

# Master Thesis Proposal

## Choice-Based Revenue Management with Consumer Heterogeneity: Estimation and Optimization

Revenue management (RM) is a strategic approach to optimizing the allocation of resource capacities to demand by controlling the availability of fare products (Vulcano et al. 2010), with the goal of matching the supply and demand in the short run. With the recognition of choice behavior's role in RM, discrete choice models have been incorporated into airline RM practices. Vulcano et al. (2010) study the practicality and effectiveness of discrete choice models in airline RM. They show that (i) choice behavior can be reasonably accurately estimated from readily available airline data and (ii) choice-based RM could bring a significant benefit relative to independent-demand RM methods. However, their research neglected the impact of heterogeneous consumer preferences for products.

The objectives of this master thesis are to:

- review the literature on the estimation of discrete choice models that capture heterogeneous consumer preferences for products,
- develop a discrete choice model to capture consumer heterogeneity under airline RM context,
- conduct an experiment (e.g., a conjoint experiment) to estimate this discrete choice model with consumer heterogeneity,
- apply the estimated discrete choice model to a simulation-based optimization framework for airline revenue management and gauge the benefit of incorporating consumer heterogeneity in the choice model as opposed to disregarding it,
- provide open research gap and future trends.

### Selected Literature Recommendations

Vulcano, G., Van Ryzin, G., & Chahr, W. (2010). OM practice—choice-based revenue management: An empirical study of estimation and optimization. *Manufacturing & Service Operations Management*, 12(3), 371-392.

Halme, M., & Kallio, M. (2011). Estimation methods for choice-based conjoint analysis of consumer preferences. *European Journal of Operational Research*, 214(1), 160-167.

Otter, T., Tüchler, R., & Frühwirth-Schnatter, S. (2004). Capturing consumer heterogeneity in metric conjoint analysis using Bayesian mixture models. *International Journal of Research in Marketing*, 21(3), 285-297.