Digitization Tutorial Application

Youngeun Lee
youngeun.lee@kellogg.northwestern.edu

1 Courses of Study

I am a 2nd year Ph.D. student in quantitative marketing at Kellogg School of Management, Northwestern University. Table 1 summarizes the courses I pursued during graduate studies.

Table 1: Courses of Study

Department	Course
Economics	Microeconomics I, II, III
	Introduction to Econometrics I, II, III
	Industrial Organization and Prices I
Marketing	Quantitative Modeling
	Structural Modeling
	Analytic Modeling
	Bayesian Methods and Computation
	Marketing Strategy
Managerial Economics and Strategy	Economics of Innovation
Operations Management	Empirical Dynamic Models

The courses I have taken serve two purposes – building a foundation in economic theory and developing skills and tools necessary for research in the field of marketing.

The microeconomics sequence covers the theory of consumer behavior and of the firm, general equilibrium, game theory, and informational asymmetries in markets, and the econometrics sequence covers topics including, but not restricted to, identification, statistical inference, asymptotic theory, extremum estimators, and non-parametric regression. Industrial organization and prices I provides an introduction to both theoretical models and estimation methods in industrial organization. Theoretical topics include price effects of mergers, collusion and dynamic competition, two sided markets and empirical topics include estimation of production and demand including Ackerberg, Caves, and Frazer (2015) and Berry, Levinsohn, and Pakes (1995). Economics of Innovation covers both theoretical and empirical analysis of technological change. Topics including incentive contracts for R&D, intellectual property rights, patent licensing, entrepreneurship, and incentives for innovation are discussed.

The marketing seminar on quantitative modeling covers both substantive and methodological issues in quantitative marketing. The course focuses on causal inference methods and discusses substantive topics including pricing, online-advertisement, online review, and network and peer influence. The marketing seminar on analytic modeling provides insight into game theory models in the field of marketing and covers topics including distribution channel coordination and sales

force management. Bayesian methods and computation covers both statistical theory and Bayesian estimation methods such as Metropolis-Hastings and Gibbs sampling. The marketing seminar on structural models focuses on understanding and implementing discrete choice models and discusses consumer heterogeneity, state dependence, individual discrete choice, aggregate discrete choice, and endogeneity. The operations management seminar on empirical dynamics model covers structural estimation of dynamic models, in particular dynamic discrete models, in the context of inventory management, supply chain coordination, and facility positioning. Marketing strategy focuses on theories of competition and strategy and covers pioneering advantage, market orientation, differentiation, customer satisfaction, and branding.

2 General Interests and Projects

My general research interest is addressing questions – whether and how behaviors of consumer and firm change as a consequence of transitions in markets – at the intersection of marketing and economics. In particular, I am interested in investigating the underlying mechanism of how newly transformed environments affects consumers decisions and choices under uncertainty. Furthermore, my research interest lies in answering research questions that arise due to the characteristics of the online platform, such as privacy, security, and information disclosure issues. Lastly, I am interested in developing new approaches and methods that utilize the availability of data from a wide array of sources to address challenges in estimation methods. In the following, I briefly describe my research projects and research interest.

2.1 Projects

My interest in examining changes or consistency in behavior under uncertainty led to a research project on modeling asset prices during my master program in statistics. The project aims to model the dynamics of asset price behavior by developing an efficient MCMC estimation method through data augmentation (Park and Lee 2014; Lee and Park 2016). The model is framed within behavioral finance: the idea is that stock prices both over-and-underreact asymmetrically to a series of outside news. The proposed multivariate jump-diffusion model enables statistical inference on the latent process of jumps in stock prices in response to outside shock, while incorporating correlation among jumps. The results show that the distribution of stock prices in responses to shocks is asymmetric and fat tailed.

An ongoing project focuses on measuring consistency of brand choice by exploiting an exogenous shift in household needs. This exogenous change is characterized by a forced migration to the next product class within a brand. For instance, households switch from infant formulas to baby food as their baby grow. Under such circumstances, prior experience with the brand is not perfectly correlated with that of subsequent purchase decisions. As a result, re-evaluation of brand choices occurs due to uncertainty associated with the product. I focus on the disposable diapers category, in particular, the transition from diapers to diaper training pants. This forced shift in needs helps disentangle and identify true underlying brand preference. The ultimate goal of this research is to develop a measurement of true brand loyalty that enables prediction of success for brand extension.

2.2 Research Interests

First, how do digitization of platforms influence consumers role in the market and their purchase behavior. The development in digital technology has led to the introduction of new platforms,

services, and marketing strategies. Changes due to digitization have motivated questions about how participants make decisions and interact in the new paradigm. The online platform facilitated interactions not only among consumers but also between firms and consumers, which in turn, led to new channels of communication. Customers have become both consumers and producers of digitized contents, impacting purchase decision of others. In addition, the online platform altered consumers role in exchanging, searching, and receiving information. For instance, the role of consumers changed from a passive recipient of traditional advertisements to an active recipient who can choose to skip, opt out, or delete digitalized advertisements. This change may have a critical impact not only on firms revenues but also on consumption patterns and market structure.

Second, how do newly instituted polices in the digitalized economy shape the market and consumers purchase decision. Policy emphasis on addressing issues of privacy, security, and content disclosure exits. For instance, the Federal Communications Commission introduced a rule to protect personal privacy online in 2016, where internet-service provides have to ask for consumer permission before they gather information about the user. Furthermore, the Federal Trade Commission has adapted an endorsement rule that requires explicit disclosures of sponsored and paid posts for individual online influencers. Most recently, disclosure of purchasers of online political advertisements have been debated because of the 2016 election advertisements that ran on Facebook and Google. These raise questions about the causal impact of increased transparency on consumers purchase patterns and the digital economy.

Third, how to develop new estimation approaches that can utilize data from different sources to address challenges that arise from estimation. Majoring in statistics prior to pursuing graduate studies, I have gained an interest in statistical learning theories and Bayesian estimation methods. My research interest lies in answering questions that entail a combination of prediction and causal inference. Thus, my current research interest lies in jointly implementing existing econometrics models and machine learning methods to answer research questions. One example can be using econometric methods coupled with machine learning techniques in quasi-experimental settings to match control groups to treatment groups. Another example of using machine learning techniques would be addressing omitted variable bias that is caused by unobservable attributes by incorporating information that can be extracted from images or unstructured texts on online property listings websites.

References

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