Introduction

Information and its double role in regulatory agencies:

1) Internal- decision making
2) Published- accountability

Key indicators: penetration, market shares, revenues, price levels

Price data- blunt way to convey information on the degree/outcome of competition either comparing price levels of different geographical area or by tracking price changes with time.

Measuring prices is a challenging task due to non linear tariffs.

For mobile phone calls: Prices depends on the time of the call or the destination network

Volume discounts, semi-flat rates and flat rates

Call connection fees

Hard to summarize in a few indicators, something desirable in public reporting.

Usual approaches:

1) Proxy price levels using average revenues per user, line or minute.
2) Use of theoretical consumer profiles (known as baskets).

Drawbacks of 2:

a) Not all consumer profiles are equally relevant in all countries (between countries variability).
b) It is not possible to guarantee that the offers finally informed are the most relevant ones.

Average revenue and average expenditure

European NRAs and the EC have proxied prices using average revenue per minute or per call, normally sourced directly from operators (i.e. total revenue/total number of minutes).

Reasons: simplicity and comparability

We argue that reporting average expenditures per unit of consumption improves on this (mean of the expenditures per unit of consumption of different individuals).

$$\text{Average Revenue} = \frac{\sum_{i=1}^{I} E_i}{\sum_{i=1}^{I} M_i} \qquad \text{Average Expenditure} = \frac{\sum_{i=1}^{I} E_i/M_i}{I}$$

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Information sources at CMT

1) From operators.

2) CMT and Red.es outsource the field work necessary to gather
   household data which consists of:

   a) Survey information (twice a year).
   b) Bill harvesting data (quarterly)

   In 2010 the sample sizes were of around 3,000 households and over
   6,000 individuals for the questionnaires and around 2,500 households
   for the bill harvesting data.

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Sources of differences between AE and AR

Economic rationality: people will choose tariffs "adequate" to their consumption levels

For mobile calls, two types of tariffs:

a) Volume discounts ⟶ large consumers go for 2-part tariffs with larger one-off payments (maybe lower price per minute)

a) Call connection fee ⟶ those who tend to make longer calls pay less per minute

Both facts generates a difference between AE and AR.

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Example with call connection fee: Sources of differences between AE and AR

1) If the price per minute for all calls is p, then AE=AR.

2) Add a call connection fee: c. Each individual, i, from 1 to I, makes ni calls. di upper bar is the average duration of the calls of individual i.

Average revenue per minute is:

$$\frac{\sum_{i=1}^{I}\sum_{j=1}^{n_i}(d_{i,j}p+c)}{\sum_{i=1}^{I}\sum_{j=1}^{n_i}d_{i,j}} = p + \frac{c}{\left(\frac{\sum_{i=1}^{I}n_i\bar{d}_i}{\sum_{i=1}^{I}n_i}\right)} \qquad [1]$$

Average expenditure per minute :

$$\frac{\sum_{i=1}^{I}\frac{\sum_{j=1}^{n_i}(d_{i,j}p+c)}{\sum_{j=1}^{n_i}d_{i,j}}}{I} = p + \frac{c}{\left(\frac{I}{\sum_{i=1}^{I}(1/\bar{d}_i)}\right)} \qquad [2]$$

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Example with call connection fee: differences between AE and AR

1) The effect of the call connection fee is that the price per minute of any call decreases with its length.

2) AR=AE if the average duration of calls is the same for all individuals.

3) If all individuals make the same number of calls, AE ≥ AR.

4) When the number of calls differs between individuals, the difference between AR and the AE can take any sign.

   For AE<AR there must be a negative correlation between the average call duration and the number of calls of individuals. Loosely speaking those that phone more must make shorter calls.
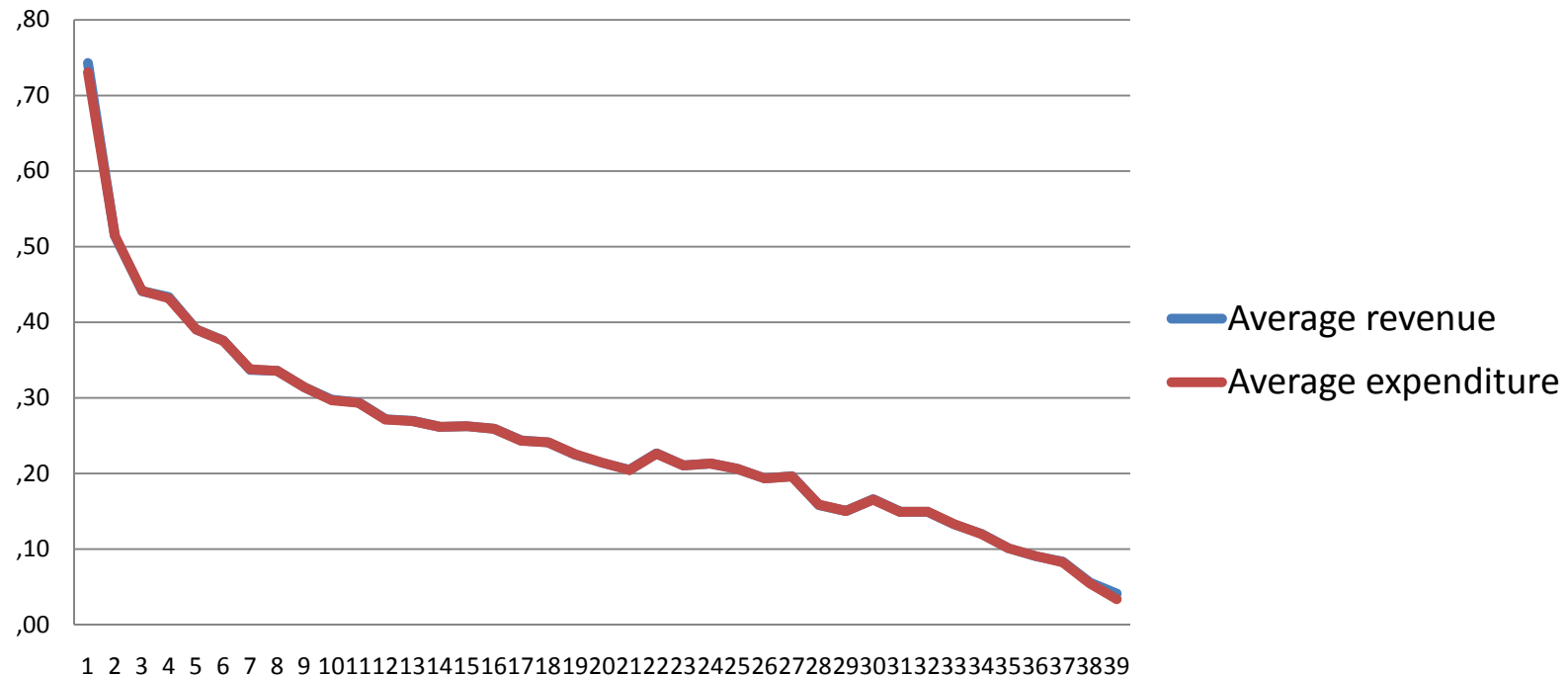
Average expenditures and revenues for mobile calls

Data of the second quarter of 2010 Post-paid calls	Panel de Hogares (2,481 individuals)		Data provided by operators
	Average expenditure	Average revenue	Average revenue
Voice calls (euro cents per minute)	29.1	13.3	15.1

Volume of minutes, impact on av. expenditure and av. revenue of mobile voice

Volume of minutes quartile	Average expenditure (euro cents/minutes)	Average revenue (euro cents/minute)	Number of minutes per month
1st	59.4	40.7	18.7
2nd	26.2	25.8	44.6
3rd	19.7	19.3	84.9
4th	10.9	7.9	301.5
Total	29.1	13.3	112.4

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Volume of minutes, impact on av. expenditure and av. revenue of mobile voice

AR and AE depending on the 2,5% percentiles of volume of minutes

Conclusions

* Two apparently similar ways to report mobile call prices, the average expenditure per minute and the average revenue per minute differ in a striking way. The reason is the diversity in tariffs.

  *AE and AR are complementary: their combination sheds a better light on price levels where price discrimination is present.

  *We are left with the question on whether it would be legitimate to give any further interpretation to the difference between both measures. Greater competition for large users? Changes in the habits in calling behaviour? Difficult to disentangle.

*To derive the average expenditure per minute one needs access to micro-data, which is still scarce.