

Quantifying Policy impacts on heating choices: Evidence from the German Building Stock

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Extended Abstract

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Abstract Summary

Decarbonizing the heating sector is essential for achieving climate targets, but policy effectiveness is strongly shaped by heterogeneity in building characteristics and regional infrastructure. Rising gas prices and increasing volatility in fossil fuel markets have further strengthened the economic case for renewable heating technologies and the importance of reducing dependency on fossil energy sources. Understanding how policy instruments translate into economic incentives at the building level, and thereby affect heating system choices, is therefore crucial. This paper addresses this issue by identifying and quantifying the economic transmission channels through which climate and energy policies influence technology adoption in the German building stock, using a large-scale, spatially resolved building-level dataset.

This paper develops an economic modeling framework that links policy instruments to investment and operating costs and evaluates their impact on technology choices by computing building-specific annuities for more than 128,000 buildings and mapping them to adoption decisions using a multinomial logit model.

The results indicate that heat pumps achieve strong uptake under current policy conditions due to favorable cost structures, while the magnitude of this effect varies significantly across building segments.

These findings highlight the need for more targeted policy design, as subsidies have limited additional impact in already cost-competitive new buildings but can substantially increase adoption in older buildings, suggesting efficiency gains from reallocating support.