BARD

FINAL REPORT

PROJECT NO. US-3067-98

The Economics of Marketing and Diffusion of Agricultural Inputs

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Project Title: The Economics of Marketing and diffusion of Agricultural Inputs

Investigators

Institutions

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Keywords *not* appearing in the title and in order of importance. Avoid abbreviations.

Uncertainty reduction, demonstration, money- back guarantee, socio-economic variance

Abbreviations commonly used in the report, in alphabetical order:

MGB (money-back guarantee)

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Signature
Principal Investigator

Signature
Authorizing Official, Principal Institution

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none

Cooperation Summary (numbers)

	From US to Israel	From Israel to US	Together, elsewhere	Total
Short Visits & Meetings	2	2		4
Longer Visits (Sabbaticals)				

Description of Cooperation:

Heiman came to Berkeley every summer, Zilberman went to Israel during winter break, and McWilliams went to Israel for a two month period.

Patent Summary (numbers)

	Israeli inventor (s) only	US inventor (s) only	Joint IS/US inventors	Total
Submitted				
Issued (allowed)				
Licensed				

Abstract

Title: The Economics of Marketing and Diffusion of Agricultural Inputs

Specific Research Objective. Develop a theory of technology adoption to analyze the role of promotional tools such as advertising, product sampling, demonstrations, money back guarantees and warranties in inducing technological change. Use this theory to develop criteria for assessing the optimal use of marketing activities in launching new agricultural input technologies. Apply the model to analyze existing patterns of marketing budget allocation among promotional tools for various agricultural input industries in the United States and Israel.

Background to the Topic. Marketing tools (money-back guarantees [MBG] demonstration, free sampling and advertising) are used extensively to induce the adoption of agricultural inputs, but there is little understanding of their impacts on the diffusion of new technologies. The agricultural economic literature on technology adoption ignores marketing efforts by the private sector, which may result in misleading extension and technology transfer policies. There is a need to integrate marketing and economic approaches in analyzing technology adoption, especially in the area of agricultural inputs.

Major Conclusion. Marketing tools play an important role in reducing uncertainties about product performance. They assist potential buyers to learn both about objective features, about a product, and about product fit to the buyer's need. Tools, such as MBGs and demonstration, provide different information about product fit but also require different degrees of cost for the consumer. In some situations they can be complimentary and optimal strategy combines the use of both. In other situations there will be substitution. Sampling is used to reduce the uncertainty about non-durable goods. An optimal level of informational tools declines throughout the life of a product but stays positive at a steady state.

Implications. Recognizing the heterogeneity of consumers and the sources of their uncertainty about new technologies is crucial to develop a marketing strategy that will enhance the adoption of innovation. When fit uncertainty is high, allowing an MBG option, as well as a demonstration, may be an optimal strategy to enhance adoption.

Achievements

The significance of main scientific achievements of innovation

- 1) We developed a modeling approach to analyze the impact of risk reduction tools, money back guarantee, and demonstration on purchase (adoption) of durable. This approach enables us to rigorously incorporate concerns about product uncertainty and heterogeneity of consumers in deriving their demand for a product. It also explains how MBGs affect demand. The understanding of these impacts on demand allow us to develop decision criteria to better design both demonstrations and MBGs that will be beneficial to the consumer, as well as society, and may improve adoption of new technologies.
- 2) While existing marketing literature develops decision rules for optimal use of either MBG or demonstration, we introduce the first framework that allows optimal management of both tools. Furthermore, we develop better understanding of the use of these tools in the various stages of product life. For example, in the early stages of product introduction when consumer uncertainty is significant both tools should be used. In some situations it may be worthwhile to reduce the consumer cost of attending demonstration and making it very appealing. But the intensity of demonstration may decline over time as consumers get a better understanding about the product performance and its impact. In many cases, it is efficient, from a firm's perspective, to maintain the MBG throughout the life of the product. Provision of a MBG is suboptimal in situations where consumer fit uncertainty is becoming minimal, or when the return and replenishment cost are substantial.
- 3) We develop a new theory of management of MBG as an option. We argue that under conditions of heterogeneity the basic tradeoff that industry and society have when it comes to MBG is between the extra cost of producing products that will under-utilize, because of lack of fit, and the cost of product return and restocking when MBG option is exercised. We argue that as communication networks improve, and uncertainty about product performance is increasing, value of a MBG increases. Thus, the increase and use of catalogs, as well as electronic marketing, increase the value of a MBG provision. Furthermore, we have shown that the profitability of electronic marketers, as well as catalog sellers, depends on reducing the cost of return for the consumer and their own cost of restocking and re-use of returned merchandise. This has implications for marketing food product electronically or through catalog. The price that can be charged can be much lower without a MBG option. Thus, electronic marketing of fresh foods and vegetables, for example, require either superior pre-sale product communication

to reduce likelihood of rejection, efficient design of return option and recognition of potential loss because of return.

4) We introduce the distinction between bundled and unbundled MBGs. Frequently, the MBG option is bundled with the product and thus the consumer has to pay a higher price. In this case consumers with who are not likely to exercise the return option are subsidizing the ones that are more likely to exercise the return option. We identify situations when the potential buyers are split between individual with low probability of return and a less informed group with a high probability of return. In this situation the optimal strategy should consist of selling the product and the return option separately. For example, renting the product with an option to buy, or offering a discount for purchasers that will give up the return option. Simulations have shown that a large range of circumstances for these strategies is worthwhile for the seller and for society.

The offering of unbundled return options is useful in cases of a diverse clientele. For example, in the case of food products, experienced buyers would like to buy the product with minimal return options while the demand of new buyers will expand with the introduction of a return option.

5) We introduce the first formal model on product sampling and information that incorporates both learning and forgetting about characteristics. Product sampling and other promotions have significant value, both for building up consumer goodwill as the product is introduced, as well as preventing erosion of goodwill due to reduced exposure and experience of the product. We argue that sampling should be maintained throughout the life of the product, especially in the case of food products with significant seasonal supply variation rather than emphasized only when the product is introduced. We also argue that sampling activities should be monitored and sellers recognize that sometimes they may have a negative effect if the sampling experience is unappealing. While the literature emphasizes the value of sampling as a consumer “turn-on” we also recognized that it may be a “turn-off” and the net effect of sampling, both in generating immediate sales and building up good will, and generating bad will should sometimes be recognized in design sampling strategies.

6) We expanded our analysis and applied our heterogeneity-based framework to adoption to study and understand the demand by a consumer for good meat. We tried to understand how to explain the purchase (adoption) of chicken vs. other meats, fresh vs. processed and ready to eat

meats. We used available data from Israel. We found that even though chicken is a prime meat in Israel, the demand is very inelastic (minimal response to price change) when quantities are large. On the other hand, demand is responsive to differences in socio-economic variables and lifestyle. In particular, income, whether people are religious or secular, whether people like and are able to cook or not, and constraint of time matters in their food choices. Orthodox people are less likely to buy processed food and are likely to buy chicken than other meats. Individuals that like to cook and get good feedback are more likely to buy fresh food, especially chicken, and time constraints may lead high income people towards buying ready to eat meats. Our analysis suggests that marketing of food has to recognize heterogeneity among segments and can enhance the demand for chicken or turkey by providing recipes and other means that will improve quality and enjoyment of cooking.

APPENDIX:

Table of Contents

Heiman, Amir, Bruce, McWilliams, Jinhua Zhao, and David Zilberman, "Valuation and management of money- back guarantee options," *Journal of Retailing*, 78 (23) (2001).

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