

Forecasting Cellular Mobile Traffic: An Econometric Approach

Åke Arvidsson, Anders Hederstierna and Stefan Hellmer

Ericsson AB, Development Unit IP Networks
P.O. Box 1505, SE-125 25 Älvsjö, Sweden
Ake.Arvidsson@ericsson.com

Blekinge Institute of Technology, School of Management
Soft Center VI, SE-372 25 Ronneby, Sweden
{Anders.Hederstierna, Stefan.Hellmer}@bth.se

Abstract: We consider the problem of explaining and forecasting the volume of cellular mobile traffic in a long-term perspective. To this end, we create a model of a market with both economic and non-economic variables, *viz.* the state of the economy, the current price level and the penetration effect on the market in question. We measure these variables by using publicly available data and by applying income theories and by combining theories of demand and technology diffusion. Applying the model to three markets, *viz.* China, Italy and Sweden, we show that it performs very well in explaining and predicting the volume of cellular mobile traffic. Noting the qualitative differences between these markets, we conclude that the model has some universality in that the results are comparable for all of them.

Keywords: Forecasting, econometric.

1. INTRODUCTION

Forecasts of traffic demand are needed when new networks are planned or when existing networks are upgraded. A forecast can relate to users and express, *e.g.*, the *number* of subscribers (possibly in a particular area such as the CBD and/or of a particular category such as business users), or the *behaviour* of these subscribers (possibly with respect to particular services such as outbound voice calls and/or particular times such as the busy hour). Other forecasts can relate to equipment and express, *e.g.*, the *traffic* in a network (possibly in a particular part such as a link, switch or router), or the *transactions* behind this traffic (possibly with respect to certain servers such as the Home Location Register in a GSM network). These aspects and units may also be combined in various ways and several other aspects and units may be considered as well.

Forecasts may consider different time spans. Short-term forecasts for the next few seconds or minutes have been suggested in the context of allocating bandwidth to bursty sources (*e.g.*, video sources [1]) or end-to-end logical paths (*e.g.*, VPs in SDH or ATM and LSPs in MPLS [2,3]). Long-term forecasts for a couple of years are typically used in the context of deploying new technologies (*e.g.*, IP telephony [4]) or expensive equipment (*e.g.*, submarine cables [5]).

Forecasting is thus an essential part of planning and maintaining telecommunications networks. For this reason forecasting has been a concern mainly for network operators. Today,

