution fee that a sophisticated consumer can pay to opt out from the suboptimal product, e, and the maximum value discount that consumers would tolerate in the market, $\overline{q}$, required for unshrouding in the market, $\frac{e}{\overline{q}}$. The lower bound approaching 1 means that the substitution costs are close in value to the maximum value firms can shroud and that the firm's profit differential from the y-axis of Figure E.7 is close to 0. If the profit differential is very small, the firm has a low incentive to shroud values in the first place. Thus, very low levels of profit differential parameter or high levels of $\frac{e}{\overline{q}}$ might be unrealistic for the markets of products with shrouded values.

[41] The list of insurance papers is provided below in Section E.2. Papers with statistically significant treatment effects are in bold.

Figure E.7 Summary: Financial Education Interventions

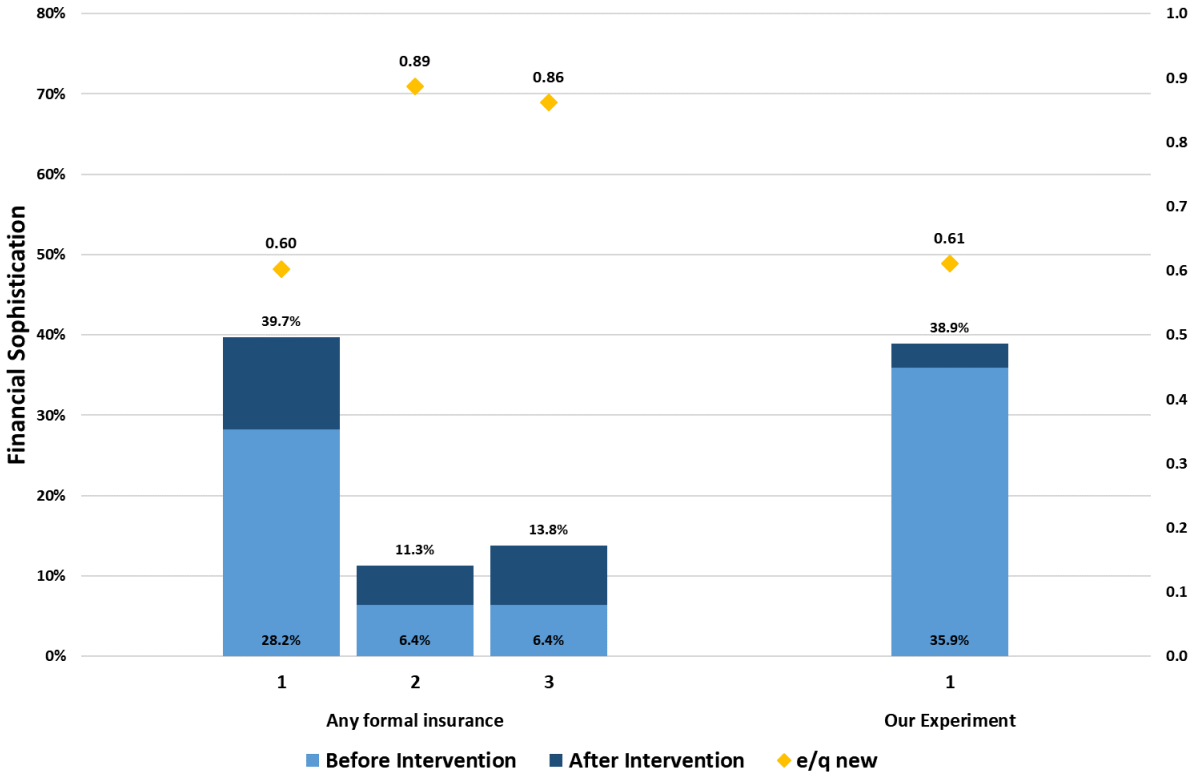


Figure E.7 displays the effects of the financial education intervention on the demand for or intention to purchase insurance products. The initial level of sophistication is shown in light blue, the after-intervention level in dark blue. Yellow diamonds represent the lower bound for the ratio between cost of substitution available for sophisticated investors, e, and the maximum achievable value discount in the market, $\overline{q}$.

Figure E.7 shows that, for all interventions, including ours, the ratio $\frac{e}{\overline{q}}$ should be greater than 50% to be effective, given the *ex-ante* level of financial sophistication. Two intervention outcomes require a ratio of greater than 80%, which is equivalent to a profit differential lower than 20%.

E.2 List of papers in the comparison

- Bonan, J., Dagnelie, O., LeMay-Boucher, P., and Tenikue, M. (2016). The impact of insurance literacy and marketing treatments on the demand for health microinsurance in Senegal: a randomised evaluation. Journal of African Economies 26(2), 169-191.

- Carpena, F., Cole, S., Shapiro, J., and Zia, B. (2019). The ABCs of financial education. experimental evidence on attitudes, behavior, and cognitive biases. Management Science 65(1), 346-369.
- Cole, S., Gine, X., Tobacman, J., Topalova, P., Townsend, R., and Vickery, J. (2013). Barriers to household risk management: evidence from India. American Economic Journal: Applied Economics 5(1), 104–135.
- Gaurav, S., Cole, S., and Tobacman, J. (2011). Marketing complex financial products in emerging markets: evidence from rainfall insurance in India. Journal of Marketing Research 48(SPL), S150–S162.
- Gine, X., Karlan, D., and Ngatia, M. (2013). Social networks, financial literacy and index insurance. World Bank, Washington, DC.
- Kaiser, T. and Menkhoff, L. (2018). Active learning fosters financial behavior: Experimental evidence. DIW Discussion Paper No. 1743.