Opportunities and risks in the residential sector during a green transition: House prices, energy renovations and rising energy prices

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Abstract

Transitioning to a low carbon economy implies both risks and opportunities in the Danish housing sector, which accounts for one fourth of Denmark's CO2 emissions. We study the heterogeneous impacts on house prices of energy prices and energy refurbishments by combining micro-level data on sales and housing characteristics with geolocation data and data from the official mandatory energy rating and housing condition reports.

While energy refurbishments are generally convenient in the long run due to large future flows of savings, households who do not plan to stay in the same housing unit for long do not have an incentive to renovate unless the refurbishment costs are reflected in the sale prices. Yet the extent to which refurbishment costs are reflected on sale prices might vary by housing, market, and refurbishment characteristics. We exploit machine learning tools both to preprocess geolocation data and to identify sources of effect heterogeneity.

We find that most refurbishments will not increase sales prices enough to cover the costs. Those refurbishments whose price effect will cover are typically located in and around smaller towns and mid-sized cities, and other areas with higher population density and well-developed road networks connected to towns and cities. They are also cheap and have lower-than-average impact on CO2 emissions.

Our results imply that private incentives may not be sufficient to facilitate climate change mitigation. We show that if home owners financed the most profitable refurbishments before selling, CO2 emissions of these houses would have decreased by only 13,000 tonnes per year, or less than 0.02 per cent of total Danish greenhouse emissions. Hence, there may be a scope for tax deductions and the allocation of subsidies for energy renovation among private households.

We conclude that while opportunities for profitable energy renovations are concentrated in these areas, transitional risks are instead associated with peripheral rural areas, where both the exposure to rising energy prices and the risk of financing renovations is highest.