The Price Impact of Energy Vouchers

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France and South Korea have implemented voucher programs in order to counter energy poverty. Energy poverty occurs when a household cannot afford the required energy expenditure for basic needs such as heating. Both countries consider as energy poor any household who spends more than 10% of income on energy. As 14% of the French households in 2018 and 11.6% of the South Korean households in 2011 are energy poor by this criterion, it is a large-scale phenomenon. Our paper investigates whether the increase of energy demand that a voucher program entails has an impact on the price of energy.

Although the use of vouchers to subsidize necessary goods has existed for a long time, they traditionally target goods supplied by private firms with relatively low market power at the national level (food, housing) or by non-profit organizations (education, health care). In contrast, the market structure that dominates energy supply is one of a national oligopolistic network industry. Firms of such an industry can have a strategic response to any policy that impacts it. Our main contribution is to take into account this strategic behavior in the formation of the energy price.

Our theoretical approach consists in modelling a game between energy suppliers and a regulator, where suppliers maximize profit while the regulator ensures that no consumer spends more than a given share of income on energy. From a benchmark case with no vouchers, we analyze the impact of their introduction in three settings: one where firms and the regulator make decisions simultaneously, one where firms move first and one where the regulator moves first. The first setting corresponds to a case where neither the industry nor the regulator has a commitment power that enables it to announce first its decision and stick to it. The two others correspond to cases where such commitment power exists for the firms or for the regulator, respectively.

We show that the implementation of the voucher program reduces the energy price under simultaneous decision-making or when the regulator moves first. However, the impact of vouchers on the energy price is ambiguous if firms move first. This scenario's price is above the price of the simultaneous decision scenario's price.

The possibility of a price reduction can be at first surprising as increasing the household's demand of energy would seem to increase the market power of energy suppliers. This does not occur because the distribution of vouchers increases the price elasticity of demand of eligible consumers, so that it in fact decreases the market power of suppliers. This reduction of market power can however be partially or fully countered by firms when they move first.

We also suggest how the model can be extended to take into account other definitions of energy poverty than the one used in France and South Korea. Our results are robust to the extent that the voucher distribution increases the price elasticity of demand of eligible consumers.

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