

## **SUMMARY**

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This project explores a puzzle known in environmental economics literature as the “efficiency gap”: why people consistently buy energy-inefficient appliances, when they would save money in the long run by making an investment in products that use less energy. The “gap” or “paradox” refers to the perception that consumers apply unreasonably high hurdle rates to energy savings investments. The discount rates required to rationalize purchasing data are extremely high, 20 percent or more, so discount rates alone cannot fully justify the fact that very attractive investment opportunities in energy-efficient capital are routinely passed over by investors. Some literature has explained this through inserting the factor of uncertainty. If energy conservation investments have low salvage value and their return is risky, then optimal investment hurdle rates can exceed the underlying discount rate by a substantial margin. Because future return on investment in energy conservation is highly uncertain, investors delay their investment in an optimal way to avoid the risk of an unprofitable investment, should energy prices fall.

Other literature provides arguments for idea that the efficiency gap may be overestimated. The realized returns to such investments fall short of those promised by engineers and manufacturers, and these realized returns are consistent with reasonable discount rates for investment. However, several argue that the efficiency gap is, in fact, underestimated because analysis typically omits the increase in utility that results from the consumer’s substitution of energy services for other goods when the cost of energy-consuming services is lowered through the use of energy-efficient appliances. Therefore, there is even more justification required than previously believed.

Professor Keohane’s project explored the problem from the perspective of incomplete information. While others have argued the possibility that consumers are simply unaware of the cost savings, a novel explanation is that consumers systematically underestimate their future use of appliances and hence the cost savings from energy efficiency. The possibility that consumers are simply unaware of the cost savings may be explored by examining consumer purchase data before and after the start of EPA’s efforts to increase consumer information about potential savings through a labeling program combined with intensive promotion, begun in 1992. We expected that information in the form of such labels should not significantly change people’s behavior. In addition, we expected to see learning over time to demonstrate that the consumer behavior was not simply a result of extremely high discount rates.

My responsibilities included performing a literature search of relevant strands of literature in environmental economics and behavioral economics, focusing on literature related to problems of information. I also investigated the current landscape in the U.S. in terms of standards and the labeling program of the EPA, and exactly when various policies took effect, in order to take advantage of temporal variations within a location and of variations across products. In addition, a large percentage of my time was spent on

searching for data, such as residential billing data by zip code or by county by contacting various public utilities commissions, utilities companies, and state energy divisions, and organizing this data. I also collected pricing data from various retailers. Because it required a significant portion of the summer to successfully collect data, we did not reach the stage of producing results.

I learned a great deal about the literature in environmental economics concerning consumer behavior, and the SRO experience was a good application of my recent courses in Microeconomic Theory and mathematics. I learned what the research process is like and the difficulties of collecting and working with a large data set. I also learned how to begin a project with a hypothesis and modify it as more information and background literature is collected.