

User Generated Content: Current research and areas for future exploration

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Definition

UGC : any form of digital content that is produced by (typically) volunteer end users of an online service or website and (typically) publicly available for consumption by other users of the service or website.

Examples: videos, blogs, discussion forum posts, photos, product reviews, seller reviews.

I am going to focus on IO and structured reputation systems and product reviews, though other UGC and IO is worthy of study too (see Gans, Goldfarb, and Lederman (2019) on consumer tweets, for example).

UGC- Pew surveys

- 2003 survey:
 - 24% of Adult American had posted some kind of content online (product review, photo, blog post, article comment, etc.)
 - Note: Internet users/all adults = 0.61 x .4 post content/Internet users.
- 2016 survey:
 - 82% of US adults say they at least “sometimes” *read* online customer reviews before purchasing something for the first time.
 - Pew found that 10% of Americans “nearly always” post their own reviews about products or services and 50% “sometimes” post their reviews about products and/or services.
 - 39% of US adults say they have shared their experiences or feelings about companies or products on social media sites.

Plan

- Tell you about the research, try to move from what HAS been done to what COULD be done.

Reputation systems

- Product\service reviews in those online marketplaces that plausibly couldn't exist without a reputation system.
 - Peer to peer markets: ebay, Airbnb, TaskRabbit, freelancer.com, upwork, etc.
 - Markets where reputation, branding, etc. weak.
 - Markets with both potential moral hazard and adverse selection problems.
 - Certainly an issue offline as well: auto repair shops, non-chain restaurants, etc., but limited empirical scope for economists to study it: (Hubbard(2002) and Jin and Leslie(2009)).

Reputation systems literature

- Theoretical and empirical literature typically framed around vertical quality and opportunism.
- Inform future buyers about the outcomes of a seller's past behavior.
 - Sometimes muddiness about the seller's performance and the quality of the product.
- Tadelis (2016) focuses on the role of a reputation system in turning a (hopeless) anonymous one-shot game into a repeated game, thus expanding the available equilibria.

One-sided vs. Two-sided

- Covered well in Tadelis review (2016)
- Literature suggesting problematic retaliation/grade inflation issues in 2-sided systems. (Bolton et. al. 2013, Fradkin et. al. 2015, Horton and Golden 2015).
- Ebay eliminated the buyer side of the feedback system when Paypal became ubiquitous (and therefore buyer performance became trivial). Klein, Lambertz, Stahl (2016) document that the market becomes more transparent and seller behavior improves.
- If the buyer co-produces the output (Airbnb), buyer side non-trivial and two-sided rating inescapable. “Usual” solution is some kind of pseudo one-sided rating.

Research idea: impact/tradeoffs of platform design solutions to mitigate retaliation in 2-sided systems.

Causal impact of reviews on sales

- Literature both in the context of the reputation systems created by online marketplaces and for online reviews more generally.
- Identification schemes:
 - cross-platform comparison (Chevalier and Mayzlin (2006), Reimers and Waldfogel (2019))
 - Regression discontinuity((Luca (2011), Luca(2016)
 - Field experiments (Resnick et. al. (2006), Godes and Mayzlin (2009))
 - Regional variation in the content of information sets (Helmers, Krishnan, and Patnam (2015)), Reimers and Waldfogel (2019))
 - Timing of product availability (Chintagunta et. al. (2010))

Chevalier and Mayzlin (2006)

- Our econometric analysis is designed to answer the following question: If a cranky consumer posts a negative review of a book on bn.com but not on Amazon.com, would the sales of that book at bn.com fall relative to the sales of that book at Amazon.com?
- We propose a "differences-in-differences" approach. For a sample of books, we measure reviews and a proxy for sales at Amazon.com and bn.com over three time points. We examine whether a change in the number and valence of reviews over time for a particular book at one site relative to the other site predicts a change in the *subsequent* sales of that book at one site relative to the other.
- By focusing on the differences between the relative sales of the book at the two sites, we are able to control for the possible effect of unobserved book characteristics on both reviews and sales. By focusing on the differences across sites over time, we control for the possibility that taste differences across the customer populations at the two sites differ in a way that affects both reviews and sales.

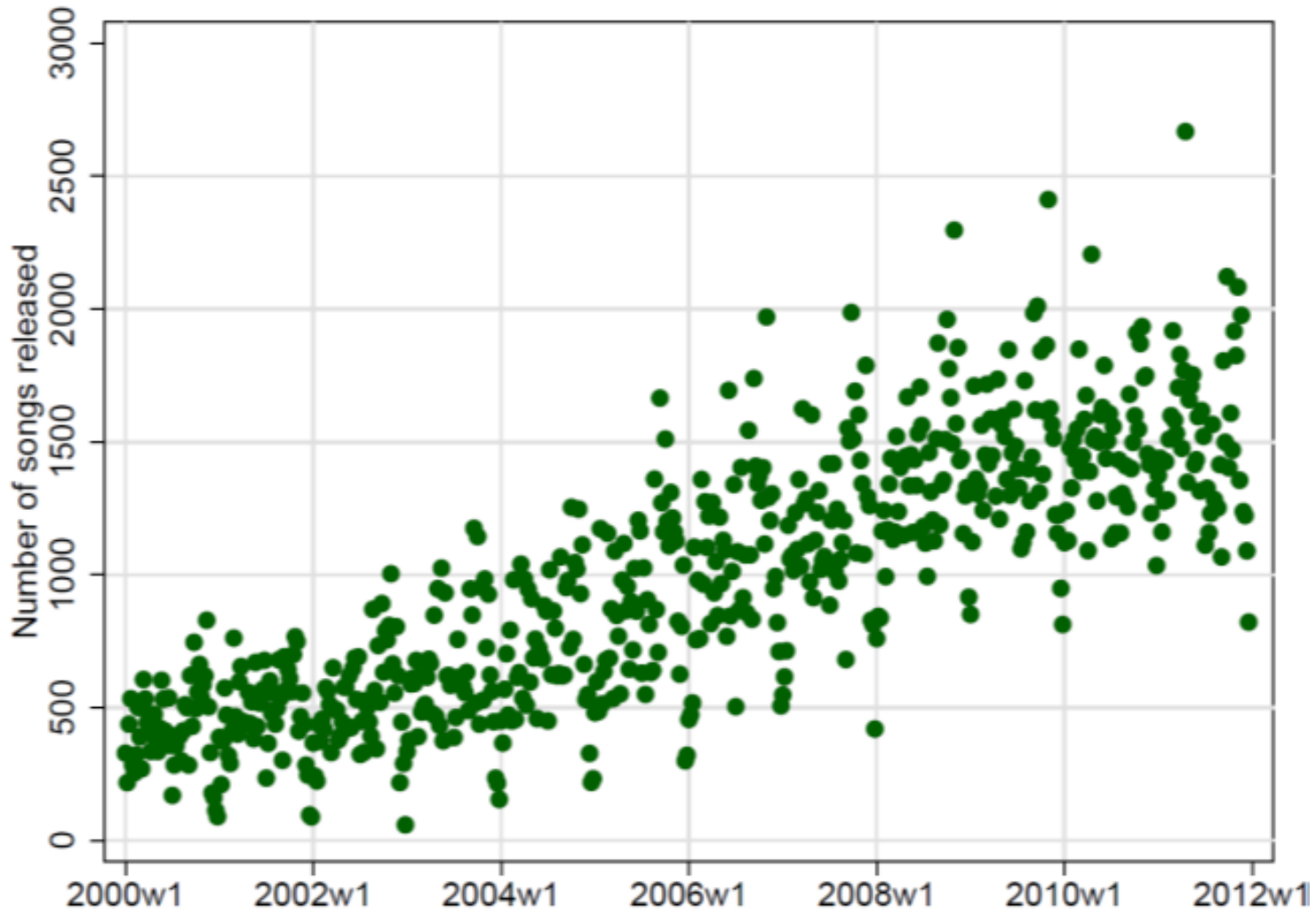
Cross-platform trick

- Chevalier and Mayzlin (JMR, 2006 Amazon vs. Barnes & Noble)
- Mayzlin, Dover, and Chevalier (AER, 2014 Tripadvisor vs. Expedia)
- Chevalier, Dover, and Mayzlin (MS 2019, Tripadvisor/ Expedia vs. Hotels.com, Priceline).
- Reimers and Waldfogel (2019, Amazon country sites)

Research idea: Use matched objects across platforms to isolate a platform design issue and/or causal effects.

How important to welfare?

- Reimers and Waldfogel (2019)
 - Digitization has lowered the cost of production and distribution of new content.
 - Explosion of new creative content --music books.
 - Lots of new content means discovery is a challenge
 - Can we identify the welfare effects of product reviews? Ultimately the welfare impacts will come from-
 - consumers buying more overall when quality is known
 - AND redistribution of sales from lower-quality to higher quality products
 - (and better MATCH quality, but this is not in the paper).



Waldfoegel JEP 2017

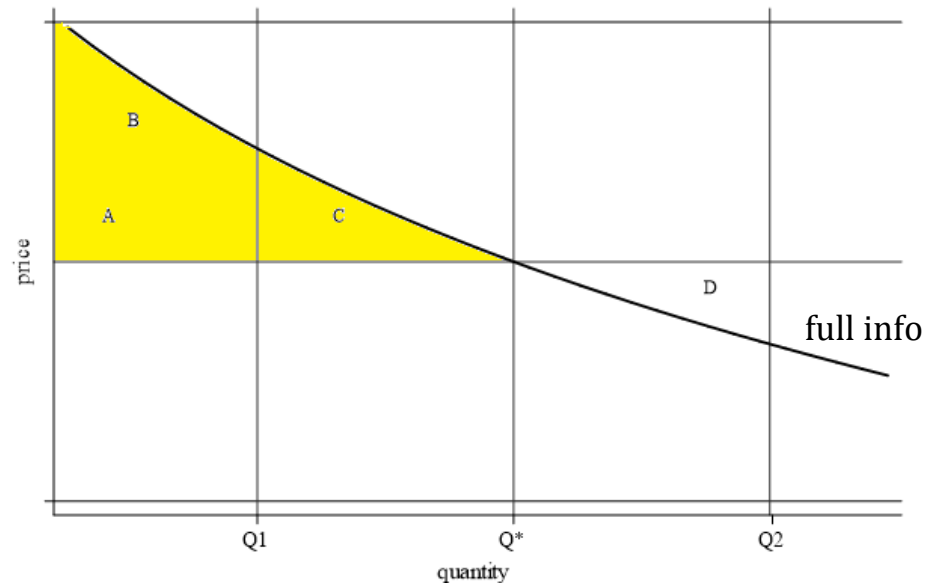
Strategy

- Find the causal impact of reviews on sales. Use these to simulate welfare effects
 - Professional reviews (~NYT) discrete events– an event study methodology can determine effects.
 - Consumer reviews tricky– reviews and sales co-determined.
 - Use a variant of Chevalier and Mayzlin (2006) exploiting the fact that Amazon Canada, UK, US have different reviews.
- By measuring impact of consumer reviews on sales, can think about the counterfactual that the book had the quality revealed from the reviews but that the quality was not known as precisely absent reviews.
 - Requires an estimate of the “expected” quality of the book- here based on genre, publisher, author prior track record.

Welfare effect of reviews when reviews reveal true quality.

- Ratings/reviews don't change the book's quality (see Jin & Sorensen (2006), Alcott (2013), Train (2015))

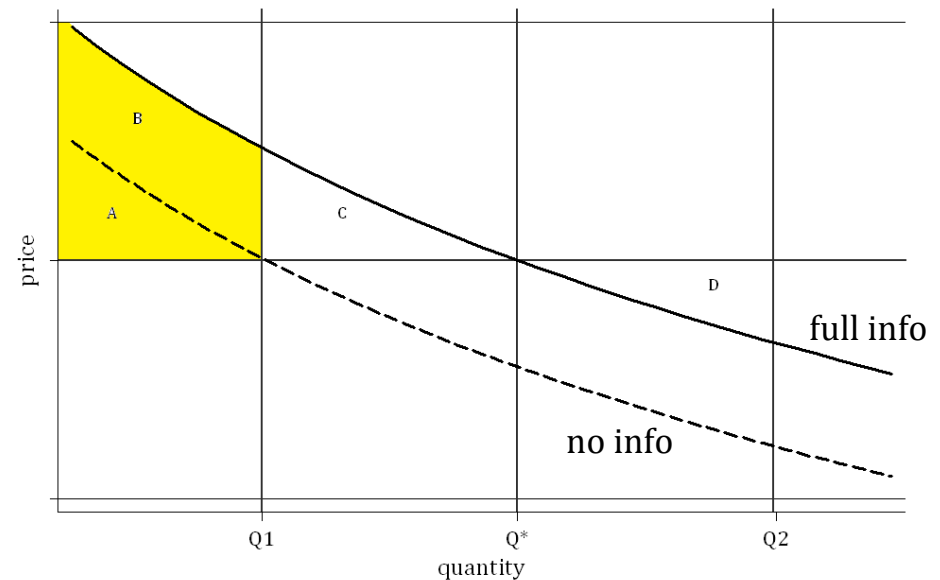
- CS with ratings is $A + B + C$



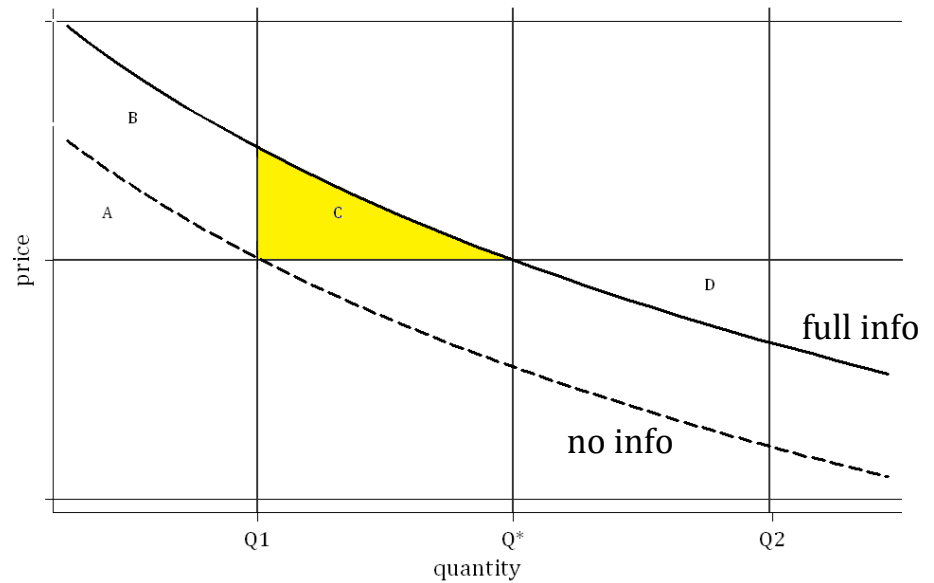
Welfare without reviews for case when reviews would reveal quality higher than expected quality.

- *Positive surprise during consumption*

- CS with ratings is $A + B + C$
- CS without ratings is $A + B$



- *Positive surprise during consumption*
 - CS with ratings is $A + B + C$
 - CS without ratings is $A + B$
- The change in CS is the DWL triangle C
- (and D for over-consumption)



Strategy: calibrate to a logit

- Using estimated causal impact of reviews on sales, estimate the elasticity of sales with respect to quality.
- Use estimated price elasticity to get the shape of the demand curve.
- Use an estimate of what quality would be expected absent reviews for each book (based on genre, author history, etc).
- Calibrate welfare impacts.

Results

- Effects on revenue
 - Reviews: +\$28m
 - Stars: +52m, net

- Effects on CS
 - Stars: +\$41.3m
 - Reviews: +\$2.9m
 - **Effect of stars is 15 times larger**
 - **Effects of stars for books that have professional reviews is only \$1.7m**

	Stars	Reviews
Revenue (net)	52.47	28.12
	(5.92)	(2.64)
R >	+191.11	
	(9.99)	
R <	-138.64	
	(7.65)	

CS (total)	41.25	2.89
	(4.20)	(0.35)
CS / Revenue	0.786	0.102
	(0.10)	(0.01)

Research idea: Welfare effects of reviews, particularly exploring the MATCH QUALITY dimension.

Who posts reviews and why?

- See survey Berger (2015)
 - impression management
 - emotion regulation
 - information acquisition
 - social bonding
 - persuasion
- Impact and ability to influence the audience.
 - Chakraborty, Deb, Oery (2019)
 - Wu and Huberman (2008)
 - Moe and Trusov (2011)
 - Zhang and Zhu (2011)
 - Proserpio and Zervas (2017); Chevalier, Dover, and Mayzlin (2019)
 - Chakraborty, Deb, Ory (2019) – w implications for competition
- Negative feedback particularly difficult to elicit
 - Nosko and Tadelis (2014)

Research ideas: Dynamic quality vs. static quality environments.
Experiments on making reviewing more/less satisfying.

Existing literature in economics/ marketing

Are reviews systematically biased?

- Reciprocity bias: Cabral and Hortacsu (2010), Fradkin et. al. (2015)
- Promotional behavior bias: Mayzlin, Dover, and Chevalier (2014), Luca and Zervas(2015)
- Positive selection: Hitt and Li (2008), Horton (2014), Nosko and Tadelis (2015), Berger and Milkman (2012)
- Systematic review dynamics over time: Li and Hitt (2008), Godes and Silva (2011), Moe and Trusov(2011)

Limitations

- Large number of studies of reviewer behavior and/or whether reviews impact sales
 - Little on the relationship between reviews/other UGC and more traditional IO/Policy concerns
 - In Econ & Marketing (but not CS): Substantial focus on quantitative review summaries (stars)
 - Challenge: bridge unstructured textual data created by UGC and quantitative inputs to IO/policy analysis.

Possible research avenues

- How does existence/proliferation/nature of UGC *drive* variables of interest in IO/policy?
- How can UGC be used to *measure* variables of interest in IO/policy?

Possible research avenues

- How does existence/proliferation/nature of product reviews/UGC *drive* variables of interest in IO/policy?
- How can UGC be used to *measure* variables of interest in IO/policy?

Market Structure

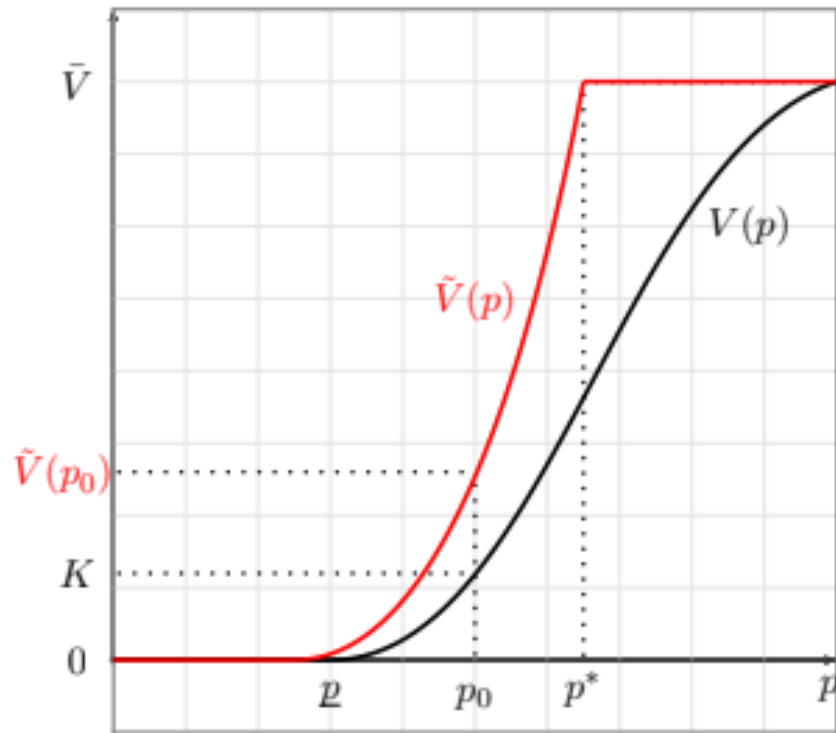
- Intuition from Bar-Isaac, Caruano, Cunat (2012):
 - More product information (lower search costs)
 - Superstar effect
 - Consumers more likely to find the “best product”
 - Encourages more-advantaged firms to choose broad designs
 - Niche effect
 - Consumers are more likely to buy better-suited products
 - Induce more firms to choose more niche designs
 - Effects of more information/reduced search costs on competition and markups ambiguous.

Vellodi (2020)

- Product reviews and barriers to entry.
 - This paper examines the endogenous entry and exit decisions in the presence of product reviews.
 - Intuitively, consumers will choose a highly-rated incumbent over an unrated entrant even if the entrant is higher quality.
 - This creates a barrier to entry. (This is still true with endogenous pricing because the entrant has to price low to attract customers, still making entry unattractive.)

Vellodi (con't).

Figure 3: Optimal policy



Role of UGC in entry/variety....

- We just discussed markets where we suspect they couldn't exist without review mechanisms (requiring trust of a random stranger).
- We discussed Reimers and Waldfogel (2020) which implicitly suggests that reviews function to enable more varieties in books.
 - Luca (2011) another paper w this conclusion
 - Bar Isaac, Caruano, Cunat (2012) related
- Vellodi (2020) is identifying the opposite effect.

Research Idea: Explore this tension more theoretically/empirically

Impact of UGC on quality provision

- Quality improvements
 - Klein, Lambertz, Stahl (2016)
 - Ananthakrishnan, Proserpio, Sharma (2019)
 - Closely related: Gans, Goldfarb, Lederman (2017)
- Reviews and market outcomes in a multitasking framework.
 - Example: patient reviews of doctors

Astonishingly little research

- Reviews/UGC and the provision of *horizontal* quality information.
 - Render the undifferentiated differentiated.
 - Allow for creation/discovery of niche products.
 - To what extent do product reviews on sites like Tripadvisor allow the creation of niche products or to what extent do they just disintermediate an older information provision sector (travel agents, Zagat, Fodors, etc.)?
 - Role of UGC in improving match quality

Research idea: This.

Competition among UGC platforms and competition between UGC platforms and other firms

- Does the existence of a UGC asset create competitive advantages in a transaction market?
 - The content is usually non-rival and non-excludable.
 - Freestanding UGC content providers entering the transaction role.
 - Yelp reservation system
 - TripAdvisor direct booking

Possible research avenues

- How does existence/proliferation/nature of UGC *drive* variables of interest in IO/policy?
- How can reviews/UGC be used to *measure* variables of interest in IO/policy?

Measurement of characteristics

- Inputs to demand analysis
 - We typically use introspection/data availability to choose characteristics to include in models.
 - UGC contains rich information about characteristics that consumers evaluate.
 - Or at least a selected set of consumers.
 - Challenge: Bridge from unstructured linguistic UGC to characteristics, etc. that can be used in, for example, demand estimation.
 - Closest paper: Archak, Ghose, Ipeirotis (2012)
 - See also Timoshenko and Hauser (2019)

Second choice/Close competitor modelling

- Anything like second choice data helpful in demand system modeling (see BLP 1998)
- Textual analysis of UGC can be used for “brand associative network” (see Netzer et al 2012).
 - In reviews/blog posts about product x, what other products are referred to and how many times?

Measures of heterogeneity

- Harder: measurement of disagreement/
heterogeneity of preferences over specific
characteristics.
- Even harder: measurements of the
distribution of the heterogeneity.

Possible research avenues

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- How can UGC be used to *measure* variables of interest in IO/policy?