How Markets Alleviate the Excessive Choice Effect:

A Field Experiment on Craft Beer Choice

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Introduction

Popular books such as "The Paradox of Choice" (Schwartz, 2004) posit that increasing choice within the marketplace might increase regret and decrease satisfaction, creating the so-called excessive choice effect (ECE). "Information overload" challenges the standard economic conjecture that more choices cannot decrease consumer utility.

The size and significance of the ECE has been extensively researched by psychologists and economists with conflicting results (Scheibehenne et al., 2010), bringing one to ponder the causes of the heterogeneity in the measured effects. If ECE lowers consumers' well-being, they (or the businesses selling to them) might deal with the issue by utilizing various institutional nudges that help better navigate through large choice sets. The evolution of these market-based institutions might explain the conflicting results in the literature. More choice might be desirable in some settings and certain instances, but not in others.

The Role of Informal Institutions

Many private institutions that constrain choice spontaneously arise from culture, norms, and customs. "Institutions are enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world. The rules, norms and shared strategies are constituted and reconstituted by human interaction in frequently occurring or repetitive situations." (Crawford and Ostrom, 1995)

In our context, informal institutions can be thought of as a way to minimize search costs given the existence of bounded rationality in decision-making. When the number of options are exogenously chosen, greater variety increases the probability that a consumer might find a more preferred option, decreases variety prices, and creates less efficient, less successful searches within the marketplace (Norwood 2006). Sellers might use various informational strategies (or institutions) to improve the efficiency of the buyer's search. The three strategies we test are highlighting (1) specials or (2) local options and (3) providing expert scores for the options on the menu.

Objective

The objective of our student is to determine whether the ECE exists in a field experiment related to craft beer and to determine whether it can be mitigated through certain informal institutions that plausibly lower the cost of search.

Statistical Model

$$log\left(\frac{\pi(x)}{1-\pi(x)}\right) = \alpha + \sum_{i=1}^{3}\tau_i X_i + \lambda W + \sum_{i=1}^{3}\gamma_i X_i W + d_t$$

$$log\left(\frac{\mu}{t}\right) = \alpha + \sum_{f=1}^{3}\tau_i X_i + \lambda W + \sum_{f=1}^{3}\gamma_i X_i W + d_t + h_r$$

$\pi(x)$ is the share of total beverage purchases that are beer, $log\left(\frac{\pi(x)}{1-\pi(x)}\right)$ is the log odds ratio of beers ordered per drink purchase (n=4062), α is the constant which refers to the effect of the number of beers ordered when six options are available and the menu has received no treatment, τ_n is the effect of menu treatment n relative to the control, X_i is a dummy variable indicating each menu treatment relative to the control, λ is the effect of the number of beer options for drink choice, W is the number of options (6 or 12), γ_i is the interaction effect between the number of beer options and the menu treatment, d_t is a normally distributed day of the week random effect, t is each individual receipt (n = 1292), μ is the expectation of the count of beers ordered per receipt given that $E\left(\frac{Y}{t}\right) = \frac{E(Y)}{t} = \frac{\mu}{t}$, and h_r is a random effect for time of day (Before 5:00PM, Between 5:01PM and 8:00PM, and After 8:01PM). Of related interest is how each treatment changed sales for the specific beer that was listed as "special" or "local." To avoid any confounds, the pilsner option was listed as both the special and the local.

Why Craft Beer?

Craft beer fulfills the preconditions for an excessive choice effect in that it offers numerous options that consumers are unlikely to have well-defined preferences. Furthermore, there is no clearly dominant option in the marketplace. Finally, craft beer has recently experienced staggering growth – from 89 breweries in 1979 to over 3,000 in 2013, leaving producers concerned that there might be an overwhelming number of options for consumers (Beer Institute, 2013).

Experimental Design

Data were collected at Zannotti's Wine Bar in Stillwater, OK, and we switched treatments on Monday of each week. Six beer options were listed on the menu for first half the treatments and twelve beer options were listed on the menu for the remaining treatments. For each choice set-sizes, we utilized a control and three information treatments (or consumer-institutions) designed to potentially lower search costs. For logistical reasons, the treatments were changed sequentially. Prices for each option were held constant over the term of the experiment. To hold constant any confounds due to positioning effects, the additional six options of the second treatment are added between the first six options.

The control menu consisted of six beers listed in order from lightest to darkest. The first menu treatment is the same as the control but with one beer labeled as a "Special." The second treatment is the same as the control except the menu included the scores obtained from ranking website Beer Advocate. The fourth treatment is a menu that was the same as the control except it highlighted the local beer options. These information treatments were then repeated in the design that included 12 options to make for a total of 2x4 = 8 treatment combinations.

Six Options (9/2/14-10/4/14)	Twelve Options (10/5/14-11/1)
Control (9/2-9/6; 9/29-10/4)	Control (10/6-10/11)
Special (9/8-9/13)	Special (10/13-10/18)
Beer Advocate (9/15-9/20)	Beer Advocate (10/20-10/25)
Local Option (9/22-9/27)	Local Option (10/27-11/1)

Design structure

Beer List
Sales taxes not included

Angry Orchard Crisp Apple Hard Cider, OH $5.5
A crisp and refreshing cider! Its fresh apple aroma and slightly sweet, ripe apple flavor make it hard to resist

Hoegaarden Witbier, Belgium $5.5
Features the aromas of orange peel, coriander and herbs with a light yellow and naturally murky color. A soft taste of citrus notes that are light and slightly sweet and sour
Beer Advocate Score: 85

Marshall Old Pavilion Pilsner German Pilsner, OK $5.5
Crisp and clean with a distinct and pleasurable hop flavor and aroma, Old Pavilion Pilsner is brewed in the North German "Pils" style. Brewed with American malts, American and German hops and fermented with a German strain of lager yeast
Beer Advocate Score: 84

Coop DNR Belgian Strong Ale, OK $7.5
Notes of dried fruit, cinnamon and vanilla make DNR a very complex experience to be enjoyed in moderation
Beer Advocate Score: 84

Stella Artois European Pale Lager, Belgium $5.5
Sharp with a full and green-tea sweetness, this fan favorite European lager finishes faint and bittersweet
Beer Advocate Score: 71

Big Sky Trout Slayer American Pale Wheat Ale, MO $5
Trout Slayer is a filtered wheat ale, fermented at cool temperatures, making it a smooth drinkable session beer
Beer Advocate Score: 82

Great Divide Hercules Double IPA American Imperial IPA, CO $7.5
Hercules delivers a huge amount of hops from start to finish. Its hefty backbone of nutty, malty sweetness balances its aggressive hop profile. Great Divide Hercules is not for the faint of heart!
Beer Advocate Score: 92

Boulevard Hibiscus Gose, MO $5.5
A great introductory sour beer, Hibiscus is a tangy, sweet and sour ale with a refreshing citrus character
Beer Advocate Score: 87

Rogue Mocha Porter American Porter, OR $7.5
Ruddy brown in color with a bittersweet balance of malt and hops that ends with a light and creamy finish
Beer Advocate Score: 87

Kostritzer Schwarzbier Black Beer, Germany $6
Varied taste ranges from spicy and bread-like to smooth and sweet. Kostritzer is a distinctively fine malty beer from refined barley malt
Beer Advocate Score: 88

Steelhead Extra Stout American Stout, CA $6
Dark opaque sweet stout with a rich creamy roasted chocolate malt character and a very mild hop complement. A smooth and pleasing dessert beer
Beer Advocate Score: 90

Founders Dirty Bastard Scotch Ale, MI $5.5
Dark ruby in color, complex in finish, with hints of smoke and peat, paired with a malty richness and a right hook of hop power
Beer Advocate Score: 90

Results

	Number of Options		
Treatment	6	12	Odds Ratio
Control	19.22%	17.70%	1.09
Special	22.54%	17.67%	1.28
Beer Advocate	26.26%	22.47%	1.17
Local Option	9.16%	16.38%	0.56

Percent of times beer is chosen contingent on menu treatment for data on daily sales (N=4062)

|	Probability of buying beer [a]	Count of beers purchased [b]	Number of pilsners purchased
Intercept	-1.440***	-0.670	-0.640
Special	0.286	0.401	1.048
Beer Advocate Rating	0.517	0.848***	-1.648
Local Beer	-1.685***	-1.293***	-0.534
Number of Options	-0.022	-0.042	-0.216*
Options x Special	-0.018	-0.022	-0.039
Options x Rating	-0.016	-0.080**	0.154
Options x Local	0.139***	0.096**	0.037
Day	Yes	Yes	Yes
Time of day	N/A	Yes	Yes
Number of observations	4062	1292	297

[a] Logit model estimates
[b] Poisson model estimates
*,**, and *** represent significance at the 90%, 95%, and 99% levels

Model estimates for the likelihood of buying a beer

Discussion and Conclusions
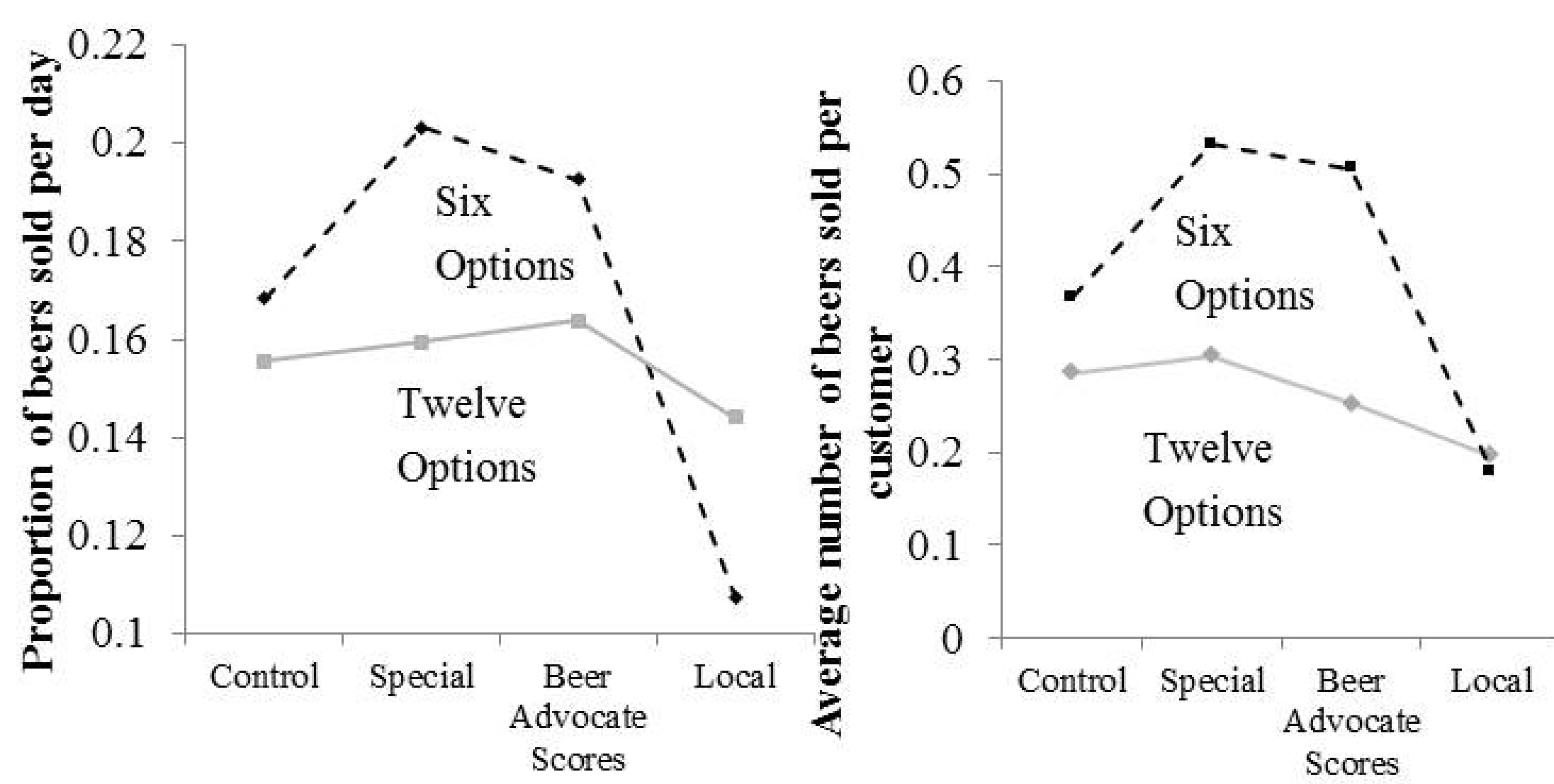
Although we find that consumers tend to be more likely to order beer when presented 6 rather than 12 options, the differences are often not significant depending which data are used and how it is analyzed. At the same time, however the interaction between treatments and the number of options proved to be statistically significant for both datasets ($\alpha = 0.05, F_{3,40} = 4.70, p < 0.0067; \alpha = 0.05, F_{3,1277} = 4.95, p < 0.002$). We take this to mean that additions of specific pieces of information through the informal institutions of specials, expert rankings, and "localness" can help alleviate the issues consumers face when the number of choices increase in a market.

Highlighting specials or listing beer rankings have an effect on consumer choices, and have the potential to decrease the excessive choice effect. Listing an option as local appears to decrease consumer preference for the product, but this might be a function of a negative perception of local alcohol for this specific context. At the same time, sales during the local created unique outcomes relative to the other treatments . For those treatments alone, more beer was sold in the twelve option week. The experiment also suggests including a special is the most effective way to increase sales of a product category, but not the necessarily specific product itself.

To conclude, this research supports the idea in Norwood (2006); namely, that excessive choice effect is created by increased search costs. At the same time, informal institutions have evolved to reduce those search costs and to provide more efficient choices in the market.

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