Energy Efficiency Mandates and Housing Supply

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Extended Abstract

Residential buildings constitute a significant source of energy consumption and greenhouse gas emissions—accounting for approximately 20% of energy use and 17% of emissions in the United States—positioning them as critical targets for climate policy intervention (EIA, 2025). Building energy codes, implemented since the late 1970s and now extensively adopted across jurisdictions, establish minimum efficiency standards for new construction with the explicit aim of mitigating the environmental externalities associated with building operations.

The environmental economics literature (Novan et al., 2022; Bruegge et al., 2019; Kotchen, 2017; Levinson, 2016; Jacobsen and Kotchen, 2013; Aroonruengsawat et al., 2012) has predominantly concentrated on evaluating the direct energy savings and associated externality reductions from these codes. Concurrently, housing economics research demonstrates that regulatory interventions in the housing markets induce substantial dynamic responses in both supply and demand (Diamond and McQuade, 2019; Diamond et al., 2019a,b). Despite the evident interconnection between these strands of literature, a comprehensive theoretical and empirical framework integrating these perspectives remains notably absent.

This paper bridges this critical gap at the nexus of environmental and housing economics by presenting a unified framework that addresses the question: what are the comprehensive welfare effects of building energy codes when explicitly modeling both environmental benefits and housing market distortions? We examine how these mandates impact developers' construction decisions, consumer housing choices, and overall market outcomes. Our theoretical model identifies key distortions induced by energy efficiency mandates: (1) intertemporal distortions in construction timing as builders strategically accelerate projects to avoid stricter regulation; (2) spatial distortions in the supply of housing; (3) allocative inefficiencies arising from the interaction of these supply-side distortions and heterogeneous consumer preferences. By integrating heterogeneous consumer preferences and strategic builder responses into a unified framework, we provide novel insights into the distributional consequences and equilibrium effects of these widespread building regulations. Crucially, the magnitudes of these distortions cannot be determined ex-ante due to complex interactions between consumer preference heterogeneity, builder cost structures, strategic timing responses, and the potential presence of market failures like the energy efficiency gap.

*Any opinions and conclusions expressed herein are those of the authors and do not reflect the views of the U.S. Census Bureau.

We link data on address-level building permits with housing transactions and property characteristics to estimate the key elasticities for our structural model of housing supply and demand. Using a regression discontinuity in the adoption timing of state-wide building energy codes, we find that builders strategically bunch permit filings to avoid the stricter code. We will then contrast the estimates of this strategic avoidance behavior with behavioral responses in states with decentralized building energy codes (i.e. each jurisdiction adopts their own code at different dates). Together, these estimates will be used to decompose the overall welfare effects of building energy codes on consumers and builders.

References

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(EIA) U.S. Energy Information Administration

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