The prospects for smart energy prices: observations from 50 years of residential pricing for telecoms and energy

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Background

- Harnessing flexibility of energy demand is significant in:
  - improving integration of renewable resources and,
  - achieving low carbon power systems
- Demand side response programs allow customers to respond to signals (e.g. prices) and modify their consumption when necessary.
- Research carried out looking at electricity prices in London (with thanks to EdF Energy) and the BT Archive.

Background

- Thus, part of the load could be shifted to time periods when total system demand is lower or when outputs of renewable generation is expected to be high.

- However, the main question is how to entice customers to provide this demand side flexibility?

- Most demand side response models assume certain changes in tariffs, e.g. real time varying, time of use, CPP or locational varying price.

Background

- Thus, it is important to investigate whether it will be acceptable to customers to buy energy at variable prices considering their experiences with other services, in particular telecommunications.

- The study looks into this question and give a critical overview of previous experience as well as expectations for future behaviour.

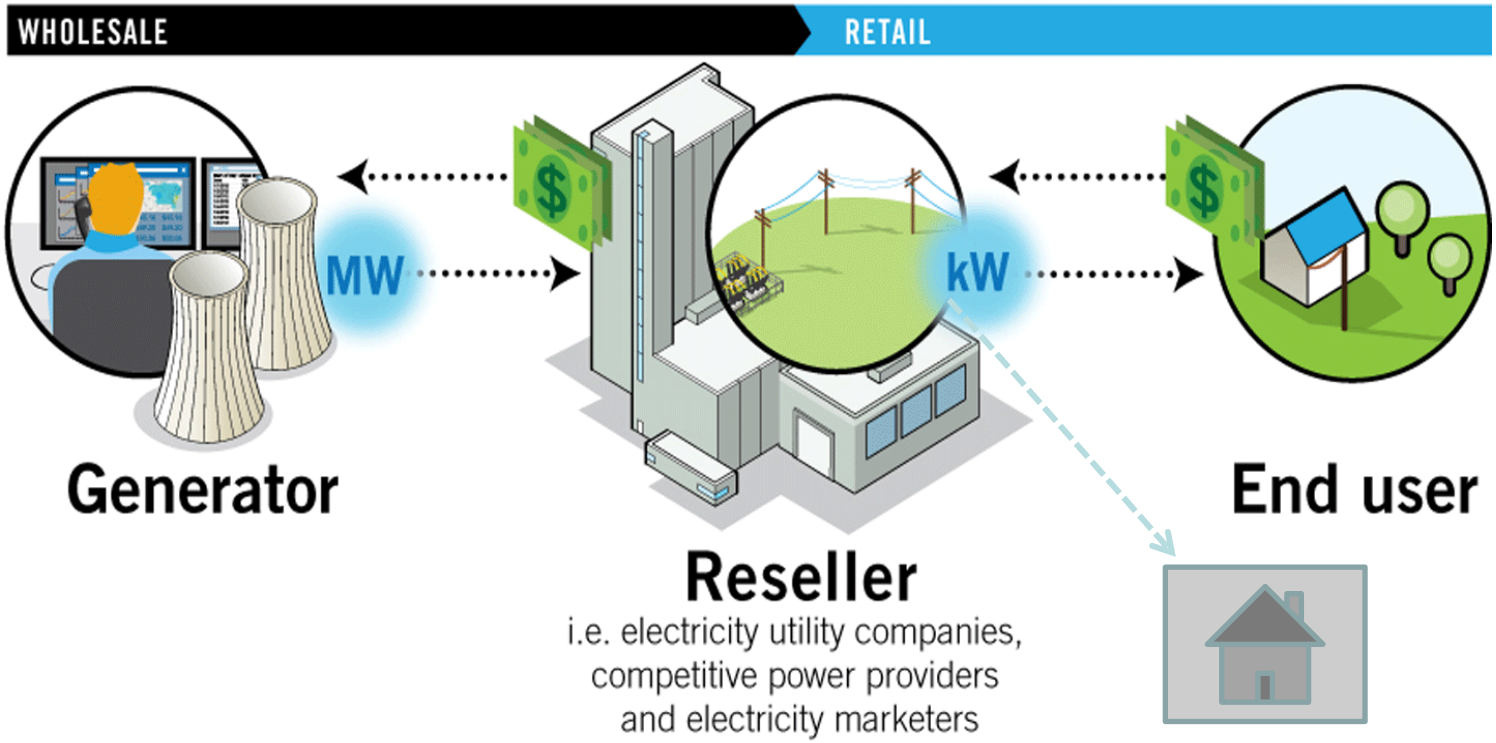
Background

- Specifically, this study examines how energy and telecommunications have evolved over the last 50 years.

- And what we can learn from there in order to examine the prospects for smart energy pricing by 2050, based on past behaviour of firms and their customers.

Pricing Telecoms and Energy

- Price discrimination is economically necessary due to spatial and temporal variation.



Pricing Strategies

- Examples of pricing strategies in telecoms and energy

  - *Cost-based pricing*

  - marginal cost, Ramsey pricing

  - *Differential pricing*

- second degree – e.g., block tariffs (rising or decreasing)
- third degree – e.g., out of former incumbency area discounts

  - *Product line pricing*

  - Price bundling (e.g., dual fuel, combined internet broadband & TV subscription)

Pricing Strategies

- *Complementary pricing*

-Captive or lock-in-pricing (e.g., subsidised cellular phones but customers are forced to sign a contract with the cellular network).

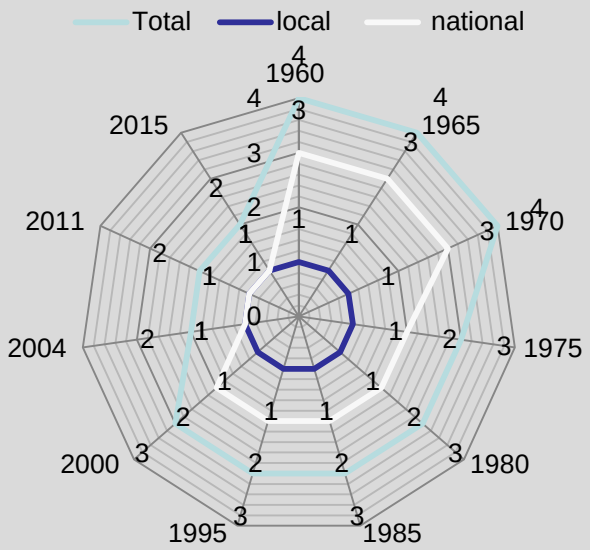
-Two-part pricing – Fixed sum + consumption dependent charges (e.g., metering/ connection costs + tariff per KWh).

Products and Price Differentiation

Telecoms

- There has been a decrease in the degree of location/distance variation in prices over time. However, there has been increase in the degree of time-varying prices and the number of products on offer.

Fig. 1: Number of distance/location based fixed voice telecoms

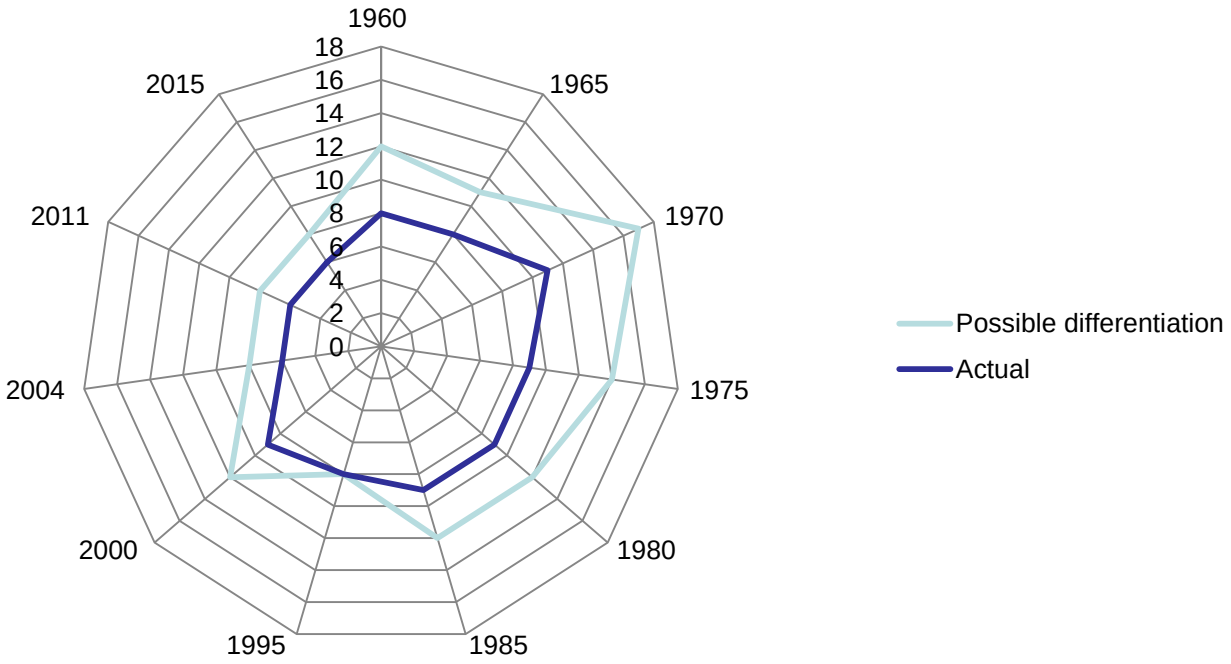


Products and Price Differentiation

Telecoms (Fixed)

- The amount of the observed time-varying price differentiation falls short of the potentially possible differentiation. This looks at how many pricing periods (i.e. possibly different prices) vs the number of actual price points.

Fig. 2: Possible and actual price differentiation by BT



Products and Price Differentiation

Electricity

- There has been no increase in the degree of time or location varying prices, though there has been some increase in the number of products on offer.

Fig. 3: Number of electricity products on offer

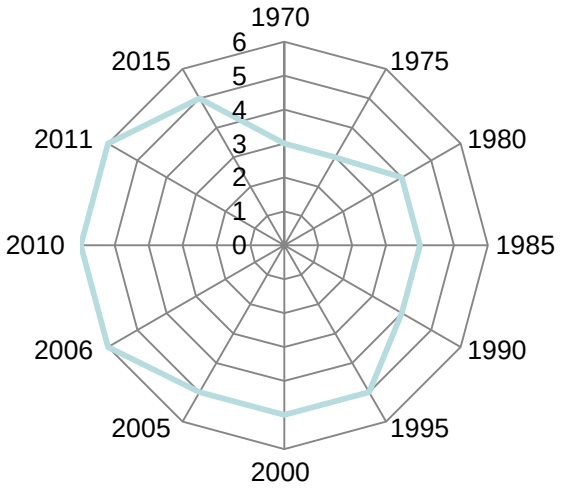
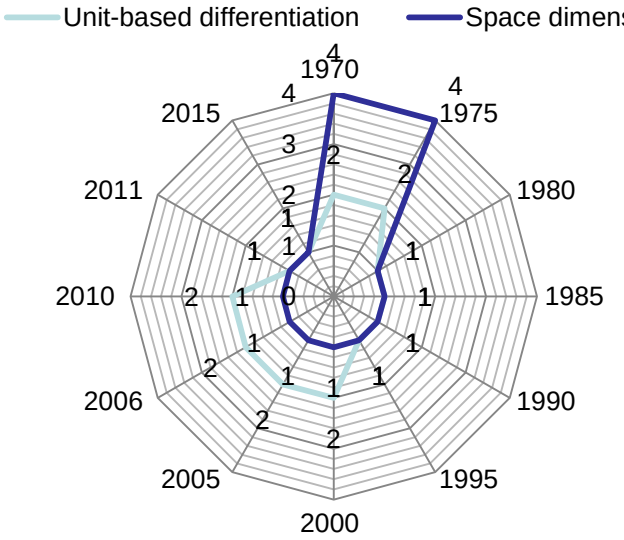


Fig.4: Unit and house size based product differentiation – white meter

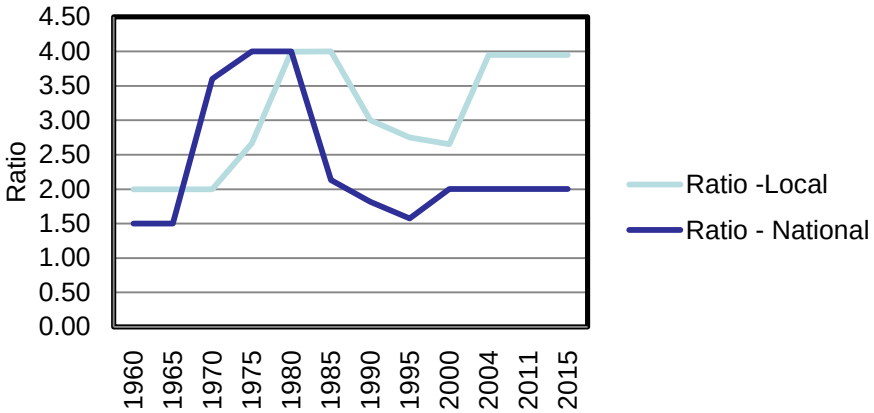


Products and Price Differentiation

Telecoms and Electricity

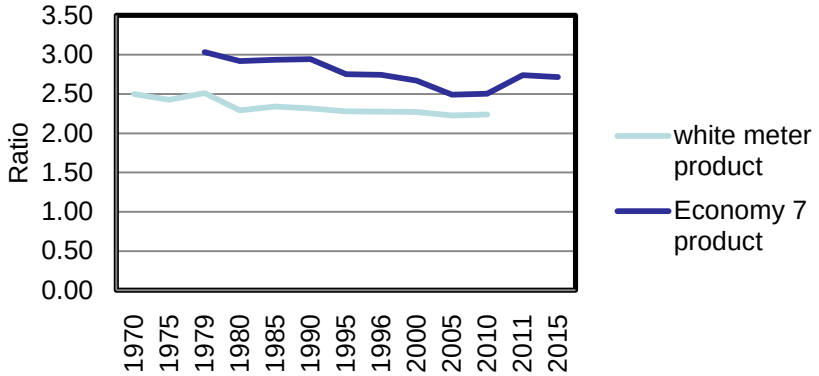
Within-calls degree of time price differentiation for national calls has significantly reduced compared to local calls.

Fig. 5: Ratio of standard call to cheap/off-peak call rates



Within-product degree of time price differentiation has reduced overtime

Fig. 6: Ratio of Peak to Off-peak Electricity Prices



Future Energy Pricing

Smart Pricing?

o Telecoms shows relatively more location-based pricing differentiation (e.g. local vs national).

o More time-based price differentiation seems possible (and plausible?), e.g.

- weekend pricing

- regrouping of peak and off-peak periods to reflect a more time of use: e.g., off-peak (00 - 06 hrs), moderate/standard day (06 – 18.00), peak (18.00 – 22.00), moderate/standard night (22.00 – 23.59).

Conclusions

- History of both telecoms or energy does not suggest that there is a trend towards increased use of differentiated pricing in space and time for the same product.

- As the energy sector continues to experience dramatic changes, we don't know exactly what changes and new technologies will shape our energy systems by 2050. But we do know that the rollout of the next generation of electricity meters (smart and advanced meters) will in theory allow households to take control of its energy consumption. They will also enable new products and services to be developed, including tariffs which offer more time and space variation.

- There needs to be further research investigating what tariff structures consumers are willing to accept, taking into consideration their impacts on energy suppliers. Should energy price be cost-reflective or be more reflective of consumer preferences? Should tariffs involve more flat charges or be highly discriminatory?