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Consumers, experts, and online product evaluations: Evidence from the brewing industry ☆

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ABSTRACT

The growth of the Internet has led to a dramatic increase in the number of consumer or "user" product ratings, which are posted online by individuals who have consumed a good, and are available to other individuals as they make decisions about which products to purchase. These ratings have the potential to substantially improve the match between products and consumers, however the extent to which they do so likely depends on whether the ratings reflect actual consumer experiences. This paper evaluates one potential source of bias in consumer ratings: mimicry of the reviews of experts. Using a rich dataset on consumer product ratings from the brewing industry and a regression discontinuity empirical framework, I show that expert reviews influence consumer ratings. Consumer ratings fall in response to negative expert reviews and increase in response to positive expert reviews. The results are most pronounced for strongly negative or strongly positive expert reviews. This mimicry limits the extent to which information on product quality from actual consumer experiences diffuses to the population. I suggest that "nudges" could be implemented to limit the extent to which mimicry affects ratings.

1. Introduction

The Internet has led to a massive increase in the number of consumer or "user" product ratings. These ratings, which have sometimes been referred to as "electronic word-of-mouth", provide a complement or substitute to expert reviews, which have historically been of greater significance to consumers. Expert reviews and consumer ratings are both common, and these two types of evaluations are often presented alongside each other in web sites. Rotten Tomatoes, the popular web site for movie reviews, presents both a "Tomatometer", which is based on critic reviews, and an Audience rating, which is based on user ratings. CNET, which provides ratings for electronic products, displays both an Editor's review and an average user rating. Edmunds.com provides both an expert review and consumer ratings for cars. Amazon.com often provides summaries of expert book reviews from major news outlets before presenting the average consumer rating for the book. Additionally, for all products, Amazon presents the average rating for a product, as well as "the most helpful reviews", which are displayed more prominently.

The availability of a new widely accessible source of information on product quality provided through consumer product ratings holds the promise of substantially improving the match between products and consumers. However, the value of consumer ratings likely depends on whether these ratings reflect actual consumer experiences. One potential source of bias is mimicry of the reviews of others. A substantial literature on individual behavior suggests that individual decision-making is influenced by information on the actions of others, and that certain types of individual responses can lead to negative welfare consequences. Most notably, as developed in Banerjee (1992), mimicry of the behavior of others can lead to socially inefficient outcomes because "herd behavior" – in which individuals are influenced by the decisions that have previously been made by others due to its informational content – limits the diffusion of information to the rest of the population. Ottaviani and Sørensen (2001) show theoretically that the presence of experts can exacerbate herding problems and lead to worse outcomes, especially when experts do not have fully accurate

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information and when the population contains heterogeneous preferences.

While mimicry and herding are most often discussed in the context of financial markets, such behavior is applicable in many settings, and recent research has focused on its potential role in consumer product ratings. Muchnik et al. (2013) implement a field experiment with a social news aggregation web site and find that a randomly assigned positive initial rating for an item leads to large and lasting effects in the amount of positive ratings received by the item. They conclude that mimicry can lead to "ratings bubbles" which biases the opinion of "collective intelligence."[1] Moe and Trusov (2011) find similar evidence of mimicry, using data on fragrance and beauty products to show that ratings behavior is significantly affected by previously posted ratings. Mimicry in ratings is consistent with the notion of conformity, in which individuals behave in patterns consistent with the social norm in order to protect their status within the community (Bernheim, 1994).

For products in which both consumer and expert ratings are available, both the previous ratings of others and the opinions of the experts serve as potential sources of mimicry. Though the response of consumer ratings to expert reviews has not previously been examined, mimicry of expert reviews may be of relatively greater significance because individuals appear to be more responsive to the opinion of high-status individuals than low-status individuals. For example, Kumru and Vesterlund (2010) present experimental evidence that "low-status" individuals mimic "high-status" individuals in charitable giving. Whether mimicry is driven by the opinions of peers or the opinions of an expert, the extent to which it exists is likely to be socially harmful because mimicry limits the diffusion of information regarding actual consumer experiences.

In this paper, I provide the first evaluation of whether consumers mimic the reviews of experts. The analysis is based on data from the brewing industry, and I use a rich dataset on expert reviews and consumer ratings from the leading site for beer evaluations, Beer Advocate. Using a regression discontinuity empirical framework based on the timing of expert reviews, I find clear evidence that expert reviews influence subsequent consumer ratings. In particular, consumers mimic the reviews of experts. Positive expert reviews lead to an increase in subsequent consumer ratings and negative reviews lead to a decrease. The response is most evident for strongly positive or strongly negative expert reviews. The evidence is most consistent with users changing their ratings in response to the expert review, as opposed to the expert review changing the selection of users who choose to rate the beer.

In addition to relating to the literature on mimicry and herd behavior, this research contributes to a rapidly growing literature on online product ratings which reflects their expanding role in modern marketplaces. While economists have been aware of the importance of information in consumer decisions for some time (Akerlof, 1970; Nelson, 1970), as well as the potential for the Internet to enhance the role of consumer ratings (Avery et al., 1999), recent research has focused on identifying empirical relationship. Consumer ratings have been shown to influence demand in many settings, including menu inserts and choice of food items (Cai et al., 2009), Yelp reviews and choice of restaurant (Anderson and Magruder, 2012; Luca, 2013), online movie reviews and box office receipts (Chintagunta et al., 2010) and Amazon.com reviews and book sales (Chevalier and Mayzlin, 2006). Other studies have shown that the demand for an item sold through eBay depends on the ratings that the item's seller has received from previous buyers (Cabral and Hortacsu, 2010; Lucking-Reiley et al., 2007; Jin and Kato, 2006; Melnik and Alm, 2002). Researchers have also examined whether firms actively manipulate consumer ratings and have found mixed evidence.[2]

As with the literature on consumer ratings, the literature on expert reviews has focused on consumer demand as the primary outcome of interest. Reinstein and Snyder (2005) find evidence that expert reviews influence consumer demand for movies.[3] Both Hilger et al. (2011) and Friberg and Grönqvist (2012) find evidence that expert reviews influence the demand for wine, with the former study using a field experiment and the latter study exploiting a quasi-experiment based on the timing of reviews. Berger et al. (2010) find that receiving a favorable book review from the *New York Times* is associated with increased sales. DellaVigna and Hermle (2014) provide one of the few studies focusing on potential bias in expert reviews, finding no evidence that expert movie reviews are biased when they are reported in a media outlet that is owned by the same company that produced the film.

The remainder of the paper proceeds as follows. In Section 2, I describe background information on the brewing industry and Beer Advocate, as well as the features of the rating-level dataset that provides the basis for the analysis. In Section 3, I evaluate the effect of expert reviews on consumer ratings using a regression discontinuity framework. I conclude by describing some implications of the findings in Section 4.

2. Background and data

I study consumer ratings in the context of the brewing industry, which is an appealing setting for three primary reasons. First, the brewing industry is substantial, accounting for $99 billion in sales and 200 million barrels of beer in the U.S. in 2012 (Brewer's Association, 2013). Secondly, the brewing industry involves a large number of products. Beers vary in their ingredients, style, and brewer and each beer variety constitutes a different product. There are currently more than 2500 breweries in the U.S., and breweries typically produce multiple varieties of beer.[4] Third, unlike many other products, beers are not typically reviewed by "experts" as soon as they are produced. The delayed review of most beers enables the empirical framework that I employ, which is based on how ratings change immediately following the expert review, and which enables plausible identification of causal effects (Angrist and Pischke, 2010). One of the benefits of focusing on how user ratings change following an expert review is that it leads to estimates that are free from concerns related to reverse causality, in which user reviews influence expert reviews, as opposed to vice versa.

I examine reviews of beers reported on Beer Advocate (beeradvocate.com). Beer Advocate is the primary source for beer ratings, and receives more than 25 million page views and 2.5 million unique visitors per month (Beer Advocate, 2013).[5] Ratings are provided by the Beer Advocate founders, Jason and Todd Alström, and by site members. Member registration is free and, as of 2012, there were over 30,000 members contributing to the reviews on Beer Advocate. Beers receive an overall rating, as well as separate ratings for taste, appearance, aroma, and mouthfeel.[6] The overall rating is chosen by the member, as opposed to being generated through a formula based on the other ratings. Ratings are scored on a 1 to 5 point scale. Over the time period in which the data was collected, Beer Advocate required that ratings must be accompanied by reviewer comments of at least 250 characters in length.

[1] Collective intelligence is a relatively recent term within the psychology literature that refers to the decision-making capabilities of groups (Woolley et al., 2010).

[2] Mayzlin et al. (2014) find evidence of such manipulation in Hotel ratings on TripAdvisor. Anderson and Magruder (2012) do not find evidence of rating manipulation in restaurant reviews on Yelp.

[3] Eliashberg and Shugan (1997) also examine the impact of expert reviews on box office performance, but do not find a significant relationship.

[4] The number of breweries has increased dramatically in recent years due to the expansion of the craft brew sector. Relative to large commercial breweries, craft breweries tend to have low production volumes, a focus on local or regional markets, and an emphasis on more specialized varieties of ales (stout, porter, IPA, etc.). The volume of craft brew produced grew at a rate of 10% annually between 2007 and 2012 (DeMeter, 2013).

[5] The main alternative to Beer Advocate is RateBeer.com. Google search volume for Beer Advocate is about three times as large as search volume for Rate Beer (Google, 2013).

[6] In the analysis, I focus on the overall rating of a beer because ratings for taste, appearance, aroma, and mouthfeel are not displayed prominently at beeradvocate.com.