Application to the NBER Economics of Digitization Tutorial

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My name is Shunyao Yan. Since October 2016, I am enrolled as a PhD student at the Graduate School of Economics, Finance, and Management (GSEFM) at Goethe University Frankfurt in Germany. I am supervised by Bernd Skiera and Klaus Miller from the marketing department. I major in quantitative marketing and my substantive research interests are digital advertising and media consumption. My dissertation is titled "Monetization of Digital Content". I will detail my research projects in the following paragraphs and a list of the graduate courses that I took is in the end of this document.

Research Statement

More and more people are consuming content (news, music, videos, user generated content, etc.) online. In this process, digitization brings both benefits and critical challenges. How can we design business models for digital content that can both do well (financially) and do good (for the society)? I set out to answer this question in the context of digital news with my dissertation. Leveraging a new dataset and combining recent methodological advances, I provide empirical evidence on how the choice of the business model supports and thus shapes the consumption and creation of digital news.

In my first paper, "How Does the Adoption of Ad Blockers Affect News Consumption?" with Klaus Miller and Bernd Skiera (manuscript available and currently under revision for second-round review in the *Journal of Marketing Research*), we analyze how ad blockers, which remove digital ads on the internet, impact a user's news consumption. The ad-supported publishing industry, especially news publishers, perceive ad blockers as a threat but little is known about how ad blockers impact news consumption. Using 3.1 million anonymized browsing sessions from 79,856 users on a news website, we find that the

adoption of an ad blocker has a robust positive effect on the quantity (15%-28% more news articles) and variety of news consumption (9%-18% more categories). The increase in news consumption is especially strong for light users and it is primarily driven by an increase in the number of sessions of a user, not the number of page impressions per session. These sessions start with a direct navigation to the news website, which indicates an increased loyalty of users. We discuss how news publisher could benefit from these increase in news consumption and loyalty.

In my second paper "Paywall and Content Polarization", I empirically test whether financing content via a paid subscription (through a digital paywall) increases content differentiation of news (manuscript available). Theoretical work predicts that financing content by advertising results in minimum content differentiation à la Hotelling while financing content by subscription results in maximum content differentiation (for a review, see Anderson and Jullien (2015)). By focusing on the political slant of the news content, this paper defines the content differentiation as the political polarization of the news media (e.g., news media leaning to the political left or right). To develop a dynamic measure of content polarization, I first built a novel dataset that includes not only the news articles but also the byline assignment (e.g., journalists who wrote the article) and editors' change of the 4 largest U.S. news media. I then apply a polarization measure proposed by Gentzkow et al. (2019). I find that the New York Times polarized itself by 20% more after adopting a paywall (i.e., NYT leaning to the political left by 20% more). As the mechanism, I find that the newsroom also gets more polarized: journalists who wrote more left-leaning news articles are more likely to get new byline assignment and are quicker to get promotion after paywall.

My second paper finds that combining advertising with subscription revenues alleviate the polarization of news content, which incentivizes the news publisher to provide more accurate information. However, my first paper documents a negative impact of ad exposure on news consumption, which suggests a trade-off faced by news publishers in deciding the

quantity of ads (more commonly termed as ad load in the industry) run in their websites: more ads bring greater immediate advertising revenue but come at the expenses of future advertising revenue (if a user adopts an ad blocker) and potential subscription revenue (if a user does not enjoy the user experience enough to subscribe or cancels the subscription).

To solve this tradeoff, my third paper proposes to personalize ad load, which serves different quantities of advertising to different users within one publisher based on a user's ad aversion and subscription propensity, to maximize publisher's expected revenue (work in progress). In reality, most publishers serve a uniform ad load to all users visiting the publisher's website, even though digital advertising has been personalized for a long time. My third paper combines recent advances in machine learning with econometrics to develop a scalable and flexible personalized ad load framework, quantify the returns of personalizing ad load, and compare it with the current industry uniform ad load framework.

Completed Courses

Advanced Marketing and Management (Bernd Skiera & Andreas Grunewald)
Customer Satisfaction and Consumer Choice (Thomas Otter)
Big Data and Machine Learning (Bernd Skiera)
Current Research in Marketing (Bernd Skiera)
Advanced Econometrics (Horst Entorf & Thorsten Schank & Mehdi Hosseinkouchack & Michael Binder)
Advanced Microeconomics (Alfons Weichenrieder & Alessandro Gioffré & Christine Zulehner & Roman Inderst)
Topics in Microeconometrics (Jin-Young Choi)
Econometric Methods for Evaluation (Jin-Young Choi)
Mathematical Methods (Michael Weba)
Microeconometrics: Health and Education (Reyn van Ewijk)
Development Microeconomics (Matthias Schündeln)
Experimental Economics-Lab Experiments (Volker Benndorf)
Textual Analysis in Finance (Alexander Hillert)

References

Anderson, Simon P and Bruno Jullien (2015), "The advertising-financed business model in two-sided media markets," in *Handbook of Media Economics*, Simon P Anderson and Joel Waldfogel and David Strömberg, eds. Vol. 1. North-Holland: Elsevier.
Gentzkow, Matthew, Jesse M Shapiro, and Matt Taddy (2019), "Measuring group differences in high-dimensional choices: method and application to congressional speech," *Econometrica*, 87 (4), 1307-40.