THE EFFECTS OF ENERGY RETROFIT POLICIES ON FUEL POVERTY: EVIDENCE FROM THE FRENCH WHITE CERTIFICATES SCHEME

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Overview

Residential energy retrofit is commonly known to be among the most cost-effective ways to achieve the energy transition. For many years, ambitious public policies have been implemented in order to support energy refurbishment. The magnitude of these policies is mainly justified by two arguments. First, buildings represent a significant share of final energy consumption: 45% in France, ranked at the top above transport or industry. Second, energy retrofit provides affordable solutions to reduce energy consumption and GHG emissions. Actually, several ex-ante engineering models go further predicting negative carbon abatement costs for certain energy retrofit operations (such as wall/roof insulation) (McKinsey & Company, 2009). However, households do not haste to carry out energy retrofit investment, a phenomenon which was noticed by Hirst and Brown (1990) and theorized under the name of "energy efficiency gap". Certain economists have argued that information asymmetry was the main cause of the gap, and have advocated for ambitious public policies in order to bridge it (Gillingham and Palmery, 2014). Targeting fuel poverty[1] is often a priority for these energy efficiency policies. First, it leads to both energy savings and social justice. Besides, low-income households living in less efficient buildings, their homes are often considered as the biggest and cheapest energy savings field. Finally, modest households have a higher discount rate (Hausman 1979) and do not have the liquidity to invest in energy retrofit, which increases the energy efficiency gap for this households category. In 2012, The European Commission enacted The Energy Efficiency Directive (EED - 2012/27/EU) which sets binding energy savings targets for member states. In order to achieve these targets, France has been implementing several policies: reduced VAT, zero-interest loan, tax credit, and a white certificate scheme. The latter, called "Certificats d'Economie d'Energie" scheme (CEE), is nowadays the French energy efficiency spearhead. In a nutshell, the government sets obligations targets for energy providers, the scheme obligated parties, that they must meet by funding energy retrofit operations in buildings. The scheme was launched in 2006 and has partly targeted fuel poverty after a major reform in 2016. Its significance has never ceased to grow, and it eventually grants more than 4 billion € in energy retrofit works per year nowadays. Despite their magnitudes, energy retrofit public policies efficiency has been challenged in the past years. First, studies suggest that targeting low-income households might be counterproductive because the rebound effect is higher for precarious households (see Hong, Oreszczyn, and Ridley (2006), Madlener and Hauertmann (2011)). Worse, the general efficiency of energy retrofit has been recently questioned by ex-post studies. Fowlie, Greenstone, and Wolfram (2018) using randomized controlled trials (RCT), addressed this question for low-income households in Michigan, USA and found an overestimation of ex-ante models by 50% compared to the ex-post measurements. Even though, they find no evidence of a rebound effect for low-income households. Other studies reach similar conclusions (see Liang et al. (2018) or Davis, Fuchs, and Gertler (2014)). In France, Glachant and Kahn (2021) using households panel data between 2000 and 2013 found that 1,000 € invested in energy retrofit save only 30 € per year. Directly evaluating policies, Nauleau (2014) and Giraudet, Segu, and Dast-gerdi (2021) argue that both tax credit and zero-interest loans increase households' investments in energy retrofit but they do not state on policies effect on energy consumption. Chlond, Gavard, and Jeuck (2021) using data about energy retrofit investment and projected energy savings argue that the CEE scheme is the most cost-efficient policy among the other energy efficiency supporting tools in France. However, articles assessing policies impact on energy consumption are scarcer. In this paper, we present the first ex-post study which assesses the impact of the CEE scheme on both energy expenditures and residential carbon emissions in France

[1] Fuel poverty was first defined by Boardman (1991), it covers different definition regarding countries. In a nutshell, it differs from general poverty because fuel poverty refers to households having a sensible part of their expenditures dedicated to energy consumption.

Methods

We use a difference-in-differences approach using a scheme reform proposed in December 2015 and applied from January 2016 as an exogenous shock in order to deal with endogeneity which is an important issue in ex-post energy retrofit evaluation. The reform has defined two types of households according to incomes per consumption unit: ”precarious” and ”very precarious” households matching more or less with the 50% poorest and the first income quartile. From January 1st 2016, obligated parties of the scheme have been forced to obtain 25% of their certificates from these ”precarious” households. Furthermore, funding energy retrofit into ”very precarious” homes provides bonuses (for one certificate produced, one was given for free). If the scheme is efficient in reducing energy consumption the poorest neighborhoods should have reduced their energy consumption faster than before the reform. Besides, scheme actors were not able to anticipate the reform since it was effective less than one month after it was suggested. We use a difference-in-difference strategy, using public data of energy consumption and incomes distribution by decile on 9,000 France neighbourhood. Since we can only measure gas and electricity consumption, we restrain our panel to neighborhood where 90% households use these fuels for heating, they account for France population 40%. From the deciles distribution, we calculate each neighborhood share living under both scheme’s official income threshold.

Results & Conclusions

We find out that if there are 10% more people living under the ”very precarious” threshold, energy expenditures decrease by 1% in 2019 compared to before the reform. We find no significant effect on carbon emissions neither on ”precarious” households expenditures.

Our results suggest that the CEE scheme has been efficient to reduce energy consumption and fuel poverty and that the rebound effect does not seem to cancel all the foreseen energy savings. Furthermore, two channels might be responsible for the measured effect: a higher retrofit efficiency in low-incomes homes, quality effect, or a huge increase of retrofit works in these homes after the reform, quantity effect. We are not able to discriminate between both of them.

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