

PERCEIVED PRICE COMPLEXITY OF ELECTRICITY AND WATER TARIFFS: LEARNING FROM THE LAB

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Overview

Tariffs have the potential to contribute to address the climate change, resource allocation and inequality issues in critical sectors like energy and water, but tapping this potential ultimately depends on residential consumers selecting them. Consumers are now used to faced different tariffs when buying cell phone, electricity or gaz contracts or trains and airplane tickets. On the one hand, the standard line is that choice is good for consumers: it confers upon them freedom, personal responsibility, self-determination and autonomy inn their consumption choice. On the other hand, too much choice might stress them out, notably because it is a complex task whith no clear-cut trade-off in practice. Typically, what should consumers choose between a simple flat tariff pricing and a more complex but also more advantageous non-linear tariff structure which create multiple marginal prices for the same good? On the supply side, it is justified since proposing more sophisticated tariff like time-of-use pricing, critical peak pricing, and real-time pricing help to implement demand response and provide the needed flexibility to the electricity system. In the water sector, increasing block tariffs already used in many countries were water has been historically scarce aim at providing the poorest consumers with inexpensive water, while charging the highest prices to richer consumers and companies. By charging higher prices for high consumption, increasing block tariffs are also meant to discourage excessive water use. At the end of the day, consumers may become quite obfuscated, without really understanding tariffs' mechanism and effects nor the way they have to adapt their behaviors to benefit from the tariff they have chosen. Our paper aims at better understanding the foundation of consumers' electricity and water tariff choice through the lense of behavioral economics and a lab experiment. We focus both on the tariff perception and its optimal usage. By studing both electricity and water tariff we aim at identifying a potential "good effect". Based on the behavioral literature, we expect participants to prefer simplest tariffs, no good effect and once they have information regarding their potential saving (in KWh or m³) choose the tariff that minimizes the bill (€) given their estimated level of consumption.

Methods

We conduct a lab experiment (13 experimental sessions were organized in the LEEP at the University Paris 1 from december 2018 to March 2019). We recruited 237 participants from the experimental database of the laboratory who are representatives of electricity and water consumers. We used a framed context of decision making by eliciting each subject's household electricity and water annual consumption at the beginning of the session (respectively in KWh and m³). During each session, the participants had to make decisions, consisting of choosing between three types of tariffs (two by two, i.e. 6 combinations) – linear tariff, two-part tariff and increasing block tariff . There are two situations:

- in the first situation, they have only information about their consumption (in KWh and m³) estimated though a standard questionnaire on their usages taking into consideration household composition, housing characteristics, equipment etc. The choice criteria is their immediate perception. The choice is not incentivized (un-incentivized).
- In the second situation, we provide them with information regarding electricity and water conservation behaviors and ask them whether they are willing to adopt these behaviors. We evaluate their own potential savings (in % of their actual estimated consumption) if they effectively adopt these saving behaviors. They have to choose tariff as in the first situation. In this situation, they are informed that there is a tariff that is more advantageous than the other. If they choose the most advantageous, they are rewarded. If they choose the other one they are not rewarded. The choice is incentivized. The choice criteria is the bill minimization.

After dealing with the tariff decisions, subjects were presented a Holt and Laury (2002) lottery procedure, that we used for eliciting the participants' risk aversion in the analysis of the results as well as a questionnaire to explain their choices and complete the analysis with qualitative data. The final payment consisted of the payoff in the Holt and Laury's lottery, the payoff for the 12 tariff decisions section, plus a 5 Euros show-up fee. For determining the payoff for the tariffs' section, they receive 1€ if they have chosen the most advantageous tariff (the one that minimize the bill), i.e. 6 € maximum.

Our empirical strategy consist at explaining the tariff choices in the two situations using a probit model.

Results

Our preliminary results are the following:

1. Without incentives, the block escalating rate is a minority choice in all goods, although it is economically more advantageous.
2. Based on the tariff perception, without incentives and decision support, consumers appear to be inconsistent in their choices. Most prefer simple tariffs to complex tariffs, even if they are more economically advantageous. Moreover, consumers make stronger choices in electricity than in water. This could be explained by a different price relationship between the two goods. Electricity pricing has a greater impact on household budgets. In addition, consumers are more sensitive to price issues in this good.
3. Based on the tariff perception, participants choose more the increasing blocks tariff to save money. This is more true in electricity than in water.
4. When incentivized, the subjects prefer the progressive tariff (+ of rationality) than the linear tariff suggesting that there is a smaller of the "good effect".
5. When incentivized, the consumer associates more preferences, behavior and choice of tariff (regardless of the good).

Conclusions

From these preliminary results, we can deduce several lessons regarding tariff design. First, without incentives or information, consumers have a stronger preference for simple rather than complex tariffs (linear/two-part tariffs vs. progressive tariffs). This confirms the literature on water and electricity tariffs. In the end, progressive tariffs are preferred only when the choice is incentivized, but only marginally. Indeed, these complex tariffs are based on a very rational behaviour from consumers who are able to control their consumption. They represent a relative minority among the participants of the study. Thus, our results would argue in favour of tariff discrimination taking into account the heterogeneity of consumers. The different preferences and risk aversion make it necessary to help consumers to choose (especially in the economic calculation of tariffs). Otherwise, there is a risk of having tariffs that are undeused by consumers. One solution could be to offer a menu of fares to consumers who would self-select the optimal fare according to their elasticities and preferences. However, our result suggest that without transparency but also assistance in this choice, their spontaneous preference will go towards simplicity rather than efficiency.