The Effect of Social Information on Demand in Quality Competition

In the services industry, consumers are typically not well-informed about the level of quality of different service providers. They rely on social information and their own prior experience to learn about the quality of service, form expectations, and choose which firm to visit. With the rapid growth of online communities and social networks, recommendations from friends and consumer opinions posted online have become a critical source of information about quality and a key driver of demand. According to the Nielsen Global Surveys of Trust in Advertising conducted in 2013 and 2015, they rank among the three topmost trusted channels of advertising by consumers worldwide (Nielsen 2015).

Investments in social media marketing by firms have followed suit, nearly doubling between 2014 and 2016, from roughly $16 billion to over $30 billion according to a worldwide survey of marketers (Statista 2017). However, social information captures a wide range of attributes and formats, e.g., ratings, rankings, volume and content of online reviews, engagement in a firm’s website or online community, etc. Do consumers respond equally to different types of social information? Which ones should a manager promote? There is little guidance available to firms to answer these questions. Thus, the effectiveness of social media marketing remains poor: only 13% of marketers in the above survey rated the effectiveness of their social media marketing as very successful and only 38% stated that they were able to measure the return on investment for their social media activities. Our paper addresses these challenges through the following research questions: (1) how do consumers learn from own experiences and different types of social information to decide which firm to visit? (2) what are the effects of social information on the demand and long-run market shares of firms competing in a marketplace? (3) are different types of social information equally valuable to competing firms?

To answer our research questions, we take both a theoretical and experimental approach. We begin by developing a learning model for a consumer choosing between two firms with unknown service quality. The consumer’s decision may be influenced not only by the service outcomes of her own previous choices, but also from social information. Moreover, she may be susceptible to a recency bias. We model the consumer’s learning and decisions as a Markov chain, which allows us to distinguish between various factors and their effects on latent consumer preferences (such as the weight on a consumer’s own-learning propensity versus the weight they apply towards social information versus recency bias). Moreover, our model can be estimated easily and used to generate theoretical predictions for the individual-level consumer learning behavior as well as the firms’ long-run aggregate demand characteristics: expected market share, demand uncertainty, and rate of convergence to steady state.
In particular, in our experiment each participant acts as a consumer choosing between two firms of dissimilar quality over several periods. We then manipulate, depending on the treatment, the difference in average service quality between the two firms, large or small, and the type of social information provided: no social information, market share-based social information (SI), or quality-based social information (SI). Market share-based SI is measured by the fraction of people in a network who visited each firm in the previous round. It reflects the overall popularity or market shares of the firms. In practice, such information is obtained online through sales ranks and bestseller lists or through location-based social media features. For example, when a customer checks into a restaurant, a retail store, a bank, or an airline lounge, she may share her location with her Facebook network. Quality-based SI is measured by the fraction of people in a network who received a satisfactory experience from each firm in the previous round. It represents the average quality of a firm. In practice, such information is provided by consumer ratings, online reviews, and peer-to-peer sharing of experiences. Thus, we compare two different types of information that a consumer may learn through her social network.

We obtain three key estimation results. First, with respect to individual-level learning, we find that, while consumers learn from their own visit experiences, social information directly influences consumers’ choices. Furthermore, consumers are susceptible to a recency bias, yet this bias is mitigated or exacerbated depending on the type of social information available. For example, when the difference in service quality between the firms is large, the presence of quality-based SI significantly reduces consumers’ recency bias, which then benefits the high-quality firm through higher market share, lesser variance of demand, and a faster rate of convergence to equilibrium. On the other hand, when the difference in service quality is small, the presence of share-based SI actually augments the recency bias.

Second, turning to the firms’ long run market shares, we observe that quality-based and share-based SI have contrasting effects depending on whether the difference in service quality between the firms is large or small. Compared to the case without any social information, when there is a large difference in service quality between the firms, the firm with the higher service quality achieves a 22% increase in market share, from 70.0% to 85.6%, by promoting quality-based SI, but it obtains virtually no benefit from share-based SI, as market share increases by only 1%, from 70.0% to 70.8%. Alternatively, when there is a small difference in service quality, then the firm with (marginally) higher quality actually experiences a decrease in market share of 9%, from 56.7% to 52.1% upon promoting quality-based SI, relative to when there is no social information. From a managerial perspective, these results suggest that a significantly higher quality firm can increase its market share by promoting quality-based SI but
not from promoting share-based SI. In contrast, a marginally higher quality firm gets hurt by quality-based SI, but can slightly increase its market share by promoting share-based SI.

Third, our experimental data indicate that the contrasting effects of quality-based and share-based SI extend to other demand characteristics, such as demand uncertainty and rate of convergence to steady state. For example, when there is a large difference in service quality between the firms, quality-based SI not only increases the higher quality firm’s market share, but also leads to lower demand uncertainty and faster convergence to steady state, whereas share-based SI does not appear to affect the higher firm’s demand uncertainty and convergence. Ultimately, these results can help practitioners to better manage their demand uncertainty, depending on which social information they choose to promote, translating into improved operational planning decisions.

In an effort to determine the robustness of our results, we conduct two additional analyses. First, we construct an alternative Logit model for capturing a consumer’s visit decision, and find that it largely supports the findings of our hidden Markov chain model. Second, we conduct an additional experimental treatment where both types of social information are present simultaneously. The data from this treatment are virtually identical to our treatment when only quality-based SI is provided, suggesting that when both types of social information are available, quality-based SI may potentially crowd out the effects of share-based SI. This insight may be particularly valuable to managers who may assume that promoting both types of social information is beneficial, and may unnecessarily expend extra resources.

Our paper makes three main contributions to the operations literature on social information. First, we consider the problem from a behavioral operations perspective and conduct a controlled human-subject experiment that permits us to tease out the effects of two common, but different, types of social information as well as own learning on consumers’ choices. Second, we propose an estimation model of individual-level learning that can be used to explain the mechanisms for the effect of social information on both one-period-ahead and long-run demand. Although we limit this paper to two types of social information, our model can easily be expanded to incorporate a larger number of variables. Finally, we show that social information is not always beneficial to all types of firms.

References