

# "Air Conditioner Purchase Behavior and Implications for Long-run Household Electricity Use"

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## **Abstract:**

In this paper I specify a structural dynamic model of consumer demand for energy-intensive durable goods, focusing specifically on air conditioners. I examine long-run derived energy demand using this framework, which explicitly incorporates dynamic consumer behavior, including expectations and uncertainty. These aspects of consumer choice are essential to accurately estimating the timing of durable good purchases, since such decisions are inter-temporally dependent and key variables are changing over time. Structural parameter estimates from the model allow for the evaluation of several popular demand-side carbon abatement and energy security reform initiatives. Results indicate that a carbon tax is a potent lever to achieve energy demand reductions, both immediately and in the long run. Efficiency standards are also effective for long-term energy conservation, though their effectiveness is reduced by an extensive margin rebound effect. This analysis uses multiple cross-sections of households collected by the U.S. Department of Energy and includes key variables relevant to air conditioner demand and use. The dataset is used in a novel way to extract the maximum amount of dynamic content where panel data does not exist.