

# **Telecommunications Price Indexes**

## **session: abstracts**

### **1. Fuzzy Price Indices: A Case for Flexible Classification Rules**

**Kari Manninen, University of Helsinki**

This study draws solely from practical, and personal, difficulties that price statistician face when trying to put together three components of price indices: the price measure, appropriate weight, and their corresponding classification. This problem is especially apparent in conjunction with telecommunication industry's products and services, both in the context of the CPI and the PPI. For example, how do we construct meaningful and conceptually sound indices for a bundle that provides cable TV subscription, fixed line internet telephony (VOIP), unlimited broadband internet connection (plus cable modem, email, voicemail, fax), and video-on-demand (VOD)? How do we compile the price index, using the current classification systems, when all belongs to a single fixed monthly fee?

While fuzzy theory is more widely applied in control and system applications in engineering, we will show how applying fuzzy set theory to price statistics can overcome some of the practical problems without the need to make major changes in current classification systems, data collection, and dissemination practices. The method relies on defining membership function with respect to classification system that describes, as in probability terms, the degree in which the object belongs to a set (class). Mathematically, the fuzziness means that some sets don't have clear boundaries (or in the real world: whether a mobile device is a phone, PDA or a digital camera) and can hence belong to multiple sets. This is precisely why we believe that economic statistics, in more general terms, is a fruitful area to apply fuzzy set theory because it currently often describes complex, dynamic, real world phenomena using in (implicit) rigid, two-valued membership functions!

We begin by describing fuzzy set theory and what operating fuzzy set means in the context of price index compilation. We then discuss the various aspects of fuzziness in the NA context. In particular, we discuss the fuzziness in use and timing and how they translate to the CPI and PPI. Finally we describe how, in practice, to go about compiling the fuzzy price indices and, at the end, we extend the fuzzy price index concept into the transaction economy framework (paper presented at the last Ottawa Group meeting) and hedonics.

### **2. Multi-Dimensional Product Differentiation for Service Bundles**

## **Abhay Gupta, Simon Fraser University**

This paper develops a model of Multi-Dimensional Product Differentiation for Services which bundle features together. Consumer has different position (desired quantity-mix) and different weight (reservation price) for each of the features. He selects a service that maximizes his surplus and the one which is closest to his position. Producers face a fixed cost of bundling and marginal costs for included features.

The paper also notes two channels that affect the service prices in opposite ways. In each corresponding period, consumer with lower reservation prices are shopping for the services. But these reservation prices are going up due to complementarity/ network-effects .

The model is applied for the case of Cellular services plans being offered by various wireless providers. A price index is suggested that represent change in price for Same-Quality (and same-quantity of features) service.

### **3. Evaluation of the behaviour of different methods for price measurement in the telecommunication market**

#### **Alexandra Beisteiner, Statistik Austria**

For telecommunications the most relevant methods for sampling and replacement are unit values, comprehensive basket and consumer profiles, as identified by the final report of the Task Force by Eurostat. These methods are taken as a basis for an evaluation of the behaviour of each method to typical sampling and replacement cases that occur in that area. Starting with the question of what is kept fixed in terms of weights and the implication on the results of the various methods is examined.

The telecommunication market is highly competitive with frequent changes of prices and price determining characteristics: After the identification and classification of typical sampling, replacement and quality change issues, the behaviour of the three methods is evaluated. A database which contains detailed figures on turnover and absolute values of minutes cross classified by enterprises and price determining characteristics is used to apply the different approaches to the same input data to enable a comparison of the results.

### **4. Telecommunications Indices in the Japanese CPI**

#### **Makoto Shimizu, Statistics Bureau, Japan**

This paper provides an outline of index compilation for telecommunications in the Japanese CPI.

In the CPI of Japan, items for telecommunications are fixed telephone charges, mobile telephone charges and internet connection charges. These charges are differentiated for various services, and changed rapidly with deregulation and technological innovation. For comparison with the same quality, indices for them are computed by using charges and numbers of members for plans or lines from providers.

At the 2005 revision, the weight decreased for fixed telephone charges but increased for mobile telephone charges, and prices of plans with bundles for telephone and e-mail were newly aggregated for indices for mobile telephone charges.

The paper also introduces what happened to the indices with the revision, and a scope for compiling methodology in future based on recent circumstances around telecommunication.