

STAYING COOL: INCOME, WHETHER, AND COOLING ADAPTATION PATTERNS IN KOREA

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Extended Abstract

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Abstract Summary

This paper examines whether the decoupling of cooling welfare from energy consumption is stratified by income, analyzing household climate adaptation via air conditioning (AC) along extensive and intensive margins. Using a panel of over 4,000 South Korean households (2015–2020) with appliance-level efficiency ratings and detailed AC usage data, we find that income is a central determinant of adaptation capacity.

On the extensive margin, early-summer heat experience raises the probability of efficiency upgrading for middle- and high-income households, but low-income households exhibit a significantly negative response to the same signal, consistent with liquidity constraints blocking investment even when heat risk is directly perceived. Pre-season climate news uniformly suppresses efficiency upgrading across all income groups. In a mature AC market with progressive electricity pricing, both information channels operate primarily through operating cost anxiety: anticipating more frequent extreme heat raises the salience of future electricity bills, paradoxically deterring investment in the efficient capital that would reduce those costs. Beyond belief-updating, climate volatility—not mean temperature—emerges as the primary long-run driver of efficiency upgrading, as efficient capital acts as a structural hedge against weather uncertainty.

On the intensive margin, high-income households achieve longer AC usage duration without proportionally greater electricity consumption, consistent with decoupling driven by more efficient capital. Under heat stress, high-income households distinctively lower temperature settings rather than extending hours, while low-income households face a binding tradeoff between thermal comfort and electricity costs—a gap that single-metric approaches relying solely on electricity consumption fail to detect.

These findings suggest that risk communication campaigns and operating cost subsidies are insufficient or counterproductive in mature markets. Policies should instead resolve liquidity constraints directly—through appliance replacement subsidies or building

renovation programs—targeting low-income households in high climate-variability regions where the returns to efficient capital are greatest.

Presenting Author Biography

Eseul Choi is a researcher at the Bank of Korea in the Microeconomic and Institutional Research Division. Her research focuses on household economic behavior and climate adaptation. She examines how income and liquidity constraints shape households' investment in energy-efficient technologies, with a particular interest in the distributional consequences of climate change and the design of effective adaptation policies. Her current work draws on large-scale household panel data to study cooling behavior and energy efficiency upgrading in South Korea.