Moral hazard in the quality of building energy efficiency: Evidence from post-retrofit audits

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Overview

The under-provision of quality work could account for a significant portion of the Energy Efficiency Gap. For instance, Christensen *et al.*, (2023) evaluated a retrofit program in Illinois and found that if all contractors performed as well as the top 5\%, the performance gap would be reduced by 43\%. A key question regarding quality defects is whether they result from contractors merely lacking skills or deliberately reducing their effort. These competing hypotheses relate to different economic problems with distinct policy implications. Skill shortages are known to be significant in the construction sector, a fragmented industry with high worker turnover (Jagger, Foxon and Gouldson, 2013). From an economic perspective, this is a public-good problem that can be addressed through appropriate training policies. Conversely, workers possessing adequate skills but occasionally cutting their effort do so due to information asymmetries—moral hazard in particular. The moral hazard hypothesis suggests that when outcomes are difficult to verify, low-quality work is more frequent, leading to reduced performance. As a result, the returns on home energy retrofits are typically uncertain, making them a "credence good" (Giraudet, 2020; Lanz and Reins, 2021). One way to empirically determine whether poor quality is due to skill shortages or moral hazard is to examine the pattern of defects. Under the moral hazard hypothesis, defects are expected to be more prevalent when the incentive to cheat is stronger. The incentive to cheat depends on the ease with which the underlying task can be verified and the penalty charged for underperformance. While Giraudet, Houde and Maher (2018) have established the link between low verifiability and poor energy performance, the connection between verifiability and low quality remains unexplored.

Methods

In this paper, we intend to fill an important research gap by providing direct evidence of the link between the easiness with which defects can be verified and their prevalence, in terms of both their probability of appearance and severity. To do so, we exploit a database of 1,587 building audits performed in France between 2010 and 2021. Crucially for our analysis, audit records contain evidence of both defects and good practices. This allows us to conduct logistic regressions to investigate the effect of the easiness-to-verify on the probability that a defect of varying severity occurs relatively to a good practice. Although not causal, our analysis thus provides suggestive evidence of moral hazard on both the extensive and intensive margin of quality provision.

Results

In logistic regressions, we find a positive and statistically significant association between the hard-to-verify nature of defects and their probability of occurrence. The result holds in the full sample and in both the construction and renovation sub-samples. When we partition the sample between energy efficiency and non-energy efficiency works, however, evidence of moral hazard is only found in the former. This lends support to the hypothesis that moral hazard is an important cause of the energy performance gap. Importantly, we find that the auditing company's identifier is an important determinant of this relationship. Focusing on the severity of defects, we find that the hard-to-verify aspect is primarily associated with minor and medium defects. When considering the energy efficiency sub-sample, the same result extends to major defects. This suggests that the decennial guarantee, which is supposed to prevent major defects in structural works but not energy efficiency works, is effective. We then run random effect regressions by technical elements to investigate heterogeneity in the manifestation of moral hazard. We find that across all samples, and particularly in energy efficiency works, the prevalence of moral hazard is low in technical elements where defects are more likely. This indicates that moral hazard is not the only source of defects, and thus that skills shortage might be an issue. Lastly, our results are robust to a range of robustness checks, including placebo tests falsifying the easiness of verification variable and the energy efficiency classification.

Conclusions

Our analysis contributes to the scarce literature on information asymmetries in home energy retrofits. Specifically, we document quality defects as the missing link between the informational context in which actions are taken and their effectiveness in terms of energy savings. Furthermore, our strong evidence is consistent with Giraudet, Houde and Maher (2018)'s evidence that the performance gap is explained by the easiness of verification for part of the time (specifically, on Fridays). Based on the available evidence, we can therefore conclude that moral hazard is an important issue in reaching high energy efficiency for the building sector. Accordingly, more resources should be dedicated to monitoring and verification, as well as to mandatory guarantees for energy efficiency work. Additionally, incorporating performance bonuses into the policy mix should be considered as a cost-effective way to mitigate low-quality work and reduce the prevalence of information asymmetries (Christensen, Francisco and Myers, 2023).

References

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