Selling and Saving Energy: Energy Efficiency Obligations in Liberalized Energy Markets

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EEOs are energy saving targets imposed by governments on energy retailers, who typically fulfill them by offering energy-efficiency subsidies to energy end-users. EEOs have dramatically expanded over the past ten years, with 47 programs now in existence across the U.S., the EU, and large economies such as China and Brazil, thus involving nearly $30 billion yearly investment.

Forcing energy retailers to reduce their sales may seem paradoxical. The argument stressed by policy-makers to motivate EEOs is that energy retailers are fit for identifying cost-effective energy saving opportunities, owing to the private information they own about energy end-uses. Previous research has showed that the argument makes economic sense in the natural monopoly context that prevails in the U.S., provided cost-recovery charges are adequately designed by the regulator. The argument, however, has not been studied in the liberalized context that prevails in Europe, where it is called into question. In such a context, the extent to which retailers can recover compliance costs depends on the degree of competition in energy markets. Moreover, the fact that retailers are allowed to incentivize their competitor's customers may prevent them from exploiting the information they possess about their own customers.

We examine the conditions under which EEOs effectively induce competing energy retailers to leverage private information about end-users. We rely on a Hotelling model of competition whereby two energy retailers supply energy to a continuum of customers who differ along two dimensions that are privately known to their current retailer: their individual price elasticity of demand, and the cost they incur upon investing in energy efficiency.

We find that, instead of selecting the most cost-effective investments options, firms may either target their most elastic customers, which enables them to increase their retail price, or their competitor's customers, which protects their sales. Allowing firms to trade obligations can restore cost-effectiveness, but reduces consumer surplus. Overall, the degree of flexibility that should be incorporated into such programs crucially depends on the degree of heterogeneity across investment costs and the relative weights governments assign to cost-effectiveness and consumer surplus.

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