Geography and Branding in the Craft Beer Industry

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Place-based branding strategies are important marketing tools for both regions and firms and take advantage of consumers' embrace of the local in response to globalization. Craft brewing is a particularly salient user of these strategies and provides ample data. We find a strong, positive link between the number of place-based labels and a brewery's rating, suggesting consumers are receptive to place-based branding.

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1 Introduction

Craft beer produced by microbreweries is serious business, and has exploded in popularity, and absolute terms, over the past decades (Carrol and Swaminathan, 2000; Cabras and Bamforth, 2016). The global craft beer market was estimated to be $95 billion in 2020, which represents roughly 12% of the $740 billion global beer market (Fortune Business Insights, 2022). The precise definition of craft beer varies country-to-country, but the craft beer Brewers Association defines a craft brewery as being two things: 1) Small - producing less than 6 million barrels produced per year; and 2) Independent - no more than 25% owned by a non-craft brewery (Brewers Association, 2022). Craft brewing has arguably thrived exactly because of this small and independent definition, and craft brewers have deftly exploited place-based marketing perhaps more than any other industry in recent memory (Flack, 1997; Schnell and Reese, 2014).

Craft and microbreweries usually emphasize their small, local status and deliberately market themselves as “against the grain” of large global beer brands. They are hometown Davids pitted against placeless Goliaths, aggressively pursuing differentiation strategies (Clemons et al., 2006). C raft beer appeals to the benefits of consuming products that consist of locally grown ingredients, and as such fuels and benefits from, the “locavores” movement (Reid et al., 2014). Craft beer also takes advantage of consumers’ renewed interest in local and regional products. Craft beers provide identity and distinctiveness, creates a sense of place feeling, and the idea of having a connection to place. All these feelings are exploited by the place-based branding and marketing strategies pursued by craft and microbreweries (Schnell and Reese, 2003, Sjölander-Lindqvist et al., 2020).

Our research question is quite simply - how do the placed-based branding strategies employed by the craft beer industry influence consumer perception of brewery’s beers and their brands ? We focus on craft brewing because of its popularity and an abundance of review data, from which we can quantitatively evaluate how geography affects consumer preference. This wealth of data allows us to address a quantitative gap in the place-based branding literature, which has largely had to focus on small-scale or qualitative studies. Furthermore, we believe that our methods and our findings may be applicable to similarly-situated industries. As we explore in this paper, the place-based branding strategies employed by craft brewing are not universally effective and depend on factors like firm size, age, and the number of products a firm produces. These traits are not unique to the craft brewing industry, and it is our hope that by quantifying them in the craft brewing case, we can inspire similar strategies and research efforts in related industries and products. Not every industry will benefit from place-based strategies, but understanding why they work for craft brewing will help advance this field of study and potentially aid in diffusing these ideas to other, related industries.

Traditionally, place-based branding and marketing has proven effective for breweries since the taste and quality of beer is easily connected with its origins, or because references to places might create a link to social aspects related to place and the home market. More contemporary placed-based strategies pit local products against those from elsewhere. These strategies frequently employ imagery that goes well beyond labels of origin and instead appeal to consumer desires to taste, consume, and experience authentic local products (Taylor and DiPietro, 2020). These desires, termed the neolocalism movement (Shortridge and Shortridge, 1998), paired with the much-emphasized benefits of consuming products that consist of locally grown ingredients, stand in contrast to globalization where any style of beer can be brewed in any place with ingredients from all over the world.

For example, BrewDog in Scotland makes a Vietnamese Coffee Stout while Heart of Darkness in Vietnam makes a Dry Irish Stout. The styles these breweries create don't come from Scotland or Vietnam, but their brands do. Those beers may have been invented elsewhere, but the fact that they were made locally becomes the main message (Pike, 2011). Hoppe and Nedzhvetskaya (2023) also call attention to this issue, noting that the pace where goods are actually made and the place conjured up by a firm's 'rhetorical geography' are often wildly different.

Craft breweries' successful navigation of the above issues and the exploitation of localism and geography serves as a lesson not only to future brands and industries, but to regions as well. Regions who have leaned in and incentivized local craft brewing have witnessed spatial agglomeration and growth of more breweries, the transformation of blighted industrial areas, and an increase in complementary industries like hospitality and tourism (Nilsson et al., 2018). Today, virtually any product can be produced anywhere in the world, but making it locally imbues it with authenticity and credibility that resonates with consumers, who nowadays so rarely see where their goods come from. Understanding what has made the craft beer industry so successful is important for other industries and for regions looking to incubate and encourage more place-based industry and product initiatives.

To the best of our knowledge, systematic evidence regarding consumers' positive perception towards breweries' products that are marketed via place-based strategies versus those brands that miss linkages to local references is still largely missing. Studies into consumers' perceptions of place-based brands mainly rely on interviews and questionnaires and so usually also only focus on specific localities (Tylor and DiPietro, 2017; Murray and Kline, 2015). Recent studies, however, have begun to take advantage of trademarks as a new data source, as suggested by Castaldi and Menonça (2022). One such example is the large-scale quantitative work of Miranda and Ruiz-Moreno (2020), who use Spanish Trademark filing data to measure references to historical themes in companies' branding language. While not strictly place-based, this method is similar in spirit to our Named Entity Recognition approach. In spite of these recent efforts, it is still unclear if place-based

brands appeal to the same extent across all consumer segments and regions, especially in comparison to global brands that do not make place-specific claims.

We address this gap with a dataset from a social network platform that contains information on breweries, their brands, as well as reviews and ratings from consumers. After several processing steps, our final dataset contains thousands of breweries, their marketing language, and their public ratings, along with several other key controls. We find that place-based marketing indeed leads to widespread positive consumer perceptions, and thus confirms prior small-scale qualitative studies. The results also support the idea that place-based branding surpasses branding strategies that make no or little reference to place, geography and other aspects that incorporate the neolocalism movement.

The following section provides a brief overview of some of the relevant literature and theoretical considerations that serve as foundations to the present investigation. The subsequent sections describe the data, data processing steps, and the regression specification. Finally, we discuss our results in detail, and offer some concluding thoughts.

2 Background Literature

We begin by reviewing the background literature on place-based marketing and branding strategies below. We first present the literature addressing these strategies in the broader regional context. We then turn to the more specific literature on the branding strategies of craft breweries in conjunction with public perception, and our contribution to it.

2.1 Place-Based Marketing in a Regional Context

Place-based marketing and branding strategies are a well-documented phenomenon, both by firms and sua sponte by regions to increase their attractiveness to firms (Vuignier, 2017). Less clear, however, are how these methods measure up in a larger, comparative context (Rauhut and Rauhut Kompaniets, 2020). While place-based marketing and branding may seem interchangeable, there are indeed significant differences, as highlighted by Boisen et al. (2018). Place-based marketing strategies, frequently regarded as important planning instruments (Kavaratzis and Ashworth, 2008), are guided as much by supply side considerations as they are demand driven. In this sense, place-based marketing could both promote a city or region to current residents as well as aim to attract new ones from afar. On the other hand, place-based branding, unlike targeted and

frequently temporal marketing strategies, usually focuses on intangible assets grounded in perceptions, connotations and associations that are rooted in our popular consciousness. Zenker and Braun (2017: 273) provide a good definition in this regard by stating that place-based branding is "…a network of associations in the consumers' mind based on the visual, verbal, and behavioral expression of a place and its stakeholders. These associations differ in their influence within the network and in importance for the place consumers' attitude and behavior."

It is noteworthy that the literature also speaks to a third category in this context which falls between place-based marketing and branding. Place-based promotion is perhaps the simplest of the three strategies, perceived as a sender-to-receiver approach. Place-based branding, on the other hand, involves an identity-driven approach that relies on reputation. That reputation requires management, image orchestration, and a perception and association balance that in turn generates the attitude people develop for a certain place in question (Boisen et al., 2018). In a regional perspective and context, place-based branding, and especially regional identity, is gaining importance as a way to increase regional competitiveness. Place-based branding is now an important component of local economic development strategies, although the gap between aspirational place-based branding policies and realistic goals is frequently difficult to overcome (Cleave et al., 2016). Nevertheless, a powerful and dynamic regional branding strategy is considered a positive factor when it comes to attracting business and talent in general (Florida, 2002), and recent insights into the multiple dimensions of place brands indeed suggests that there is a positive relationship between certain place-based branding strategies and the growth of industry sectors and employment (Scarborough and Crabbe, 2021).

Historically, place identity and local culture might have been considered something static that develops slowly over time and is then projected onto the regional setting via the outside world (Mayes, 2008). The response to globalization, however, has led to a growing interest in local products at the consumer-level, prompting an increase in product differentiation efforts at the firm-level. As such, a much more dynamic relationship between place-based branding efforts at the regional scale and local providers of services and products has developed. Understanding how place-based strategies influence consumers' perceptions is then fundamentally important in explaining the producer-consumer dynamic (Kavaratzis and Hatch, 2013). In this regard, place-base branding attempts need to be considered in conjunction with those producers and brands that either engage or dismiss regional strategies in the context of an ongoing dialogue. Prior research has shown that the role played by local institutions, e.g., tourism boards, might be a very significant, because producers mainly adopt regional identities and cultural heritage driven narratives and images in their own branding strategies rather than developing their own regional branding strategy (Riviezzo et al., 2017; Eades et al., 2017).

2.2 Place-Based Branding and Consumer Perception in the Beer Sector

There is a large body of literature detailing the importance of regional geography and place-based marketing to the success of craft and micro brewing. Flack (1997) was among the first to point out the trend in the then-budding US craft beer industry, noting that neo-localism and a sense of place were key components of the craft industry's success. Elzinga et al. (2015) chart the growth of the American craft beer industry from 1979-2012, and test an empirical model of craft brewery formation, noting that craft breweries are extremely entrepreneurial ventures and tend to appear in geographic clusters. Cabras and Bamforth (2016) study the evolution of two former microbreweries, BrewDog and Sierra Nevada, and attribute at least some of their success to marketing strategies that embraced localism as a rejection of national and global trends. Dennett and Page (2017) also document this localism trend using a survey of London craft breweries. They note that while breweries initially tout their neighborhood within London at large, as more breweries enter the region and the space becomes crowded, brand strategies switch from the neighborhood-level to simply including "London" as the regional origin. Wallace (2019: 961) documents this same phenomenon in London, but this time in the context of brewers' status as artisanal entrepreneurs who are "heralded as makers and producers who can give districts an entrepreneurial 'craft' profile".

O'Brien (2020) also focuses on UK craft breweries, this time with a survey of beer labels in the Surrey region. O'Brien finds that virtually every brewery labels their beers with their region of origin, and some even go so far as to include regional landmarks in the beer label designs. Gatrell et al. (2018) also document the prominence of regional names and landmarks in beer designs, this time using case studies of several craft breweries in the US Midwest region. They note that the unique combination of nature, place, and identity gives craft beer an immediately authentic feeling brand. They end by suggesting that this place-based branding strategy is ripe for imitation by other industries and products. Wojtyra et al. (2020) (along with Elzinga et al. (2015) and Dennett and Page (2017)), document the extreme prevalence of spatial clustering in the craft beer industry. The literature generally suggests that this is due to a convergence of several factors, most notably: cheap industrial space, a lack of competition from large brewers, and distinct local characteristics around which to build a brand. These findings are perhaps the most compelling from a regional strategy standpoint, as craft beer is not unique in requiring these ingredients to be successful. Regions who are aware of potential for new industries and who foster the development of those industries through place-based branding will be well-positioned to reap the benefits of the next local product revolution.

The organizational ecology literature offers some explanation as to why these geographic strategies are successful, especially in the drinks industry. Hsu and Hannan (2005) point out that organizations create 'form identities' along several key dimensions. One of these, especially for the craft beer industry, is authenticity. Hsu and Hannan (2005: 482) note that "Consumers often choose

microbrewery products as a form of self-expression or as a reaction against mass production and the dominance of large corporations." Notwithstanding, the appeal of craft beer mainly builds upon its small size and traceable origins. Evoking these features through geography or localism only serves to strengthen the appeal of small microbreweries against international behemoths.

This stark division between micro and macro breweries can be explained by the organizational ecology concept of categories. Categories are a semantic collection of features formed by social agreement and tradition. Film genres are one example of categories, as are macro breweries and microbreweries, as are traditionalist and modernist winemakers. Negro et al. (2011) study the emergence of modernist winemakers in Italian Barolos and find that the modernists were successful precisely because they were able to establish their own, new category in the minds of consumers. While traditionalist wines would have previously been viewed as authentic and technically superior, the modernists, through their creation and socialization of this new category, were able to create a new type of artisanal authenticity of their own that resonated with consumers.

Craft brewers have done much the same thing as the modernist winemakers, and created a new space in the mind of consumers where individuality and creativity is rewarded or at least regarded as something quite different from established producers. Craft brewing has done this by emphasizing its small, local status through geography, something macro breweries struggle to do. Indeed, when large firms attempt to span multiple categories, as international beer conglomerates have done with the acquisition of craft breweries, they are often punished for it. Kovács and Hannan (2010) suggest that spanning multiple categories introduces a fuzziness in the minds of consumers and hurts the brand and consumer associations with it. Microbreweries make no such mistake and stick to their battle-tested script of small, local production. Furthermore, Carroll and Swaminathan (2000) note that "the robust identity strategies attempted by the major breweries and the illusory authenticity of the contract brewers are effective for only short periods, if at all". This is because craft breweries fiercely defend their ideological territory, often going so far as to self-police with marks of quality or guarantees of true independence. This can be done at the local level, as in the case of the Oregon Brewers Guild, or even internationally in the case of the Brewer's Association 'Independent Craft' label and icon. Craft brewers then have created a carefully cultivated image of authenticity and independence from the establishment. They have done so by continuously espousing a small, local focus, which has successfully differentiated them into a new category in the minds of consumers. Geography plays an important role in this story by emphasizing the local, traceable nature of craft brewing.

While the rise of craft and microbreweries and their overwhelming use of place-based branding has been frequently discussed in the literature, there has yet to be a comprehensive, quantitative study spanning multiple regions, nations, and even continents. We address this gap by aggregating data on thousands of breweries around the world from a popular beer review website.

Though focused on craft beer, this paper has important takeaways for place-based branding. Furthermore, while place-based branding may seem like a firm-specific strategy, there are key advantages at the regional policy level too, making this highly relevant to the regional studies literature.

3 Data

This paper addresses the current quantitative gap in beer and branding literature by gathering data on tens of thousands of breweries and their brand language from a beer review website. We collect data on breweries, their locations, their beers, and the number and quality of their reviews. With this data, we separate the brand from the place, and observe how craft breweries flourish or flounder based on their sense of place.

We gather this brewery-level data from Untappd.com, a type of social network for breweries that allows users to 'check-in' when visiting a brewery or drinking its beer. Crucially, users may also rank breweries and their beers from one to five stars, which gives us our measure of brewery quality. Much like other commercial social networks such as Yelp and Google Maps, Untappd provides breweries with a home page where they can write a description of themselves, their beer, and their brand. As of 2020, Untappd had over 8 million users and over 100,000 breweries in 75 countries[2]. Like Yelp and Google Maps, breweries may create or claim their pre-existing pages to better control their online presence. It is impossible to know how many small breweries are not registered on Untappd, but Untappd is so ubiquitous in the craft beer community that almost every commercially minded brewery has a profile.

Because of Untappd's popularity, a brewery's presence on it and rating can be critical to consumer perceptions. One of the first things an Untappd user sees when checking a brewery's page is the brewery's description. And while we cannot be sure if a user reads the description before formulating an opinion on a brewery and rating its beer, we believe the brewery description to be largely consistent with the rest of the brand language a consumer would experience when purchasing and consuming beer. A consumer's beer drinking experience is largely unobservable, but the description text provides some window into this process. For this reason, the description text is our focus for analyzing breweries' brand language. For example, see the below snippet from Garage Beer Co out of Barcelona:

We started as a brewpub in 2015 in the Eixample neighborhood of Barcelona. In 2017 we opened our main brewery where most of our beers are brewed, though we still use the brewpub for

[2] https://www.brewbound.com/news/untappd-parent-company-next-glass-receives-investment

our mixed fermentation beers. You can find us every day at Consell de Cent 261, Barcelona, where we'll receive you with open arms and fresh beers!

This description text often includes information about a brewery's local origins and claims to provenance. We use this text to measure how a brewery's reliance on geography as part of its brand identity influences the brewery's rating score. That rating score is our key dependent variable.

The brewery rating score is a conventional one to five star system and is an average of all the individual ratings of that brewery's beers. For example, if a brewery has two beers, Beer A with an average rating of four and two total reviews, and Beer B with an average rating of 3 and four total reviews, the brewery's score is ((4*2)+(3*4)/6) = 3.33 [3]. Because a brewery's rating is dependent on consumers' ratings of its individual beers, our key assumption is that a brewery's brand affects consumer's perceptions of and tastes for that brewery's products. It is important to note however, that some breweries have a physical presence in addition to selling cans and bottles. For example, Garage Beer Co has a brewpub where customers can enjoy beers along with other snacks and refreshments. While the Untappd rating system is based on individual beers, and thus should not be influenced by the type of service or ambiance a brewery provides, it is possible that a brewery's rating could also be influenced by consumers' experiences at its physical locations

Among breweries who have been rated, scores follow a normal distribution with a bit of positive skew. Most breweries received an average rating of 3.5 stars. Figure 1 below reports the distribution of the average Brewery Rating Score.

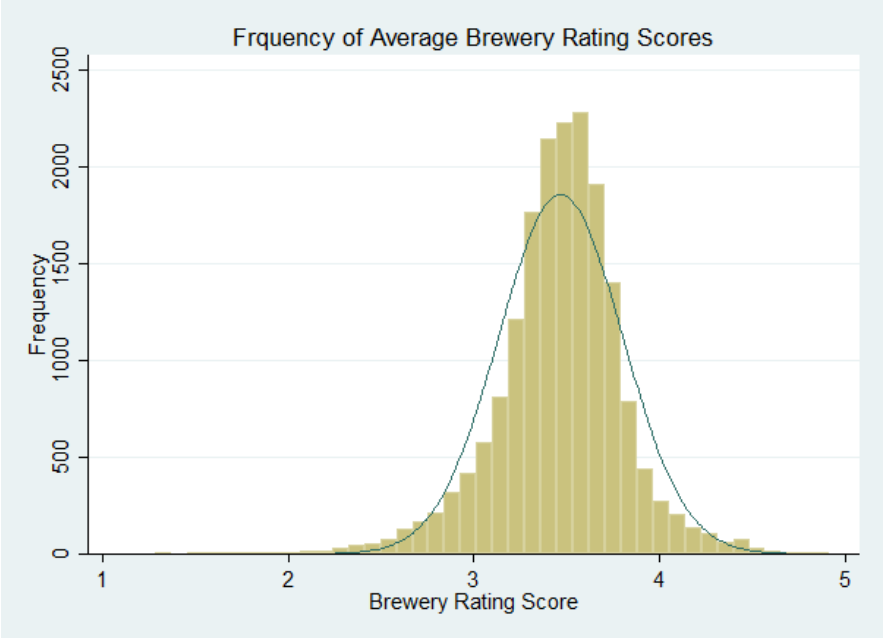

Figure 1: Histogram of Brewery Rating Scores

[3] https://help.untappd.com/hc/en-us/articles/360034136372-How-are-ratings-determined-on-Untappd-

It is also important to note the geographic distribution of breweries. While Untappd contains breweries all over the world, the largest concentrations by far are in North America and Europe respectively. These clusters are illustrated in Figure 2 below.

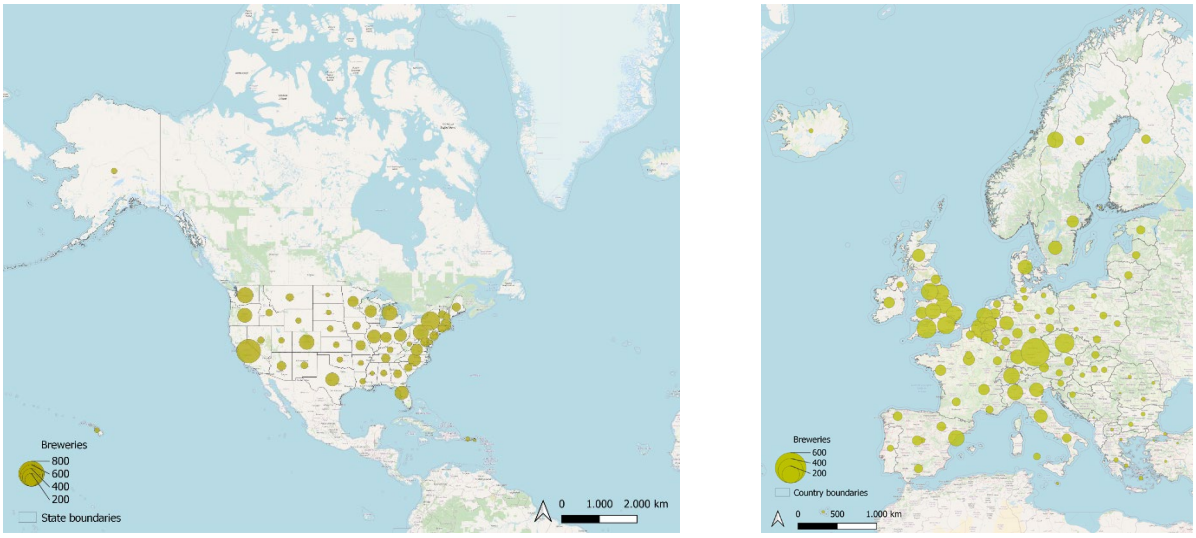

Figure 2: Most Common Brewery Locations

We collect data from 85,978 breweries on Untappd. Most of these profiles, however, are homebrewers or otherwise don't represent an actual commercial brewing operation. Because we wish to study how a brewery's use of branding influences consumer perceptions, we restrict our sample to only those breweries with a tangible commercial presence and consumer engagement. We do so by only including breweries that have been reviewed 100 times or more. This restriction reduces our sample to 18,004 breweries. One hundred reviews is an arbitrary cut-off, but one we feel represents a certain critical mass and brand awareness for a commercial brewery. This restriction also likely eliminates small home brewers and other hobby projects that may not be commercially minded or have a strong brand identity.

Because the named entity recognition we wish to perform on the brewery description text is language-sensitive, we impose a final restriction that all descriptions must be written in English. We used spaCy's FastLang language identification module (Thiebaud 2020) to filter out non-English reviews, which we discuss in more detail in Section 3.1 below.[4] This final restriction takes us down to 17,895 breweries.

[4] For more information on FastLang, see: https://spacy.io/universe/project/spacy_fastlang

To sum up the sample selection process, we start with 85,978 raw, unfiltered breweries. We then restrict this sample to only breweries that have been reviewed 100 times or more, and further filter this sample by taking only breweries with description texts written in English. This leaves us with a final sample of 17,895 breweries, which we will use for the rest of this paper.

For each of the breweries in our sample we collect the description text, number of beers, location, brewery age on Untappd, number of reviews, and most importantly, the brewery type, which is a categorical variable corresponding to brewery size. Table 1 below lists brewery types and sizes as defined by Untappd [5].

Table 1: Brewery Types and Definitions

Type	Description
Macro	A brewery with an annual beer production of over 6,000,000 barrels (7,040,865 hectoliters) or a brewery owned by another brewery with annual beer production of over 6,000,000 barrels (7,040,865 hectoliters).
Regional	A regional brewery with a majority of volume in "traditional" or "innovative" beer(s) with an annual production between 15,000 barrels (17,600 hectoliters) and 6,000,000 barrels (7,040,865 hectoliters).
Micro	A brewery that produces between 2,000 barrels (2,300 hectoliters) and 15,000 barrels (17,600 hectoliters) or less beer per year.
Nano	A brewery that produces 2,000 barrels (2,300 hectoliters) or less beer per year.
Brewpub	A brewery with the majority of the beer brewed is primarily for sale in the restaurant and bar of the venue.
Contract	Any business or brand that does not have their own physical brewery and hires another brewery to produce their beer.
Homebrewery	Any brewery that brews approved beverages (beer, cider, mead, kombucha, etc.), but are produced for non-commercial consumption at home.
Cidery	A business where the majority of the product is cider.
Meadery	A business where the majority of the product is mead.

Because annual production in many cases defines brewery types, these breweries are not evenly represented in our data. Reassuringly for our focus on the craft beer industry, the most common brewery type in the sample is a "Micro Brewery", which is most commonly associated with independent, craft brewing. Figure 3 below plots the count of observations per brewery type.

[5] https://help.untappd.com/hc/en-us/articles/360034018812-Supported-Brewery-Types

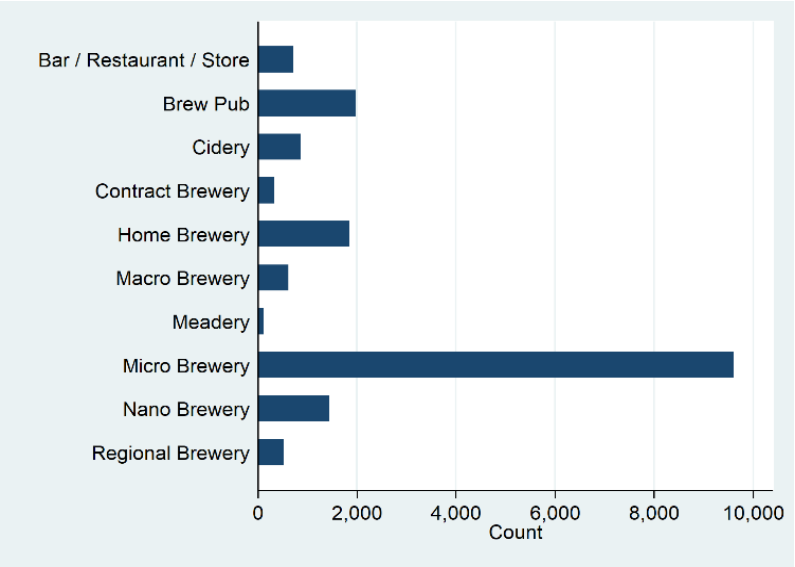

Figure 3: Number of Observations by Brewery Type

Of primary interest to us are the Macro, Micro, and Nano breweries, as these are the bulk of the sample and offer a natural baseline against which to compare the predominantly craft-focused microbreweries. We use the Brewery Type categories to stratify our sample in our regression analysis in the following section and identify some key differences and surprising similarities between Brewery Types. This is especially useful as the existing literature attributes the use of geography in branding primarily to the craft beer industry, which implies the smaller Micro and Nano breweries. However, we find that in at least some specifications, the use of geographic terms in the breweries' descriptions is prevalent across several brewery types and has a positive effect on consumers' perceptions of beers and thus a brewery's Brewery Rating Score.

Finally, we observe the latitude and longitude of each brewery's headquarters. We use these coordinates along with geographic shape files to assign breweries to specific regions in Europe and postal codes in the US[6]. We choose to focus on only the EU and US for this geocoding exercise because they are the overwhelming majority of the sample and are also the best-defined regions. This provides significant variance at the regional level by which to compare our breweries. Geolocating breweries in this way allows us to further explore the regional dimension of the data and identify trends in specific regions. This corresponds with qualitative studies in the existing literature, which make note of waves of craft beer resurgence happening at the regional level or even within certain neighborhoods of large metropolitan areas like London (Dennett and Page, 2017; Wallace, 2019).

[6] European regions are classified according to the Nomenclature of Territorial Units for Statistics (NUTS) 2 level schema; for further information on this refer to the following: https://ec.europa.eu/eurostat/web/nuts/background.

3.1 Named Entity Recognition

After downloading the description text for each brewery, we use the spaCy (Honnibal et al. 2020) natural language processing (NLP) Python library to perform Named Entity Recognition (NER) on the text.[7] spaCy has a wealth of pre-trained natural language models trained on over 64 languages. Here we use spaCy's default 'en_core_web_sm' (English core web small) model to perform the NER. Because this model is language specific and trained to recognize entities written in English, we also need to filter out reviews written in other languages. Almost all Untappd descriptions are written in English anyway, but spaCy's FastLang language identification module makes it relatively straightforward to filter English-only descriptions. FastLang works by decomposing words into sub-components called n-grams. These n-grams are then used as features, and passed to a classifier, which will probabilistically assign a language based on the co-occurrence of n-grams together. We implement FastLang as a pipeline stage that runs on the text description before running the NER stage. In this way, only English documents are passed to the NER algorithm. One notable exception to this quantitative trend is Miranda and Ruiz-Moreno 2020, who use Spanish Trademark filing data to measure references to historical themes in companies' branding language. While not strictly place-based, this method is similar in spirit to our Named Entity Recognition approach spaCy's NER detects several different labels, which are listed and described in Figure 4 below. We highlight the labels that appear in the Garage Beer Co example text using spaCy's displaCy visualization tool in Figure 5 below.

For each brewery description, spaCy provides us with the count of each of these labels, which we use as independent variables to measure a brewery's reliance on cultural and geographic entities. While spaCy provides a rather extensive list of labels, we find that most labels do not exhibit significant variation in our sample and are used too infrequently in description text. We drop these variables from our analysis, and instead focus on the most frequently used and varied labels: DATE, FAC, GPE, LOC, NORP, ORG, PERSON.

[7] See here for more information on spaCy: https://spacy.io/

TYPE	DESCRIPTION
PERSON	People, including fictional.
NORP	Nationalities or religious or political groups.
FAC	Buildings, airports, highways, bridges, etc.
ORG	Companies, agencies, institutions, etc.
GPE	Countries, cities, states.
LOC	Non-GPE locations, mountain ranges, bodies of water.
PRODUCT	Objects, vehicles, foods, etc. (Not services.)
EVENT	Named hurricanes, battles, wars, sports events, etc.
WORK_OF_ART	Titles of books, songs, etc.
LAW	Named documents made into laws.
LANGUAGE	Any named language.
DATE	Absolute or relative dates or periods.
TIME	Times smaller than a day.
PERCENT	Percentage, including "%".
MONEY	Monetary values, including unit.
QUANTITY	Measurements, as of weight or distance.
ORDINAL	"first", "second", etc.
CARDINAL	Numerals that do not fall under another type.

Figure 4: spaCy NER Labels

The fact that these labels are most frequently used in brewery descriptions is not surprising and is an initial indicator of breweries' reliance on localism and sense of place. We briefly discuss each and our rationale for including them in turn.

'DATE' is an important measure that harkens back to a brewery's founding and origin story. In the Garage example below, they do not shy away from their relatively fresh origins in 2015, and instead place it front-and-center as a nod to their microbrewery challenger status. 'FAC' or facilities, captures references to local infrastructure, which a brewery may use to reference local landmarks. 'GPE' or geopolitical entity is an important indicator, and captures references to cities, countries and states. These are some of the most obvious ways a brewery can evoke the local geography and culture. 'LOC' or location is the complement to GPE and captures things like mountain ranges and bodies of water. This is especially important in the brewing context as beer and food in general is often seen to be the product of local natural resources. An obvious example of LOC in the brewing context is Coors Brewing's constant reference to the Rocky Mountains.

'NORP' captures nationalities and religious or political groups. This is a more cultural indicator, but there is still an implicit geographical component to these monikers as well. Indeed, the entire Trappist style of Belgian beer is named for the monks who brew it. 'ORG' is a reference to an organization or institution. In the Garage example below, the street the brewery is located on is perhaps incorrectly identified as an ORG. This identification is still helpful however, as Garage's inclusion of the street was clearly meant to evoke the part of Barcelona they are from.

Finally, 'PERSON' identifies famous real-life and fictitious individuals. A reference to a person in the beer context naturally evokes what made that individual famous. For example, the microbrewery Hemmingway's uses the famous author's name to evoke the machismo and romanticism of Ernest Hemmingway himself. Returning to our Garage example, we can see how spaCy performs NER and extracts most labels, while missing one neighborhood (Eixample) with a rather unique name.

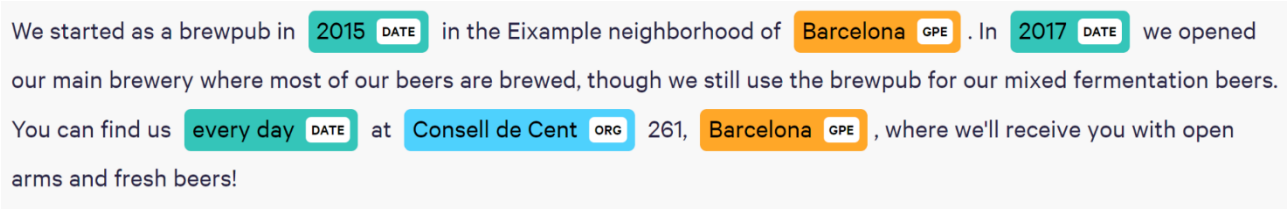

Figure 5: spaCy's NER applied to Garage Beer Co.'s description text.

These NER labels are the core of our analysis, as our regression specification measures the count of these labels in each brewery's description. While we include many of these labels to control for potentially confounding marketing factors that could also contribute to a brewery's success, our main labels of interest are GPE and LOC, which both relate directly to the use of geography and natural features.

We should note that spaCy's NER labeling is not perfect. The spaCy model we use has a precision, recall, and f-scores equal to 85%, which means that spaCy will mis-label or fail to label an entity roughly 15% of the time.[8] Furthermore, spaCy is better at recognizing some NER labels than others, which could potentially bias our observations. We report the NER performance metrics for spaCy's 'en_core_web_sm' model in Table 2. Apart from the FAC label, which does significantly affect our results, the spaCy model's performance is broadly similar across the seven NER labels of interest we identified above. Given the similar performance across labels, and the size of our dataset, we believe this is an acceptable level of error. We should also note that short of developing a beer-

[8] See https://spacy.io/models/en for reporting of NER metrics, and see https://spacy.io/usage/facts-figures for spaCy's performance against NLP benchmark datasets.

specific NER model, which would be extremely time consuming and require extensive hand-labeled examples, we would be hard-pressed to improve on the performance of the baseline model.

Table 2: Brewery Types and Definitions

Label	Precision	Recall	F-Score
DATE	86.03%	88.38%	87.19%
FAC	35.85%	29.23%	32.20%
GPE	91.47%	89.43%	90.44%
LOC	72.11%	67.52%	72.96%
NORP	89.57%	90.00%	89.78%
ORG	79.56%	89.43%	80.93%
PERSON	86.18%	89.33%	87.72%

To summarize our treatment of the data so far, we first collect roughly 86,000 breweries from Untappd. We then restrict this sample to only breweries that have been rated 100 or more times to ensure we capture breweries with some sort of presence. We next run FastLang's language identification to filter out any brewery descriptions not written in English. Finally, we pass this refined sample to spaCy's NER algorithm, and count the number of times NER labels appear in the description text. Summary statistics for these NER labels as well as key control variables are presented in Table 3 below.

Table 3: Summary Statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
In Production?	17,895	0.103	0.304	0	1
Independent?	17,895	0.953	0.211	0	1
Beer Count	17,895	64.25	141.8	0	8,740
Rating Count	17,895	36,770	202,062	100	7.722e+06
Brewery Rating Score	17,895	3.466	0.333	1.287	4.915
Age on Service	17,895	3,258	499.1	289.3	4,099
DATE	17,895	0.401	1.023	0	15
FAC	17,895	0.0595	0.283	0	5
GPE	17,895	0.565	1.270	0	16
LOC	17,895	0.0833	0.344	0	5
NORP	17,895	0.118	0.456	0	7
ORG	17,895	0.666	1.547	0	23
PERSON	17,895	0.826	2.327	0	32

After gathering, cleaning, and processing the data, we now turn to our econometric approach.

3.2 Regression Specification

We use the above data to estimate the following regression specification:

$$\ln(\text{Rating}) = \beta_1 \text{Date} + \beta_2 \text{FAC} + \beta_3 \text{GPE} + \beta_4 \text{LOC} + \beta_5 \text{NORP} + \beta_6 \text{ORG} + \beta_7 \text{PERSON} + \beta_8 X + \alpha \text{Region} + \epsilon$$

Where Rating is a brewery's average Brewery Rating Score from 1 to 5; DATE, FAC, GPE, LOC, NORP, ORG, and, PERSON are the counts of the NER labels identified in each brewery's description text; X is a set of controls including ln(Brewery Rating Count), Brewery Status, and ln(Brewery Age on Service); α is a set of country-level fixed effects; and ϵ is the error term. We also ran a bi-variate specification with Rating and each of our seven NER labels individually, but there was difference in the coefficients or significance of the results.

While we use counts in the above specification, we also perform robustness checks and instrument each of the NER labels as a simple yes/no dummy variable based on a label's presence in a description. This alternative specification should capture the extensive effect of adding a particular NER label to a description, e.g., mentioning the brewery location, as opposed to the intensive effect of adding an additional label, e.g., mentioning the brewery location twice.

There is much we simply cannot observe about a beer-buyer's consumption decision. Indeed, we cannot even be sure that a consumer reads the label or other marketing copy before making a purchase. Our data, while quite broad in coverage and rich in some areas, is still very limited. To address this, we make use of fixed effects to control for as much exogenous variation as possible. As there is no time-series variation in our data, our use of geographic fixed effects should control for idiosyncratic differences such as price, preferences, and prevailing macroeconomic conditions between consumers in different places.

A similar concern is that there may be considerable overlap between our NER labels. For example, the use of a DATE label may be highly correlated with a GPE label e.g. "We started as a brewpub in 2015 in the Eixample neighborhood of Barcelona". Table 4 below presents correlations between our NER label variables. While there is significant correlation between many variables, the magnitude is quite small and therefore not overly worrying for our econometric approach or results. Indeed, many parts of speech correlate with one another, but do not necessarily detract from one another's explanatory power.

Table 4: NER Label Correlations

	CARDINAL	DATE	EVENT	FAC	GPE	LANGUAGE	LAW	LOC	MONEY	NORP	ORDINAL	ORG	PERCENT	PERSON
CARDINAL	1.00													
DATE	0.42***	1.00												
EVENT	0.13***	0.20***	1.00											
FAC	0.17***	0.25***	0.09***	1.00										
GPE	0.35***	0.44***	0.14***	0.25***	1.00									
LANGUAGE	0.04***	0.06***	0.03***	0.02*	0.07***	1.00								
LAW	0.07***	0.07***	0.06***	0.04***	0.08***	0.03***	1.00							
LOC	0.18***	0.23***	0.10***	0.15***	0.25***	0.03***	0.06***	1.00						
MONEY	0.09***	0.08***	0.04***	0.02*	0.07***	-0.01	0.01	0.04***	1.00					
NORP	0.19***	0.26***	0.06***	0.10***	0.27***	0.12***	0.02**	0.12***	0.02**	1.00				
ORDINAL	0.19***	0.35***	0.11***	0.14***	0.26***	0.04***	0.04***	0.14***	0.05***	0.15***	1.00			
ORG	0.36***	0.45***	0.12***	0.28***	0.53***	0.07***	0.09***	0.22***	0.07***	0.28***	0.18***	1.00		
PERCENT	0.09***	0.10***	0.02**	0.04***	0.12***	-0.00	0.02**	0.05***	0.04***	0.09***	0.07***	0.16***	1.00	
PERSON	0.31***	0.37***	0.06***	0.23***	0.47***	0.07***	0.10***	0.13***	0.03***	0.26***	0.12***	0.64***	0.12***	1.00

4 Results

After detailing our data collection and processing strategy above, we now turn to discussing our results and robustness checks. Table 5 below presents our initial results, as well as several variations and robustness checks.

Column 1 is our baseline specification with our seven different NER labels and controls for number of ratings, beers, brewery status, and age on service. GPE, and LOC are both positive and highly significant, which suggests that breweries are in fact better received when they make references to geography and local features in their descriptions. DATE is also positive and significant, which supports our reasoning that mentioning the date a brewery was founded increases credibility and thus brewery rating score. Curiously, PERSON is significant and negative. spaCy's rather terse definition of PERSON, "people, including fictional", is quite broad [9]. A simple explanation could be that reliance on celebrity or fictional character is a signal of a weak brand itself that cannot generate its own presence or reputation through the quality of its products. A similar possible explanation is that the PERSON tag is capturing family names, or the names of founders or brewmasters.

This would once again be an effort by the brewery to influence consumer's perceptions of authenticity and quality and has been studied in the cultural sociology literature. For example, Peterson (2013) discusses the importance of creating an authentic persona for an artist to be successful in country music. This is such a common tactic in the country music world, that Peterson has identified the "Hillbilly", "Cowboy", and "Old-Timer" as the three most common archetypes artists lean on to appear authentic and credible to consumers. And music is just the beginning. Back et al (2012) provide examples of this curated, personal authenticity in the branding, fashion, and food industries. The use of personal figures or characteristics then is well-studied, and there is generally thought to be a positive link between the two. What is still perplexing in our data, is why references to persons would have a *negative* impact on a brewery's rating.

To investigate further, we manually review twenty randomly selected brewery profiles containing PERSON tags. Some of these tags were indeed references to celebrity, such as Abita's *Purple Haze* IPA and Harvey's Brewery's reference to its historical founder John Harvey. Others were simply errors in the NER, such as "BBQ ribs" being identified as a person in Grizzly Peak Brewing Company's description. The rest of our manually reviewed results were similarly inconclusive and offered little evidence for the negative result.

[9] https://github.com/explosion/spaCy/blob/master/spacy/glossary.py
This definition is itself derived from the definitions put forth in the ACL MUC 7 task:
https://aclanthology.org/M98-1028.pdf

Table 5: Baseline Specification

VARIABLES	(1) All	(2) Robust Errors	(3) Cluster - Brewery Type	(4) Cluster - Country	(5) Cluster - State	(6) Cluster - City	(7) Fixed Effects	(8) Fixed Effects	(9) Fixed Effects
DATE	0.00991***	0.00991***	0.00991***	0.00991**	0.00936***	0.00977***	0.00246	0.00312	0.00265
	(0.00276)	(0.00241)	(0.00246)	(0.00467)	(0.00278)	(0.00226)	(0.00289)	(0.00252)	(0.00354)
FAC	0.00776	0.00776	0.00776	0.00776	0.0119*	0.0113*	-0.00507	0.000182	-0.00361
	(0.00881)	(0.00671)	(0.00651)	(0.00882)	(0.00616)	(0.00658)	(0.00800)	(0.00649)	(0.0107)
GPE	0.0119***	0.0119***	0.0119***	0.0119***	0.0115***	0.0118***	0.00484	0.00548*	0.00884*
	(0.00236)	(0.00255)	(0.00336)	(0.00356)	(0.00263)	(0.00247)	(0.00312)	(0.00262)	(0.00450)
LOC	0.0411***	0.0411***	0.0411***	0.0411***	0.0425***	0.0434***	0.00827	0.0147	0.00780
	(0.00718)	(0.00550)	(0.00830)	(0.00820)	(0.00607)	(0.00540)	(0.0110)	(0.00824)	(0.0123)
NORP	-0.00615	-0.00615	-0.00615	-0.00615	-0.00208	-0.00123	0.00516	0.00718*	0.00375
	(0.00550)	(0.00478)	(0.0106)	(0.00573)	(0.00531)	(0.00474)	(0.00647)	(0.00369)	(0.00628)
ORG	-0.00309	-0.00309	-0.00309	-0.00309	-0.00254	-0.00248	-0.00572**	-0.00381**	-0.00631
	(0.00219)	(0.00191)	(0.00314)	(0.00273)	(0.00232)	(0.00193)	(0.00218)	(0.00159)	(0.00749)
PERSON	-0.0115***	-0.0115***	-0.0115***	-0.0115**	-0.0102***	-0.0104***	0.00142	0.000990	-0.000170
	(0.00137)	(0.00138)	(0.00295)	(0.00470)	(0.00195)	(0.00133)	(0.000994)	(0.00148)	(0.00293)
Independent?	0.272***	0.272***	0.272**	0.272***	0.252***	0.254***	0.172***	0.163***	0.188**
	(0.0114)	(0.0132)	(0.0897)	(0.0316)	(0.0174)	(0.0129)	(0.0401)	(0.0438)	(0.0654)
In Production?	-0.00375	-0.00375	-0.00375	-0.00375	0.0146	0.0183**	-0.105*	-0.0817**	-0.0660
	(0.00787)	(0.0110)	(0.0555)	(0.0305)	(0.0105)	(0.00859)	(0.0513)	(0.0330)	(0.0416)
Age on Service	-5.93e-05***	-5.93e-05***	-5.93e-05***	-5.93e-05***	-7.14e-05***	-6.93e-05***	-8.01e-05***	-8.32e-05***	-9.93e-05***
	(4.90e-06)	(5.08e-06)	(1.43e-05)	(1.63e-05)	(7.04e-06)	(4.63e-06)	(1.12e-05)	(7.17e-06)	(1.27e-05)
Rating Count	9.40e-08***	9.40e-08**	9.40e-08**	9.40e-08*	6.87e-08***	6.76e-08**	7.67e-08*	7.19e-08*	7.00e-08*
	(1.28e-08)	(3.66e-08)	(3.39e-08)	(4.88e-08)	(2.57e-08)	(2.66e-08)	(3.67e-08)	(3.47e-08)	(3.70e-08)
Beer Count	0.000538***	0.000538***	0.000538**	0.000538***	0.000650***	0.000678***	0.000300*	0.000366**	0.000311
	(1.82e-05)	(0.000138)	(0.000220)	(0.000132)	(8.85e-05)	(9.15e-05)	(0.000163)	(0.000139)	(0.000186)
Constant	3.360***	3.360***	3.360***	3.360***	3.410***	3.389***	3.549***	3.566***	3.587***
	(0.0205)	(0.0209)	(0.104)	(0.109)	(0.0304)	(0.0207)	(0.0802)	(0.0530)	(0.0644)
Observations	17,895	17,895	17,895	17,895	14,683	15,954	17,895	14,683	15,954
Adjusted R-squared	0.108	0.108	0.108	0.108	0.147	0.147	0.327	0.368	0.370
Country FE	NO	NO	NO	NO	NO	NO	YES	NO	NO
State FE	NO	NO	NO	NO	NO	NO	NO	YES	NO
City FE	NO	NO	NO	NO	NO	NO	NO	NO	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As we noted in Section 3, spaCy's NER is far from perfect, and these inaccuracies are evidence of that. spaCy's F-score for the PERSON label is 87.72%, which means that spaCy mis-labels a PERSON entity roughly 12% of the time. This could also explain these somewhat perplexing results. While frustrating, we note that the PERSON label is only identified in 17% of brewery descriptions and so is likely not a frequent contributor to brewery rating success.

As for our other NER labels, FAC, NORP, and ORG all appear to have no effect on rating and are all insignificant. We now turn to our controls - a dummy for a brewery's independent status, a dummy for whether the brewery is actively producing beer, the length of time a brewery has been on Untappd, the number of times a brewery has been reviewed, and the number of beers the brewery has listed on the service.

A brewery's status as independent has a large, significant impact on its rating. In fact, independence has the largest impact on rating out of all our controls. This could imply that independent breweries simply brew better beer but given that this data was collected from a website used primarily by the craft beer community, we believe this reflects an implicit, positive bias in favor of independent breweries. This bias is supported by much of the existing literature, which points out craft brewing's calculated anti-establishment marketing strategies (Morgan et al., 2020).

Whether a brewery is actively in production also has a positive and significant impact on rating, which makes good, intuitive sense as presumably people need to taste the beer to rate the brewery. A major limitation of this data is that there is no time-series variation, so we do not observe when a brewery becomes inactive. Untappd then becomes both a living database of active breweries as well as an archive of those that are now closed. While we lump both groups together in this analysis, stratifying the sample based on active status does not fundamentally alter our results. We also feel it is useful to include inactive breweries, as not doing so could bias the sample to only those that are either brand-new or successful long-term.

While we do not strictly get time-series variation, we do observe how long a brewery has been listed on Untappd. We control for this age on service because naturally the longer a brewery has been listed, the more opportunities it has had to be reviewed. For the same reason, we also control for the number of reviews out of fear that the most popular breweries could bias results. Both controls have a small, negative effect on brewery rating, however. This suggests that enthusiasm for a new brewery might taper off over time, or perhaps that a brewery's initial batch of reviews is most likely to be positive due to well-wishers and fans hoping to establish a strong rating and profile for the brewery.

Finally, the number of beers a brewery has listed on Untappd also has a positive, significant impact on rating. Once again, this result is unsurprising, as breweries with a wider range of beers

are presumably more likely to be noticed and reviewed. Once again, the limitations of this data do not provide us with whether the brewery is still actively brewing a particular beer, so the count simply indicates the number of beers listed on a brewery's profile. This is important to note for craft breweries, who often try limited releases or flavor combinations to drive interest and consumption. This strategy is in stark contrast to larger, established breweries who by nature make a small number of extremely popular beers.

The remaining columns of Table 5 introduce variations on the baseline specification presented in Column 1. Column 2 uses robust standard errors but does not materially change our results. Column 3 clusters standard errors by our 10 different brewery types. The intuition for doing so is that the errors may be correlated based on brewery size, but this does not fundamentally change our results. Columns 4, 5, and 6 use cluster robust standard errors at the country, state, and city level respectively. Once again, we worry that underlying trends at the regional level could be interfering with our results, but clustering does not materially change our baseline.

Finally, Columns 7, 8, and 9 take the geographic dimension one step further, and use fixed effects at the country, state, and city levels respectively. Introducing fixed effects does affect our results, likely due to unobserved regional trends that the brewery data and NER techniques do not capture. DATE and LOC are no longer significant, while GPE and NORP are significant and positive at the 10% level when using state or city fixed effects. PERSON is also no longer significant, but ORG is significant and negative when using country or state fixed effects. These different results are almost certainly because fixed effects constrain us to comparing variation *within* a given country, state, or city rather than *across* countries, states, or cities. For example, if all English breweries mention the date of their founding at least once, and all American breweries never mention it, there will likely be significant variation in the DATE label. Imposing country-level fixed effects, however, means that all English breweries will be compared with all other English breweries, and there will be little to no variation in the DATE label. Another possible explanation for this difference across country, state, and city fixed effects may simply be a different tolerance or perception of the locations of origin claimed by brewers. Especially people who live in a city or state that a brewery claims to be from, may have a more local or critical view of this claim. They may also simply prefer the variety of brands from places they are not familiar with.

Given the limitations of our data and the largely un-observable nature of a consumer's beer-drinking behavior, we would prefer a specification that uses fixed effects so that we control for as much external variation as possible. This is reflected in the considerably higher Adjusted R-Squared in the fixed effects specifications listed in Columns 7, 8, and 9, which is roughly triple that of the baseline specification. The lack of across-geography variation is crucial to our research question however and is too steep a price to pay to use fixed effects. Instead, we settle on standard errors clustered at the country, state, or city levels, as shown in Columns 4, 5, and 6. Clustering by location

should still control for idiosyncratic differences in preferences between places, while still allowing us to compare breweries across different locations. We carry the country-level specification from Column 4 forward into our analysis on the differences between brewery types.

While we are interested in the overall effect of different NER labels across all breweries in our sample, we are primarily concerned with how smaller breweries make use of geographic branding strategies for competitive advantage. We take the country-level clustered standard errors specification from Column 4 and run it against the 10 different types of breweries in our sample. We do so to ensure that we aren't picking up trends that only affect certain kinds of breweries. We also note that as shown in Figure 3 above, Macro, Micro, and Nano breweries make up the majority of our sample. By stratifying our sample in this way, we can eliminate the over-sampling bias from these categories which may be drowning out trends from other brewery categories. Table 6 below presents these results against each of the 10 brewery types.

Perhaps unsurprisingly, none of the NER labels are significant for Macro Breweries in Column 1. This is likely because these breweries are so ubiquitous and well known, that appeals to localism or geography in their brand language are ineffective at changing consumers' perceptions. This is in stark contrast with Microbreweries in Column 2, where the LOC (location) label is highly significant and positive. This result offers strong support for our hypothesis that craft breweries rely on, and are rewarded, for their use of place-based branding strategies. Curiously, LOC is not significant and positive for any other brewery type. LOC is significant at the 10% and negative for Meaderies, but there are only 111 observations in our sample. Compared with the 8,399 Microbreweries in our sample, it is safe to say that they are driving the significant LOC results in previous regressions as well.

Surprisingly, none of the other geographic NER labels have a significant, positive effect for Nano Breweries or Brew Pubs, Microbreweries' closest counterparts. With well over 1,000 observations each, it is unlikely that this result is due to a lack of observations. Instead, this result likely represents a fundamental difference in size or consumer attention between the larger microbreweries and the other small brewery types. It could be the case that place-based branding strategies are only effective for Golidlocks-sized firms. Too small, like brew pubs and nano breweries, and firms may not have the audience or distribution network to warrant place-based branding. Too large, and place becomes less important to the overall product differentiation strategy.[10] Just right, and place is a deciding factor when consumers are evaluating different options on store shelves.

[10] There are a handful of large breweries, Guinness for example, who are very tightly-coupled with place. These global macro breweries however, do not compete against microbreweries in the same way, and so place may become less important to consumers in differentiating these products.

Another possible explanation is, as with the fixed effects, there is not sufficient variation within Nano Breweries or Brew Pubs because they all use the same type of language to describe themselves. But this size-dependent effect may not be unique to the craft brewing industry alone. It is likely that many different industries and products exhibit this same scaling pattern. At any rate, this size-dependent effect qualifies some of the literature on place-based branding and is a potential avenue for future research. The remaining brewery types in Columns 5 thru 10 are listed for completeness but are not our focus and so we exclude them from this discussion.

Because microbreweries most closely encapsulate the craft breweries and our research question, we now focus on them exclusively and study the intensive and extensive effects of including certain NER labels in the description text. On the intensive margin, we ask: what is the benefit of adding an *additional* NER label to a brewery description?, and we measure this with count variables. On the extensive margin, we ask: what is the benefit of using an NER label at all?, and measure this with dummy variables. Table 7 below presents these intensive and extensive results, with standard errors clustered at the country, state, and city levels.

Once again, the location LOC label is highly significant and positive at the country and state level, and the difference between the coefficients in Columns 1 & 2 and Columns 4 & 5 suggests there is very little to be gained from using a LOC label more than once. Curiously, the DATE label is significant and negative on the extensive margin for all specifications (Columns 4, 5 and 6), which suggests that mentioning a date *hurts* a brewery's rating. However, this result is inconsistent with the significant and positive coefficient of DATE in the baseline specification, and so is most likely spurious. In any event, the strength of the LOC label on both the extensive and intensive margins supports the fact that craft breweries successfully use geographic branding strategies to market themselves to consumers.

Overall, these results support our hypothesis that place-based branding has a positive effect on brewery perception. While not all NER labels have a consistent significant impact on brewery rating, the LOC label, which captures references to natural landmarks and geographic features, is highly significant and positive across multiple regression specifications, and especially for microbreweries. This is strong evidence in support of the craft beer industry's successful use of geography in their marketing strategies. A brewery's description text on Untappd is akin to or often indistinguishable from its marketing copy and is a faithful representation of how a brewery portrays itself to the public, especially the discriminating craft beer scene.

Table 6: Regression by Brewery Type

VARIABLES	(1) Macro Brewery	(2) Micro Brewery	(3) Nano Brewery	(4) Brew Pub	(5) Home Brewery	(6) Bar/Restaurant/Store	(7) Cidery	(8) Meadery	(9) Contract Brewery	(10) Regional Brewery
DATE	0.000533	-0.000719	0.00252	0.00166	-0.00973	0.00399	-0.00449**	0.00148	-0.00832	-0.00348
	(0.00389)	(0.000648)	(0.00302)	(0.00132)	(0.00762)	(0.0144)	(0.00228)	(0.00656)	(0.00593)	(0.00266)
FAC	-0.00762	0.00211	-0.00447	-0.00987**	-0.0338	0.0200	0.0116*	0.0347	0.00778	0.000602
	(0.0125)	(0.00217)	(0.00594)	(0.00385)	(0.0210)	(0.0319)	(0.00612)	(0.0242)	(0.0237)	(0.00507)
GPE	0.00210	0.000109	-0.000848	0.000243	0.00691*	-0.000681	-0.00287	-0.00474	-0.00318	-0.00101
	(0.00258)	(0.000577)	(0.00231)	(0.00133)	(0.00418)	(0.00906)	(0.00191)	(0.00710)	(0.00580)	(0.00121)
LOC	-0.00891	0.00402***	0.00782	0.00137	0.0211	0.0595	-0.00282	-0.0128*	0.0232	0.000891
	(0.0116)	(0.00149)	(0.00635)	(0.00319)	(0.0143)	(0.0388)	(0.00435)	(0.00748)	(0.0219)	(0.00412)
NORP	0.00518	0.00140	-0.00131	0.00252	-0.0111	-0.0134	0.00400	0.0136	0.0115	3.20e-05
	(0.00670)	(0.00147)	(0.00360)	(0.00233)	(0.0127)	(0.0120)	(0.00457)	(0.0162)	(0.0105)	(0.00320)
ORG	-0.00130	-0.00132**	0.000940	-0.000219	0.00361	-0.00315	0.00561***	0.00601	0.000791	0.00156
	(0.00277)	(0.000585)	(0.00188)	(0.00105)	(0.00473)	(0.00690)	(0.00210)	(0.00609)	(0.00435)	(0.00145)
PERSON	-0.00192	3.50e-05	0.00131	0.000280	0.00241	0.00216	-0.000174	-0.00671**	0.00430	0.000754
	(0.00172)	(0.000384)	(0.00118)	(0.000764)	(0.00429)	(0.00445)	(0.00142)	(0.00281)	(0.00276)	(0.00108)
Independent?	0.00528	0.0424***	0.0103	0.000406		0.216	0.0206***	-0.00778	-0.00156	0.00440
	(0.0112)	(0.00616)	(0.0214)	(0.00666)		(0.146)	(0.00695)	(0.0261)	(0.0200)	(0.00673)
In Production?	0.0125	0.0412***	0.0725**	0.0248*			-0.0103		0.158***	-0.0337
	(0.0604)	(0.0101)	(0.0328)	(0.0135)			(0.0125)		(0.0269)	(0.0216)
Age on Service	-0.0268	-0.0849***	-0.0410***	-0.0570***	-0.0580***	-0.00594	-0.00607	-0.0547	-0.109**	-0.153***
	(0.0321)	(0.00546)	(0.0129)	(0.00843)	(0.0199)	(0.0281)	(0.0135)	(0.0377)	(0.0439)	(0.0315)
Rating Count	0.0117***	0.0111***	0.00103	0.00834***	-0.0135***	-0.00298	-0.00122	0.00401	0.00501	0.0269***
	(0.00398)	(0.000675)	(0.00197)	(0.00141)	(0.00358)	(0.00398)	(0.00169)	(0.00754)	(0.00571)	(0.00362)
Beer Count	0.00745	0.0169***	0.0228***	0.0128***	0.0323***	0.0112***	0.0140***	0.0142	0.0335***	0.000770
	(0.00646)	(0.00110)	(0.00310)	(0.00183)	(0.00252)	(0.00418)	(0.00317)	(0.00947)	(0.00702)	(0.00349)
Constant	1.172***	1.724***	1.481***	1.589***	1.761***	1.015***	1.259***	1.679***	1.962***	2.178***
	(0.249)	(0.0433)	(0.104)	(0.0673)	(0.159)	(0.308)	(0.107)	(0.291)	(0.340)	(0.235)
Observations	611	8,399	1,226	1,704	1,786	678	851	111	302	509
Adjusted R-squared	0.364	0.479	0.306	0.488	0.227	0.298	0.273	0.348	0.301	0.737

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Microbreweries - Extensive/Intensive Margins

VARIABLES	(1) Count - Country	(2) Count - State	(3) Count - City	(4) Dummies - Country	(5) Dummies - State	(6) Dummies - City
DATE	-0.000719	-0.00104	-0.00196	-0.00505***	-0.00461**	-0.00801*
	(0.000648)	(0.000688)	(0.00160)	(0.00185)	(0.00191)	(0.00441)
FAC	0.00211	0.00259	0.00237	0.000865	0.00223	0.00208
	(0.00217)	(0.00228)	(0.00554)	(0.00299)	(0.00325)	(0.00692)
GPE	0.000109	-0.000263	0.00144	0.00236	0.00156	0.00608
	(0.000577)	(0.000599)	(0.00163)	(0.00178)	(0.00188)	(0.00432)
LOC	0.00402***	0.00499***	0.00198	0.00422**	0.00564***	0.00212
	(0.00149)	(0.00143)	(0.00391)	(0.00208)	(0.00218)	(0.00534)
NORP	0.00140	-3.21e-05	-0.000389	0.000439	-0.00209	-0.00145
	(0.00147)	(0.00157)	(0.00401)	(0.00225)	(0.00238)	(0.00611)
ORG	-0.00132**	-0.000832	-0.000322	-0.000189	-0.000722	0.00268
	(0.000585)	(0.000586)	(0.00155)	(0.00182)	(0.00189)	(0.00436)
PERSON	3.50e-05	5.52e-05	-6.33e-05	0.00253	0.00328*	0.00319
	(0.000384)	(0.000451)	(0.00125)	(0.00181)	(0.00193)	(0.00464)
Independent?	0.0424***	0.0386***	0.0431***	0.0428***	0.0390***	0.0435***
	(0.00616)	(0.00712)	(0.0147)	(0.00615)	(0.00712)	(0.0147)
In Production?	0.0412***	0.0430***	0.0564***	0.0415***	0.0433***	0.0566***
	(0.0101)	(0.0105)	(0.0181)	(0.0101)	(0.0105)	(0.0181)
Age on Service	-0.0849***	-0.0863***	-0.0991***	-0.0837***	-0.0856***	-0.0970***
	(0.00546)	(0.00544)	(0.0128)	(0.00548)	(0.00548)	(0.0128)
Rating Count	0.0111***	0.0116***	0.0103***	0.0109***	0.0114***	0.00994***
	(0.000675)	(0.000750)	(0.00179)	(0.000685)	(0.000760)	(0.00180)
Beer Count	0.0169***	0.0160***	0.0183***	0.0169***	0.0160***	0.0183***
	(0.00110)	(0.00125)	(0.00275)	(0.00109)	(0.00124)	(0.00274)
Constant	1.724***	1.741***	1.841***	1.715***	1.736***	1.824***
	(0.0433)	(0.0430)	(0.103)	(0.0434)	(0.0432)	(0.102)
Observations	8,399	7,482	8,071	8,399	7,482	8,071
Adjusted R-squared	0.479	0.532	0.539	0.479	0.532	0.540

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5 Conclusion

The craft beer industry has embraced geography in their marketing and brand languages as a claim to authenticity, nature, and good taste. This trend has been well-documented in existing literature but has necessarily relied on small-sample survey data or case studies of a handful of breweries or regions. Research in this space has thus lacked a large-scale quantitative link between geography and branding. We address this gap by assembling a dataset of thousands of breweries, including their marketing language and public ratings, among several other key controls. We use techniques from the NLP literature, and perform NER analysis on the brewery description, parsing out and counting the number of geographic references a brewery makes in its brand language. We regress these counts against a brewery's public rating, and find a positive, significant link between the use of geographical references and a brewery's rating score. This is the first large-scale quantitative result in this space, and strong proof that making references to geography and local landmarks in branding language increase public perception.

Results indicate that place-based branding strategies, as indicated by our GPE (references to geopolitical entities) and LOC (references to natural landmarks and geographic features), have a positive impact on consumers' perception of craft breweries. Furthermore, a brewery's status as independent, and the number of beers is it brews have a positive impact on perception. This supports the notion that craft breweries rely on and get rewarded for place-based branding approaches. This echoes arguments put forward in the organizational ecology literature concerning identity-based approaches to marketing and consumer perceptions (Hsu and Hannan, 2005). Looking at some of the variations between different brewery categories, it is evident that microbreweries benefit the most from a marketing language that incorporates geographic features and references, unlike other small-scale establishments like nano breweries or brew pubs. This indicates that place-based branding strategies do not have the same effect across all types of craft beer makers and that size matters in the sense that being too small or too big has a negative or at least limiting impact on breweries' performance (Carroll and Swaminathan, 2000). On the other hand, GPE and LOC references in microbreweries' branding language results in positive public perception across all regional settings, something that has been untested in the relevant literature until now. Place-based branding strategies are not unique to craft beer, and so these findings have important implications for other industries as well. Indeed, these results are even encouraging for regions who invest in creating their own place-based branding narrative to entice firms and consumers to the region.

Our results are not without limitations. There is unfortunately no time-series variation in our data that indicates when a brewery first opens or closes its doors, although we show that stratifying the sample based on active status does not change the overall findings. Further, the NER model we use is far from perfect, and sometimes mistakenly labels or misses entities. These errors could

potentially be mitigated by fine-tuning the model to the brewery dataset, but we reserve that work for future explorations. Finally, the data are at best an imperfect approximation of the beer-drinkers' consumption decision. We do not know if a consumer has read a brewery's description or otherwise considered its marketing language before making a purchase, and we cannot see what other beers a consumer had to choose from. Untappd is also not a representative sample of the general public. Untappd users are beer lovers, especially craft beer, so their preferences may be considerably different from the average consumer's. For all these drawbacks, we are still able to show that place-based branding has a positive effect on consumer sentiment, at least for one discerning subset of the market.

Another limitation of this work is the difficulty in verifying the usage of local claims. We have no way of knowing that a brewery that uses a particular location or geographic entity actually produces its beer in those places. At the same time, neither do consumers, so their response to a brewery's claims should still be useful in measuring the effectiveness of these strategies. But given how effective we have shown these strategies to be, there is definite societal risk in companies employing place-based branding unchecked. Hoppe and Nedzhvetskaya (2023) discuss precisely this issue in the context of firms offshoring their manufacturing but maintaining their 'rhetorical geography' in the place where their goods were previously made. This issue is eerily similar to that of corporate greenwashing, or the unrestricted labeling of goods as 'organic' or 'free trade'. And while there are certain protections for place names , such as geographic indications, they do not satisfactorily cover place-based branding strategies. More research is clearly needed into the potential ill-effects of abusing these highly effective appeals to localism.

While we focus on brewing and the craft beer industry, the use of geography and branding is not unique to this space. We believe our results would generalize to other areas and industries as well. Indeed, one growing area of research is on the strategic importance of trademarks for regional innovation and branding strategies. As Castaldi and Mendonça (2022) point out that trademarks are one way to capture "strategies involving aesthetics and design to shape a persuasive product that users wish to adopt" (Castaldi and Mendonça 2022: 178). While perhaps not as textually rich as beer review data, the presence of geographic entities in trademarks, or historical themes along the lines of Miranda and Ruiz-Moreno (2020), are still ripe for analysis of place-based branding strategies.

Different data sources will also be useful to expand this analysis to different industries and products and confirm some of the size-specific effects we have found here. It seems sensible that, as we showed for micro-breweries, place-based strategies and appeals to localism are only effective for smaller firms. Evidence from different industries could confirm this effect and help formulate it into a more general rule. Furthermore, it is likely that place-based strategies are only important in a limited number of industries. Consumers care about where their craft beer is made but could probably care less about where their laptops or mobile phones come from. Thus, it is reasonable to

expect that place-branding strategies work better for cultural goods rather than mass produced products. Data from different industries are needed to confirm this hypothesis.

These are just a few of the many possible avenues for further research in this space. We hope that others will take inspiration from our data collection and NLP methods to perform similar studies in adjacent fields. Further exploration and refinement in this space will almost certainly reach similar conclusions that geography and branding are positively linked.

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