

AFFORDABILITY OF TARIFFS OF LOCAL PUBLIC SERVICES & THE TURIN-INDEX

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In 2010 Foundation for the Environment / Turin School of Local Regulation launched a research project on affordability of tariffs of main local public services, in particular energy-environment related services, identifying the factors of change and the impacts on vulnerable groups. This in order to provide local policy makers and stakeholders with the necessary knowledge and instruments to face a topic that, considering the macroeconomic context, is likely to attract more and more attention.

RATIONALE

The consumption of goods with periodic payments involves an important basket of goods and services. Excluding rents, loans and mortgages a relevant share of consumers' disposable income is allocated to services with clear social and environmental implications such as natural gas, electricity, district heating, water and waste. The provision of some of these goods is characterized, for technical or social/legal limits, by a weakness of perfect excludability condition that, in most markets, is able to prevent opportunistic behaviour and free riding. Unlike goods for which there is almost perfect simultaneity between purchase occasions and payments, the perception of goods for which a periodic payment is expected suffer from some distortions that obstruct market's functioning and prevent the use of traditional incentive mechanisms.

FIRST OUTCOMES

The first phase of the research led to the identification of a simple and intuitive way to think at arrears either as an operating cost for utilities providing these services or as stemming out from deprivation. The use of an **original and unique longitudinal dataset of household billing data from three major Italian utilities** (Smat S.p.a. 50,000 observed customers for water services, Iren Mercato S.p.a.175,000 observed customers for electricity and Egea S.p.a. 34,000 observed customers for natural gas) **operating in the metropolitan area of Turin (Italy) and in the Province of Cuneo (Italy)**, allows us to model the complex phenomenon of arrears.

The descriptive analysis of datasets suggests that a **large percentage of households defers payments with regularity: 25% of the water supply bills are paid at least one day after the expiry date, 18% for electricity bills and 8% for natural gas.** Nevertheless, half of these bills presents delays not exceeding 30 days representing situations of forgetfulness or liquidity problems promptly solved.

The Dataset

(# of customers):

- ▭ **Water services: 50,000**
- ▭ **Electricity: 175,000**
- ▭ **Natural gas: 34,000**

The empirical investigation (*Probit models for panel data*) provides evidence that **state dependence**, i.e. households who have experienced an event in the past has higher probability to experience again the same event, **occurs in the case of unpaid bills pointing out that “history matters” in forecasting arrears**. In fact, 65% of households experiencing a delay in the payment of water services bill, also postpones the next payment. At the same time, 88% of those who pay regularly maintain the same behavior for following payments.

The same outcome can be seen for other services: 70% of those who are late to pay the electricity bill in due time will continue to do so, 53% for natural gas bills; 93% of users who pay the electricity bill at maturity will continue to pay on time as 96% for natural gas. The determinants of these payment behaviours are multiple and in most circumstances driven by economic or social vulnerability; however, according to the information provided by utilities, we verify the effects of different tools to manage disputes, the use of installment plans and different methods of payment. In the case of water services the analysis suggests that the resolution of disputes, especially through installment plans, is associated with a reduced cost of arrears for the enterprise. For electricity, reminder letters generate a positive effect on the cost of arrears but with a lag, conversely outages show immediate and positive effects. Interesting **experiments in communicating a state of arrears** and proposing a resolution (for example texting users) will be examined in the future of the research development.

If descriptive give a first overview of the phenomenon, **the analysis was enriched by building a compact and consistent measure of the cost of arrears for utilities based on: the time between the expiry date and actual payment and the size of the credit**. The use of information on administrative costs to manage arrears and an appropriate interest rate representing the opportunity cost of unavailable funds are able to synthetically represent the cost for each customer.

We treated this information using econometric models (Tobit models for panel data) confirming strong, but decreasing, state dependence. The model predicts higher expected costs, for utilities, attributable to consumers who experienced delays in previous payments. The econometric analysis corroborates the presence of an issue for either companies providing local public service, who face the financial cost of arrears, or for policy makers who need appropriate tools to support vulnerable end users.

THE TURIN-INDEX

The further research question pertains to the possibility of **using billing data to derive a signal of vulnerability** (or presence of a fuel poverty state). We decided to refer to the economic and sociological literature that studies the poverty states, i.e. periods of life in which the disposable income of the family is below a certain threshold, as a reference point to analyse the dynamics of arrears. In particular, we proposed the use of the **Longitudinal Poverty Index** (Mendola et al., 2011) to create an index, **the Turin-Index, capable to define different levels of arrearage intensity**. Through the use of this measure we can provide a dynamic view of the phenomenon based on the history of payments for each household, the intensity of delays and an “emergency effect”.

TURIN-INDEX

From “0” (perfect payer)
to “1” (absolute arrearage)

The Turin Index is measured between 0 and 1 with the extreme values representing respectively the case of “perfect payer” and the case of **absolute arrearage**. The values in between can be interpreted as measures of the degree of arrearage intensity. Moreover, the index can be easily aggregated to construct city or regional measures.



In a first stage, we computed the average Turin-Index for the three services considered. The mean as a measure of central tendency suffers the presence of masses and/or extreme values, this is the reason why the mass of customers at zero (good payer) causes the mean to approach zero (values between 0.02 and 0.05). The Turin-Index shows the great potential to become a bridge for the exchange of information and the identification of critical situations to monitor and to revise between public and private sector; **a synthetic indicator able to offer decision makers a snapshot of the phenomenon of arrears and a strong basis to build specific energy and welfare policies upon so as to support users who experience deprivation.**

Further investigation and modelling is currently being carried out **in order to use the Turin-Index as an effective tool to forecast arrears.**

A BROADER SCOPE IN THE RESEARCH

The analysis on the dataset of household billing data and the design of the Turin-Index are part of a broader research project to explore affordability of local public services. In particular, a parallel research activity focused on the microeconomic, cognitive and behavioural foundations of individual/collective choices in the perspective of better policy design at local level.

For further information: www.fondazioneambiente.org/afford/Afford-Executive-Summary_EN.pdf

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ABOUT US

The **Turin School of Local Regulation (TSLR)** is a network initiative that intends to offer an international high-level research, education and capacity-building experience. The School adopts a **policy-oriented approach**, with the aim of **spreading the culture and instruments of regulation and regulatory reform at local level**, connecting academic research with local policy-makers, public officials, professionals, local regulatory agencies, NGOs, consumers' associations, chambers of commerce.

TSLR is an initiative of **Foundation for the Environment**, built on 15-year experience on training and capacity building on regulation of local public services.

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