The Heating Choice Puzzle I

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In this blog series, we aim to develop a structured understanding of how households make decisions about heating system choices, starting from fundamental economic theory. Heating systems represent a major long-term investment for households, and decisions surrounding them have significant consequences for energy consumption, sustainability, and climate policy. Despite their importance, these choices are often modeled simplistically or discussed in purely technological or policy terms, without sufficient attention to the microeconomic mechanisms driving individual behavior.

Our approach is to construct a microfounded framework, beginning with the simplest rational decision model and gradually incorporating more realistic elements that reflect observed behavior. Initially, we assume that households act as fully rational agents seeking to minimize the total lifetime cost of their heating system, considering both upfront investment costs and the discounted present value of future operating costs. This reflects the basic principle of utility maximization under budget constraints, a cornerstone of microeconomic theory.

As the series progresses, we introduce complexities that deviate from the simple rational actor model. We explore how psychological effects such as the sunk cost fallacy and status quo bias influence decision-making, leading households to delay or avoid economically rational technology switches. We also consider the role of discounting, recognizing that households often apply higher discount rates to future costs and savings than traditional economic models assume, thereby affecting their willingness to invest in energy-efficient technologies.

Furthermore, we incorporate social and informational microfoundations by analyzing how peer effects, installer recommendations, and network influences alter heating system adoption patterns. Behavioral economics insights such as present bias, cognitive overload, and loss aversion are gradually layered onto the model to better reflect the realities of household decision-making.

Throughout the series, we emphasize key economic theories including:

- Utility maximization under cost minimization objectives,
- Time discounting and present value calculations,
- The sunk cost effect and its influence on investment behavior,
- Status quo bias and decision inertia,
- Social learning and peer effects in technology adoption,
- Behavioral deviations from rational expectations.

By systematically building up from first principles, this series seeks to provide a comprehensive, microfounded perspective on heating system choices that can better inform both policymakers and practitioners working in energy transition consulting and related fields.

Our goal is to develop a solution to the Heating Decision Puzzle over a series of different blog entries. To do that we are open for your feedback and input, which you can easily provide through Bluesky.