



Preferences for thermal retrofits in private condominiums: A discrete choice experiment with landlords and owner-occupiers in France

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EXTENDED ABSTRACT

Introduction

Thermal retrofit of existing buildings is a major challenge for the energy transition in most European Union (EU) countries, including France. Like other EU countries, France aims to reach a nearly zero energy level for all buildings by 2050. To meet this target, the current decrease in residential energy consumption of about 1.5% per year is insufficient and retrofit rates must increase rapidly¹. This is particularly true for the private condominium sector which accounts for 28% of the building stock in France². Renovating multi-owner buildings is particularly challenging because decisions to retrofit involve multiple co-owners with heterogeneous preferences, subject to different financial barriers, and with potentially conflicting interests.

Against this background, we elicit co-owners' preferences for thermal retrofits and for various schemes to finance these retrofits. In particular, we compare loan financing to equity financing (i.e. use of capital without recourse to a loan). A loan may be re-paid via an increase in condominium fees or via regular installments. We also examine co-owners' preferences for transferable loans, i.e. loans that are transferred to the next owner if the apartment is sold. Furthermore, we compare preferences for thermal retrofits between owner-occupiers and landlords, i.e. owners who rent out their apartment. If landlords cannot pass on the retrofit costs to their tenants, they have lower incentives to invest compared to owner-occupiers in the same building, leading to the well-known split incentive problem^{3,4}. Finally, benefits from retrofits in multi-owner buildings may be distributed asymmetrically across owners, leading to another type of split incentive problem. For example, if retrofit costs are allocated in proportion to the size of the apartment, owners of exterior apartments may benefit relatively more than owners of interior apartments because exterior apartments tend to have higher heating demands. We investigate co-owners' response to such an unequal distribution of benefits.

Methodology

Our empirical analysis is based on a large-scale survey including a discrete choice experiment (DCE) on thermal retrofits among 744 owner-occupiers and 524 landlords in France. In addition to investment costs and energy savings, the DCE includes attributes to reflect different types of financing schemes (equity financing vs.

¹ Ministère de la Transition Ecologique. (2022). La rénovation énergétique des logements. [Web link](#).

² INSEE. 2017. Les conditions de logement en France. [Web link](#).

³ Gerarden, T. D., Newell, R. G., & Stavins, R. N. (2017). Assessing the Energy-Efficiency Gap. *Journal of Economic Literature*, 55(4), 1486–1525.

⁴ Gillingham, K., & Palmery, K. (2014). Bridging the energy efficiency gap: Policy insights from economic theory and empirical evidence. *Review of Environmental Economics and Policy*, 8(1), 18–38.

loan financing, transferrable loans vs. non-transferrable loans) and differences in relative heating cost savings, i.e. owners of some apartments save more compared to others in the same building. In a first step, we use mixed logit models to estimate average participant preferences for the attributes in the DCE, providing insights about barriers and drivers of the investment decision. In a second step, we use latent class models to sort participants into different classes with distinct preferences for the DCE attributes. Class membership is related to observable characteristics, including socio-demographic characteristics such as income and ownership-type, dwelling characteristics such as size and past implementation of energy efficiency measures, and preferences such as time preferences, risk aversion and debt aversion.

Results

The findings of the mixed logit model suggest that co-owners are generally favorable to the retrofit projects shown in the DCE, preferring projects with lower investment costs and higher absolute and relative heating cost savings. This latter result highlights the presence of a potential split incentive problem if heating cost savings are distributed asymmetrically across apartment owners. In contrast, we do not find differences in the valuation of heating cost savings between owner-occupiers and landlords that would hint at split incentives between different types of owners. For financing schemes, we observe that, on average, participants prefer equity financing over loan financing and prefer to re-pay loans via an increase in condominium fees rather than regular installments even if overall costs are identical. The stated propensity to engage in loan-financed retrofit increases significantly if the loan can be transferred to the next owner in case the apartment is sold.

The findings of the latent class models suggest that our sample may be grouped in three classes. Class 1 (63.8% of the sample) consists of participants who favor retrofit and prefer loan financing over equity financing. Class 2 (30.9% of the sample) comprises of participants who favor retrofit but strongly prefer equity financing over loan financing (leading to the observed preference for equity financing on average). Class 3 members (5.3% of the sample) oppose the retrofit projects shown in the DCE. Among the observable characteristics included in the latent class model, debt aversion and time preferences are most strongly correlated with class membership: More debt-averse respondents are less likely to be in Class 1, i.e. they are more likely to favor loan financing than the other classes. More patient participants are less likely to be in Class 3, i.e. they are more likely to oppose the retrofit projects than the other classes. Finally, we fail to find ownership status and socio-economic characteristics such as age, income and education to be related to class membership.

Conclusion

Our results suggest that co-owners in multi-owner buildings exhibit heterogeneous preferences over financing schemes for retrofits. Almost one-third of co-owners prefers equity financing to loan financing. Aversion to loan financing appears to be partly due to strong debt aversion. For loan financing, transferable loans are preferred to non-transferable loans. These results suggest that building retrofits could be promoted by facilitating access to transferable loans. Our findings further suggest that facilitating loans which are taken out by the condominium manager and re-paid via condominium fees may help overcome owners' reluctance to use loan financing.

In multi-owner buildings, split incentives between owners could be a major barrier to thermal retrofits. In our DCE, we find that co-owners who expect lower energy cost savings than other owners in the same building are less willing to invest in retrofits. To address this issue, the distribution of benefits could be explicitly considered during the planning phase of a retrofit project. If benefits are distributed asymmetrically across owners, allocating costs according to expected benefits (rather than, e.g., apartment size) could increase the acceptability of the project. In comparison, contrary to expectations, we do not find that owner-occupiers have a higher propensity to implement retrofit measures than landlords. One explanation for this non-result could be that some drivers, such as compliance with regulations, are stronger for landlords than for owner-occupiers.