

# A Data Fusion Approach for Interpurchase Timing Models Using Incomplete Purchase Histories

Ryosuke Igari

Faculty of Business Administration, Hosei University

## Abstract

Interpurchase timing models are important for understanding the effects of marketing activities such as price promotions and advertising. However, companies can only obtain incomplete purchase histories, as observing customers' purchase durations in competing is difficult, and this can bias the simple application of interpurchase timing models. In this study, we develop a suitable method of estimating the parameters from the sum of purchase durations. In particular, we consider Gamma random variables composed of two types of distributions considering consumers' heterogeneities in the model. While it is difficult for existing methods to estimate the parameters suitably from only the sum of durations, we propose a new data fusion or data combination approach incorporating macro-level information into the micro-level modeling. We employ the quasi-Bayesian method, which can incorporate the objective function of the generalized method of moments from macro-level information into the likelihood. We show the effectiveness of the proposed method through a simulation study.