

Uneven geographic development of
beer breweries in the United States

by

Stanley Adam Veitch

B.S., Jacksonville State University, 2009
M.A., University of South Alabama, 2011

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

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Department of Sociology, Anthropology, and Social Work
College of Arts and Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

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Abstract

Since the 1980s, beer brewing has diversified into craft products while continuing to feature large firms who produce vast quantities of mass-produced style beers. With this growth in the industry, different parts of the U.S. have seen uneven development of its brewing industries. To date, there has been little sociological analysis of the role that this expansion has played in local economies across the U.S. This study performs an exploratory analysis of the geographic distribution of beer breweries in the U.S. in 1990 and 2010. To understand the geographic distribution and relative concentration of breweries across the U.S. during this period, commodity chain analysis is used to examine production and consumer linkages in the beer commodity chain of the U.S. in the year 2010. It is hypothesized that upstream and downstream components related to the commodity chain of brewing, including populations with cultural capital and the creative class, are correlated with the brewing industry's relative concentration in different counties in the U.S. Multinomial and binary logistic regression analyses were performed on these upstream and downstream linkages (via the location quotient of breweries) to examine each of the variables' importance to relative concentration of beer breweries in each county.

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Chapter 1 - Introduction

Beer brewing is a big business in the United States. Americans' fondness for the beverage is not a new development; beer has been a part of the cultural and economic lifeblood of the country since the days of colonization. What *is* a new development is the increasing proliferation of the number of *different* breweries in the U.S. since the 1980s. While the number of companies brewing beers between World War II and the 1980s dwindled over time, since the end of the 1980s new small breweries have emerged across the country. One need only consider the rise of Boston Beer Company (Sam Adams) to view a fundamental shift in how recently-founded beer companies have changed their sales strategies. While older breweries that sell large numbers of barrels of beer have been selling basic lagers for decades (Anheuser-Busch was founded in 1852 for instance), Boston Beer Company was only founded in 1984. Now the ninth-largest brewer in the U.S., Boston Beer Company sells itself not on images of parties, lightness of body, or other marketing ploys of older lagers, but rather on the craft and creativity that goes into different types of beer. This example is only the most economically prominent of the new developments in this major industry. Yet the proliferation of breweries has not been evenly distributed across the U.S. This study thus examines factors associated with the emergence and presence of breweries by county across the country.

The largest factor contributing to changes to the beer industry in the latter part of the 20th century is the emergence of smaller craft beer breweries. Craft beer breweries have been expanding throughout the United States since the 1980s (Tremblay and Tremblay 2005; Ogle 2007; Elzinga, Tremblay, and Tremblay 2015). What started as small local breweries founded by homebrewers in search of alternatives to the big business breweries has grown to a large national organization with thousands of different beer companies ranging from small brewpubs to

nationally-distributed behemoths. In 1980, the Brewers Association estimates that there were 92 breweries in the United States. Over the next decade, the trend toward consolidation reversed, if slowly, as there were 284 breweries in 1990. In the decades since 1990, however, the Brewers Association now estimates that there are over 5,300 breweries (Brewers Association 2017). Much of this increase in breweries can be linked to the growing number of craft breweries in the U.S. (Tremblay and Tremblay 2005; Elzinga, Tremblay, and Tremblay 2015). These breweries produce fewer barrels of beer than multinational corporations like InBev (Anheuser-Busch). Instead, they focus on selling their product based on the idea of higher quality ingredients and creative flavors (Bamforth 2009). As compared to older industrial breweries, craft breweries feature more creative input from their workers, giving them a say in the process of beer making. Consequently, craft breweries are a regular feature of areas with a tourist focus or other service ideals. The distribution of these craft breweries is not equal, however. Some regions feature them more heavily in their social landscape.

With craft breweries expanding across the U.S., they have oftentimes found themselves located in more economically and culturally developed cities. As a result, craft beer breweries have been a part of the development of the urban landscape in the United States since the 1980s. Different cities in different states, however, have developed these newer craft breweries more rapidly. California, Oregon, and Colorado are among the state leaders in craft beer breweries (Tremblay and Tremblay 2005; Elzinga, Tremblay, and Tremblay 2015). Meanwhile, Southern states like Alabama, Tennessee, and Louisiana have lagged behind. While population density may explain some variation, it does not explain why comparable cities in different regions have more breweries than others. Birmingham, Alabama (212,000>) has comparably fewer craft beer breweries than Fort Collins, Colorado (164,000>), for instance.

Beer breweries are not formed in a social or economic vacuum. They are established in particular areas and markets for a host of reasons. To examine why breweries are located where they are, commodity chains, also known as value chains, can be examined for upstream and downstream effects. Commodity chains are interconnected economic activities associated with one product (Gereffi, Humphrey, and Sturgeon 2005; Sturgeon, Van Biesebroeck, and Gereffi 2008). Within these interconnected activities are linkages of different nodes of production and consumption, similar to links in a physical chain. Upstream linkages involve materials and production that lead to the product. Relatedly, downstream linkages involve advertising and selling products to a consumer base. Value chains can take varied forms depending on a multitude of factors. These chains can be completely vertically integrated into one firm, completely horizontally organized amongst many different firms, or somewhere in between these extremes. In looking at upstream inputs into beer brewing, one needs to look at ingredients as well as industrial components of the breweries themselves (Goe and Mukherjee 2013). Upstream elements of beer production include hops, barley, wheat, and other crops included in the beer-making process (Jernigan 2000). Other elements in the upstream connections are the inputs involved in constructing and running an industrial brewery, for example, tanks for fermenting. For the most part, these upstream elements are material resources required to physically create beer in a brewery.

Commodity chains also feature downstream elements or those associated with product consumption. One aspect of downstream linkages is locating industry near the consumers of the product being sold. This oftentimes takes the form of the specific points of consumption for a given product (Gerrefi, Humphrey, and Sturgeon 2005; Goe and Mukherjee 2013). For this part of a commodity chain, it is the ultimate destination of the product that is taken into account.

Stores, cafes, restaurants, and other points of consumption are the downstream links for a commodity chain. Beer can only be legally consumed by certain people, in certain places. Because of this, part of the value chain of breweries must focus on the locations of these populations.

Other types of downstream linkages include the type of consumers targeted by the company. Certain types of beers cater to certain demographics in the United States. For instance, this study examines the potential impact of the creative class—intellectual workers associated with artistic and scientific jobs—as a downstream component of beer production. Richard Florida's (2002) creative class has been actively cultivated by urban governments to try to create a better economy for their cities via their creation of jobs in brewpubs and other Bohemian business endeavors. In explaining why some urban centers have seen more economic growth since the 1970s, the theory of the creative class focuses on the characteristics of the type of people who create and bring in new jobs. This group of people led to creative jobs in urban centers.

This changing form of businesses and jobs is important given the fall of blue-collar industrial work in American cities since the 1970s (Harvey 2005). The creative class engages in areas such as the arts, computer programming, education, engineering, design, media, and other knowledge-based work (Florida 2002). This theory also explains the growth of certain rural areas in recent years, offering a potential multifaceted theory of different types of localities (Mcgranahan and Wojan 2007). This occurs when outdoor amenities appeal to creative class workers, bringing economic growth with them. One path this takes is increased investment in the arts to attract creative people (Pedroni and Sheppard 2013). Using this logic, many areas attempt to create arts districts to improve the local economy (Rushton 2015). An experiential lifestyle

defines the creative class wherein the street culture lifestyle of urban centers is important. This is in marked contrast to lifestyles not based on personal experiences in city-centers. The creative class seeks out places with amenities to experience, rather than stay in places that do not have such comforts. This type of culture includes music scenes, art galleries, cafes, and, in this study's case, breweries. Along these lines, one may be able to see how individuals who are a part of this creative class found and work in craft beer breweries, which are oftentimes located in prosperous urban centers (Tremblay and Tremblay 2005; Elzinga, Tremblay, and Tremblay 2015). Florida and others link cultural districts with overall prosperity in a given geography, potentially linking craft brewery locations with the rise of a local creative class.

Another potential explanation of the downstream aspects of the beer commodity chain considered in this study is cultural capital. This concept is similar to that of the creative class in that it focuses on culture's relationship with material changes in the local economy. Cultural capital, however, examines the inequalities that are created and reified over time through the tastes and dispositions of people in different class positions of a given society (Bourdieu 1984). Within a stratification system, some types of cultural consumption are more valued by society than others. Those tastes most associated with upper classes are seen as more respectable, while lower-class consumption is viewed as less respectable. Because these views affect the way that groups of people relate and their chances of using connections to improve their class position in society, cultural capital becomes a means to continue the status quo of social stratification in society. Following this line of logic, contemporary sociologists have created new indexes to explain cultural differences across class in the United States; instead of focusing on distinct class cultural differences, the U.S. is argued to have cultural capital based on the ability to sample from different types of class consumables (Peterson and Kern 1996; Bryson 1996; Johnston and

Baumann 2009). Prior research has found that craft beer is more likely to be consumed by middle-class white Americans than by the population as a whole (Tremblay and Tremblay 2005; Elzinga, Tremblay, and Tremblay 2015). Because it is more likely to be consumed by those in the middle-class, craft beer can be seen as a manifestation of cultural capital for these relatively well-to-do individuals, recreating inequality across different cities. Since it takes expendable income and time to be able to understand and consume craft beers, cultural capital can potentially be used to understand why and where craft breweries spread in the contemporary United States.

Lastly, but potentially just as important, is the actual material inequalities between cities. While culture and other symbolic inequalities may explain some of these inequalities, material differences help explain the social world of craft beer development in the United States. One of the foundational arguments of sociology is the importance of material wealth on economic change (Wright 1984; Marx 2000). According to Marxian theory, for instance, the inequalities across different cities can be best understood by focusing on the material realities of the people in them. Material inequalities reproduce themselves over time and manifest in new wealth-generating ventures, like new beer breweries. At the heart of Marxian analysis of a phenomenon is the exploitation of the poor by the rich (Wright 1984). Wealthy Americans benefit from the surplus value created by the working class. In the contemporary cities of the United States, certain cities benefit from an improved influx of capital by new creative industries like craft beer. More cutting-edge industries are drawn to places with more economic capital. This recreates inequalities as new jobs are linked to areas with more wealth.

Related to such Marxist-materialist arguments is the idea that your background does matter. One's family affects later positions in the stratification system in life (Harding, Jencks,

Lopoo, and Mayer 2005). Parent's education and occupation have a direct correlation with one's economic prospects. Inequality in the present directly affects later opportunities for moving up the ladder (Neckerman and Torche 2007). The economic background of people limits or enhances their ability to indulge in new creative industries, as new ventures require some amount of social mobility. Those who spend their adolescent years in poverty face long-term disadvantages in the market (Holloway and Mulherin 2004). Those in poverty oftentimes have limited potential to relocate to different areas. This means that the cities offering creative industries such as craft beer can only attract those who already have social mobility, while the poor are left behind yet again. Because of this, cities with craft beer breweries will feature less concentrated disadvantages than cities with fewer breweries.

The previous discussion has laid out potential sociological explanations for craft brewing locations in the U.S. These geographic differences ultimately matter because they reflect larger changes and inequalities in American society. The policies that have fundamentally altered society have created more disadvantages for the lower classes while providing more opportunities for the upper classes. The location of creative and culturally advantageous businesses like breweries is directly linked to economic inequalities in the contemporary neoliberal society.

This dissertation explores the differential development of craft beer breweries across communities (here measured as counties) through key concepts articulated by the previously described theoretical perspectives. Thus, my research is guided by the following questions:

- 1. What counties in the U.S. had the highest concentration of beer breweries in 1990?*

2. *What counties in the U.S. had the highest concentration of beer breweries in 2010?*
3. *How has the concentration of breweries changed in the U.S between 1990 and 2010?*
4. *How does the location of upstream components for beer affect the location of beer breweries?*
5. *How does the location of downstream components for beer affect the location of beer breweries?*

To address these questions, this study draws from multiple sources of national data. Questions one and two employ data pulled from the U.S. County Business Patterns which provides information regarding the location of beer breweries within the United States in 1990 and 2010. The year 1990 is used here as a beginning point for the craft beer boom and brewery proliferation in the U.S. To answer question three, which pertains to the upstream components of beer production, the study incorporates data from the U.S. Census of Agriculture, as well as the County Business Patterns, to examine brewery location concerning equipment and ingredients required to run a modern brewery. For question four, downstream elements of the commodity chain analysis are extracted from measures available in the American Community Survey, U.S. Census, and County Business Patterns to examine brewery location concerning alcoholic sales establishments, presence of the creative class, and cultural capital. These last two concepts illustrate the type of people to whom craft beer aims to sell its products. As discussed above, craft beer development is responsible for much of the growth in the number of beer breweries in

the U.S. since the 1980s. Because of this, locating their intended consumers offers a window into the overall recent beer market.

For studying the difference in beer brewing between 1990 and 2010, several different comparisons are made with the available data on breweries from the County Business Patterns of those years. Growth (or lack thereof) will be broken down and elaborated on based on raw numbers, percentage of businesses, and location quotient. To examine the ways that these upstream and downstream components affect the location of breweries in the U.S., a binary logistic regression analysis and multinomial analysis will be used. A binary measure for whether a county saw growth in breweries between 1990 and 2010 will be created for the first measure. Following this, a multinomial measure of counties based on categories of no-growth, small-growth, and large-growth is created.

This dissertation is organized as follows. Chapter two discusses the history of beer breweries in the United States since the 1800s and, a discussion that focuses on theories of political economy, work, inequalities, and commodity chains in the United States. Chapter 3 posits the theoretical hypotheses. In chapter 4, the methods for this study are discussed in depth. Chapter 5 presents the empirical findings of the analysis of beer breweries concerning commodity chains. Chapter 6 discusses the results of the analytic methods. Finally, chapter 7, the conclusion, summarizes the results of this study and the implications for future research.

Chapter 2 - Literature Review

This chapter first discusses the history of beer brewing in the U.S. The importance of the historical context of beer as a social phenomenon cannot be overstated. The history of beer reveals several key factors. To parse out what sort of changes have occurred at the societal level in the United States during this period several sociological theories and concepts will be explored. The first of these is commodity chain analysis. This includes a discussion of global inequalities and world-systems analysis. After this, the history and theories of work before the contemporary historical period are discussed. This includes Taylorism and Fordism as particularly important labor regimes for beer breweries and other industries. Following this, the more recent shifts in work to flexible labor and horizontal organizations are discussed as it pertains to changes in the economy of beer. After exploring the different work regimes, the discussion will focus on different types of groups of people in contemporary society. First, the creative class is discussed as an important constituency of craft breweries. Secondly, cultural capital is explored as a form of inequality between groups with and without craft breweries. Lastly, economic inequality is explored as an important material difference between these groups and geographies.

Social History of Beer

Beer brewing has a long history in the United States. Local and regional breweries played an important role in the overall beer market in the 1800s in the United States (Stack 2000). Before national Prohibition, a wide variety of beer breweries flourished across the country (Ogle 2007). While larger companies expanded and developed technologies to allow for extend geographical distribution, different cities featured their own brewpubs catering to local groups. These local pubs were oftentimes meeting places for union men and other working-class social

groups in the early 20th century (Green 1980). Because pubs played a role in unions many of these pubs were of some socio-cultural importance to locals. In these years, beer often faced the stigma of being a working class, or worse, an immigrant drink (Ogle 2007). This was particularly true for the Northeast and Midwest where many new European immigrants from Ireland, Germany, Poland, Italy, and other non-Anglo-Saxon countries flooded in the 19th century. Over time, however, beer expanded to include Anglo-Saxon and middle-class Americans after the Civil War.

Beer developed into a more mass-cultural drink in the years between the Civil War and World War I, thanks in part to improved refrigeration technology and a campaign that championed beer, as opposed to liquor, as a drink of temperance (Ogle 2007). It was during this era that many German-American breweries were founded that are still operational today. During this period there were thousands of small breweries across the country, servicing the local community and the United States at-large. Prohibition, however, put a temporary halt on the expansion of new brewing companies in the U.S. The only breweries that could survive the 1920s were those large enough to absorb the costs of keeping their brewery in working condition while producing different products like soft drinks in the interim. By the time the Great Depression and World War II were over, there were only 421 independent mass-producing breweries in the United States (Tremblay and Tremblay 2005). Between Prohibition and the 1970s, the American beer market was dominated by a select few large firms all of whom sold the same style of light pilsner beer (Tremblay and Tremblay 2005; Ogle 2007; Elzinga, Tremblay, and Tremblay 2015). These few large firms were Anheuser-Busch, Pabst, and Miller (Coors would overtake Pabst in later years). Throughout the post-World War II era beer companies became increasingly concentrated in a few hands. Because of these social events, beer was a

product that was particularly dominated by an oligopoly beginning in the 1940s (McGahan 1991). These years were the beginning of contemporary mass consumption in the United States fueled by mass advertising (Gartman 1994). In the post-World War II United States, major companies were able to sell undifferentiated, or only slightly differentiated, commodities to the newly affluent suburban Americans of the era. Americans demanded less true variety of taste in their culture, instead substituting false distinctions (such as brand identification) while consuming very similar products. These mass-manufactured products included automobiles, foods, and of course, beers.

To satisfy this narrow cultural palette, the major breweries during this period began to cut back on ingredients per barrel of beer (Ogle 2007; Bamforth 2010; Elzinga, Tremblay, and Tremblay 2015). Anheuser-Busch itself, the owner of Budweiser, admits to making their beer less bitter and hoppy to appeal to larger swaths of the American populace (Ellison 2006). At the same time, the major breweries began raising prices, essentially tricking the lower and middle classes into believing they were purchasing a higher quality product (Ogle 2007). This change in ingredients is reflected in the shift of focus from creativity in the beers themselves, to creativity in marketing. In many ways, the beer industry in America began to move from lower-class consumption based on need (in this case cheap alcohol) to middle-class pretension through conspicuous consumption (Bourdieu 1984). Many middle-class Americans were improving their social and economic positions after World War II, so they consumed in a way that they believed reflected their new, relatively affluent, lifestyles (Gartman 1994). In this way, reverse pricing made middle-class Americans believe what was truly low or middle-brow to be upper-class (Ogle 2007).

During the post-World War II period, beer firms pushed advertising that sold beer as important to peaceful home life in the United States, fighting any remnants of the temperance movement and war rationing (Jacobson 2009; Corzine 2010). The domesticity of beer in advertising was shown as needed proof that the United States was the happy land of the free that American soldiers had fought for. In this way, beer advertisements were part and parcel with other industries looking to sell a better America for returning soldiers and their newly suburban families (Henthorn 2006). In signaling the Depression and war were over, companies had to sell the idea that it was good to buy their products and support the American economy and culture. Advertising featured happy families enjoying new suburban homes with American-made cars in the driveway, televisions in the living room, and other signs of the new domestic peace. This push was specifically from large companies that were growing more and more dominant in the 20th century. Large corporate breweries such as Anheuser-Busch, Pabst, and Miller successfully sold the idea that drinking their beers was part of the American way of life (Jacobson 2009). For this new America, freedom meant freedom to purchase and consume the products on the store shelves. Throughout these years, more and more small breweries went under, and the major corporate breweries made their formulas lighter and more homogenous (Tremblay and Tremblay 2005; Ogle 2007; Elzinga, Tremblay, and Tremblay 2015). As a reaction to these developments after World War II, home brewing and imports of European brands increased in the 1970s. These new influences lead directly to the creation of new craft breweries in the 1980s (Bamforth 2009).

Contemporary craft beer has its origins in the late 1960s when Anchor Steam Brewing was brought back to the market by young entrepreneurs looking for more variety than the then-current beer market offered (Ogle 2006). This happened concurrently with a sharp rise in imports of European beers with a rich history of variety in their styles and tastes. Beers from England,

Ireland, Germany, and other nations with a long history of beer production began to show up much more frequently in the American marketplace around this time. This in turn inspired many to begin to experiment with what can be done with beer in home brewing, which was still illegal under federal law at the time (Ogle 2007; Elzinga, Tremblay, and Tremblay 2015).

Despite its illegal status, the hobby of homebrewing grew in popularity during the middle of the 20th century. In the late 1970s, home brewing was legalized for the first time in the United States by the Carter administration (Bamforth 2009). This allowed for the development of brewers who could develop small batches of beers very distinctive from either American mass brewing or European imports. Following this, many small breweries, or microbreweries, were founded in America (Tremblay and Tremblay 2005; Elzinga, Tremblay, and Tremblay 2015). These began selling their beers to the individuals who sought out variety in their drinks, starting small brewpubs and microbrewery businesses (Alonso 2011; Grossman 2013; Magee 2014). Some of these microbreweries, such as Sierra Nevada and Boston, have grown to take a significant portion of the beer market, while new craft breweries are founded every year across the U.S. (Brewers Association 2017).

After the legalization of home brewing and the increased importation of European beers, many craft breweries were founded beginning in the 1980s to capitalize on the changing tastes of certain Americans (Tremblay and Tremblay 2005; Ogle 2006; Elzinga, Tremblay, and Tremblay 2015). The number of breweries increased dramatically throughout the 1980s and on through the beginning of the 21st century. Some of these grew to be large companies in their own right, growing past the label ‘microbrewery’, such as the Boston Beer Company, maker of Sam Adams. Overall, craft beers are consumed by individuals with more education and income than those who prefer the larger corporate beer firms (Tremblay and Tremblay 2005). Furthermore,

craft beer consumers are much more likely to be white than those who purchase mass-produced corporate beers. Interestingly, craft beer does attract more women than Budweiser, Coors, or Miller, albeit it is still mostly men who are buying craft beer.

After the number of breweries bottomed out in 1978 (to a total of 89 owned by 41 companies), smaller craft breweries began to proliferate across the nation. By 2012, there would be over 2,300 craft breweries, with two in the top ten of sales that did not exist before 1978 (Ogle 2007; Elzinga, Tremblay, and Tremblay 2015). This change is consistent with the larger changes in economy and culture during this era. As the baby boomers who were involved in the counterculture settled into careers, they began to seek out and create more variety than the generation before them. With the increasing demand for foreign flavors, it seemed in retrospect only a matter of time until different varieties of ales and lagers made their way into pubs and stores. This growth in craft beer breweries is not uniform across the U.S., however. The South has lagged behind other parts of the country in craft brewing (Baginski and Bell 2011; Gohmann 2016). Part of this is explained by the differences in socioeconomic groups in the South versus other parts of the U.S. as well as the beer needs seemingly being met by the larger firms distributing in the region. According to Gohmann (2016), cultural factors related to Southern Baptist religiosity (which leads to a large number of dry counties) as well as higher campaign contributions from larger beer firms explain part of these differences. Despite this geographical lag, there have been positive legal steps towards making craft beer more available in Southern states (White 2016).

Despite the rise of these craft breweries nationally, the largest brewing firms have grown and concentrated further in the same period (Carroll and Swaminathan 2000). According to Carroll and Swaminathan (2000), this makes sense from the standpoint of resource-partitioning

theory. In other words, the conditions are ripe for new specialty companies to form, and have low mortality rates when the industry as a whole is becoming larger and more concentrated. With these large firms pushing their products globally, and the continued existence of local beers across the globe, beer is today the most consumed form of alcohol globally (Grigg 2004). This is particularly true of North America, Africa, and Oceania. While in Europe the split between beer, wine, and spirits is about equal, spirits are the most consumed form of alcohol in Asia and South America. Even in these areas, however, beer has seen a rise in consumption in recent years. While Anheuser-Busch and MillerCoors continue to expand their sales globally, the ever-developing cultural niches in the developed world allow for loyal consumers of craft beer. And with craft beer consumers being disproportionately educated, white, and middle class, these breweries can sell higher-priced products that do not appeal to everyone.

While these growing craft breweries satisfy the social needs of those seeking distinction, it can be argued that many things would satisfy this need. Instead, craft breweries prominently satisfy the need for neo-locality (Flack 1997; Schnell and Reese 2003; Adam and Patton 2016; Fletchall 2016). The websites for many craft breweries attempt to create the image of neo-locality through prominent historical local ethnicities (Adam and Patton 2016). The ethnicities most often used in this imagery are of white European descent, such as Scot-Irish. Many people see the local identity of beers and take a sense of pride in that relationship. Small craft breweries offer visitors a chance to experience a local community in a unique way (Fletchall 2016). These breweries are a way to create place-making for cities and states in different localities. Similarly, craft breweries can be vehicles for kick-starting urban change (Mathews and Picton 2014). When a craft brewery exists in an urban setting, it can act as a mechanism for starting the change to that of a post-industrial and postmodern landscape, allowing gentrification to take hold more easily.

Along similar lines, many owners of craft beer breweries look for creativity as a type of value in and of itself (Reid and Gatrell 2017). For businesses like these, maximizing profit is not the sole determining factor of success. While turning a profit is indeed important, creating new and interesting products offers an important and secondary reward (Walker and Brown 2004). Along these same lines, a certain lifestyle associated with craft brewing is seen as important to these individuals as well (Alonso 2011). Furthermore, many craft owners are driven as much by actual enjoyment of brewing as by profits in and of themselves (Wesson and Nieva de Figueiredo 2001). In sociological terms, gaining prestige is an important secondary aspect of craft breweries (Bourdieu 1984). The status associated with the craft beer movement is an important end in itself.

In other countries, beer breweries play a role in the political economy of a given region as well. For instance, in Australia, breweries are just as likely to be located in rural areas as urban (Argent 2018). As with breweries in the U.S., these Australian establishments offer a strong local attachment in their imagery and advertising. At the same time, these workplaces have seen their employment rising in recent years, offering economic growth for their local area. In Malaysia, transnational foreign beer is sold to locals as an oligopoly (Jernigan 2000). These firms have built breweries in the country to maximize profits while controlling the bulk of the market. Within the United Kingdom, craft beers have been growing at a fast rate akin to the United States (Danson, Galloway, Cabras, and Beatty 2015). As with the U.S., these U.K breweries compete based on qualitative differences in styles of beers, rather than directly competing with the lower price points of the transnational beer firms.

Beer breweries have long played a significant role in American industry and culture. One can see how craft beer has developed into an important part of the economic and cultural

landscape of the contemporary United States. While large firms still exist in the beer market and play a vital role, most of the growth in recent decades can be attributed to new craft breweries emerging throughout the United States. With the reemergence of more variety in beer style and brewing companies, there has formed a new consumer and work culture based around beer. The importance of a sense of place and authenticity is an important aspect of the craft beer world. This applies to consumers of the beers as well as the owners and workers who are involved in making them. The historical overview provided in this section gives the reader some insight into long term patterns and trends in beer production generally throughout the U.S. Yet except for a few studies (Baginski and Bell 2011; Gohmann, 2015; White 2016), little research has examined why breweries tend to cluster in certain geographic areas. This gap is addressed in the current exploratory study. This dissertation will examine the relative concentration of breweries in the U.S., as well as some possible causal factors related to the counties that breweries are located. The remainder of this literature review examines factors that may be associated with brewery distribution and relative concentration starting with a general overview of commodity chains.

Commodity Chains

In examining how work and industry have changed, one must also consider the spatial aspects of its production. Commodity, or value, chains are key to understanding the layout and connections of a given product, such as beer brewing. Commodity chains are the interconnected linkages of economic activities related to a single commodity (Hopkins and Wallerstein 1977; Gereffi, Humphrey, and Sturgeon 2005; Sturgeon, Van Biesebroeck, and Gereffi 2008). Chains like this are organized by the division of labor, which are informed by the labor regime of the firms and society-at-large. These can be anywhere from completely vertically integrated into one major firm or divided horizontally into many firms. Vertical firms feature products created and

distributed entirely in-house. From conceptualization down to sales, all work is done by one firm. The horizontal organization of a product has many different firms involved in different aspects of the creation and distribution cycle. One firm may design a new product, while another procures the raw materials, and yet another creates the commodity. Most value chains today will fall somewhere in between the extremes of horizontal and vertical production.

The value chain describes the full range of activities that are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and disposal after use (Kaplinsky, 2005: 101). Commodity chains conceptualize the way that products in the modern economy share linkages across multiple geographies. Commodity chain analysis scrutinizes the interconnections of the global economy, linking consumers in wealthy areas like the U.S. to poorer areas in the global South (Wallerstein 1974; 2004). These commodity chains can be used to trace the incorporation of new geographic areas into the global capitalist system, and the forms of inequality that are created by this incorporation (Hopkins and Wallerstein 1977). Though commodity chains structure inequalities in the global economy, they can also be utilized to create a “learning curve” for the development of an area (Gereffi 1999). In this way, particular chains can be utilized for the social and economic mobility of a country, city, or other geographic entity.

Commodity chains are by their nature international and part of the larger capitalist system. The capitalist system is a world-system that has grown to encompass the entirety of the globe in the 20th century (Wallerstein 2004). Because of this, chains cross nations’ borders and are thus subject to interference from state authorities (Wallerstein 2009). At any given time, a hegemon may be the most powerful state in the system, and thus be able to institute certain

regulations on commodities and their chains (Arrighi 1994). In the capitalist world-system, there are cycles of hegemons who are the most powerful during a period before declining. Related to this is the development of sectoral hegemons who are the most powerful states in key sectors (Quark 2014). These sectors are key industries or agricultures that are dominated by one state with hegemonic power over it.

Commodity chains for a product will have inputs to create the said product in the first place. The chain linkages include industrial equipment for the physical location, as well as ingredients for the product itself (Goe and Mukherjee 2013). Industrial equipment is needed to create the finished product in a commodity chain. These inputs also include raw materials needed from across the globe, oftentimes extracted from poorer countries. Depending on the product and the firm's relationship with global economic activities, these chains can extend to poorer parts of the globe as a result of their weaker labor laws and wages (Wallerstein 1974; 2004).

In understanding the flows of capital and products within capitalism via commodity chains, global inequalities and economies must be considered. The concern for the transfer of resources from the periphery of the global economy to the core originates in the study of the capitalist world-system (Wallerstein 1974; 2004). The commodity chains that form across the globe in the world-system involve inputs and outputs for different types of regions vis-à-vis the global capitalist economy. In examining a region via this theoretical lens, one must consider the relationships different states and regions have with the world economy (Hopkins and Wallerstein 1986). In the core countries of the global system, commodity chain products flow to consumers with high income (relative to those in peripheral countries), such as the United States. In the periphery, workers are paid low wages to mine, farm, and assemble products to input value into the chains. In between these two levels are semi-periphery regions that feature a mixture of

inputs and outputs. When products are a part of the commodity chains in this system, they are controlled via organizational nodes across transnational borders and different firms (Gereffi and Korzeniewicz 1994). Nodes in this case are the various points across the system whereby firms control the production of commodities. The form that these nodes take is dependent in part on the labor regime that the firm is taking part in. This type of chain includes raw materials, labor, distribution, and consumption.

This type of analysis oftentimes focuses on the global system of the economy, defined by a multitude of political and economic networks (Chase-Dunn and Grimes 1995; Wallerstein 2004; Sanderson 2005). These networks feature a division of labor constituted by the three types of nation-states discussed above (periphery, semi-periphery, and core). The periphery is the working class of the networks. The core is the elite class of the networks. And lastly the semi-periphery are groups who share some characteristics of both (Wallerstein 1974). The core of the world-system is technologically dominant and exploits the semi-periphery and periphery for resources, who labor for cheaper wages (Sanderson 2005). The logic of this system is driven by the endless quest for more capital accumulation by the bourgeoisie of the world (Wallerstein 1974; Chase-Dunn and Grimes 1995; Marx 2000; Sanderson 2005). The bourgeoisie of the capitalist world-system utilizes the interstate system of modern nations to create better conditions for capital accumulation through legislation. In using this global structure, firms create commodity chains that link throughout the networks within global capitalism.

Some commodity chains in industrialized nations like the United States become increasingly organized around consumers to form a buyer-driven market of goods (Brewer 2015). Rather than locating an organization near ingredients and other inputs, organizations such as breweries will be found closer to the consumers the firm is aiming to sell products to. This

argument has at its heart the historical shift away from producer-driven models of the industry to a focus on branding and marketing as the most important factor. With this, branding has become increasingly important to firms (Moor 2007). Branding then becomes more of a foundation of consumer culture, rather than a mere means to differentiate products.

Related to commodity chains in the world-system is global cities. Global cities are major urban areas that drive economic activity, quite separately from the overall state (Sassen 1991). Global cities are financial hubs that feature corporate firms directing economic activity. Examples of these include New York City in the United States, London in the United Kingdom, and Tokyo in Japan. These global cities all feature hubs of business networks that direct commodity chains in the contemporary world (Sassen 2001). This urban network is increasingly important to the creation of the flows of capitalism today (Castells 2010).

On the other end of commodity chains are the peripheral groups who are paid low wages for their work. Commodity chains feature women in the global south doing industrial and agricultural work on products that eventually find their way to more well-off markets (Dunaway 2001). Capitalist commodity chains are built on the foundations of sexism, racism, exploitation of peripheral households (Hopkins and Wallerstein 1977). Capitalists oftentimes outsource aspects of production to the households of those in the global south as a cost-cutting measure (Wallerstein 1995). And though these women in the global south are adding value to production via household work, they are more likely to be malnourished and live in poverty (Selwyn 2012). When women do work in factories as waged labor, they are under intense surveillance and scrutiny by management (Wright 2011).

Commodity chains are part and parcel of the capitalist system for all products in contemporary society. Alcoholic beverages are no exception (Jernigan 2000; Bowen and Gaytan 2012). Oftentimes transnational firms own key links in the chains for locally produced spirits and beers (Jernigan 2000). These firms seek to imbed transnational brands into the local culture to maximize profit while still selling the idea of local products. This use of the local culture of alcoholic beverages in a region furthers the interests and powers of firms, oftentimes at the expense of the actual local farmers and workers in that region (Bowen and Gaytan 2012).

From Taylor to Ford: Scientific Management

One aspect of explaining the rise of craft beer breweries alongside the continued dominance of large corporate breweries and its geographic inequalities is related to the forms that occupations take in contemporary industrial society and the capitalist world-system. Brewery work, as with other industries, must exist within the labor regime of a given era. Before craft beer breweries and the creative work it allows, there were almost exclusively mass-produced assembly-line style breweries for the larger firms of the U.S. These firms and breweries continue to exist, albeit with more competition from the newer style of beers and work. The history of craft beer indicates it exists in part as a reaction to these mass-produced styles of beer during the 20th century (Ogle 2007).

Examining the way that the industry changed through the lens of labor changes is to bring focus to the foundations of sociology itself. The changes in economy and work at the dawn of modernity were a major spark for the rise of sociology in the 19th century (Collins 1994). Many of the most prominent social thinkers of the era, including Karl Marx, Max Weber, and Emile Durkheim, were fascinated by these changes and their effects on the individuals living and working in such conditions. For the social thinkers of the 19th century, changes to the work

patterns of populations reflected even more fundamental changes to society at large. In the past, most production labor had been done by tradesmen who created a product from start to finish. With modern industrialization taking shape, new forms of division of labor began changing the work process to that of an assembly line.

As industrialization took hold in the United States in the late 19th century, management began to focus on ways to increase productivity in the workplace (Brody 1980; 1993; Gartman 1994; Aglieta 2000). Previously, artisanal workers were able to dictate their work schedule and speed. With the industrialization of society, these workers and the immediate generations following sought the same ability to control their labor. Along these lines, one of the major problems that managers faced during the 1800s was various forms of resistance from workers, such as work stoppage and strikes. As long as workers maintained a share of creative control and knowledge, managers did not have full control of production. To combat this, Frederick Taylor developed a form of “scientific management” of workers at the end of the 19th century (Taylor 1911). This movement would put the creative focus on employers and management, leaving mere execution of specific work duties to laborers. In essence, workers become a new type of tool for managers to brandish in the creation of products. This use of workers allows for more homogenization of items as assembly line production and control of workers allows for large quantities of the same product to be created.

This new management style uprooted creative control previously held by workers (Braverman 1974; Brody 1980; 1993). A stark separation of conception and execution of work was created to fully control the workings of industrialized production. This led to new developments in workplace culture. Increasingly bureaucratic control became important as these changes to management and work took shape (Burawoy 1979). Over time, complex webs of

rules and expectations developed in the workplace. Job descriptions took on more and more details as formal systems of hiring, firing, and management took place within organizations. Job ladders developed within this bureaucratic setting, increasing the formalization and rationalization of work organizations. Workers consequently began to identify with the firms hiring them even more than their coworkers. Michael Burawoy (1979) found workers creating games of mastering tasks on the shopfloor in response to unrewarding work situations. With this game, individuals oftentimes adapted to difficult and abusive situations at work, consenting to their exploitation.

Following Frederick Taylor's theories of scientific management, Henry Ford began to develop a new workplace regime to run his automobile plants (Taylor 1911; Gartman 1994; 1998; Aglieta 2000). This follow-up labor regime to Taylorism, now called Fordism, built on Taylor's ideas while tweaking them to make workers somewhat more satisfied through higher wages. Rather than a pure focus on mass production under a Taylorist regime, Henry Ford introduced the idea of mass consumption coupled with mass production (Gartman 1994). Wages were increased to allow workers to put money back into the company. Material prosperity for the masses increased at the expense of alienation at work. Just as with Frederick Taylor's work regime, Fordism was based on assembly line production and scientific management. Workers had little or no say in the creation of products. Skill and control were further separated from workers, and productivity was increased. According to Aglieta (2000: 117) Fordism "further developed the mechanization of labour, increased the intensity of work, radicalized the separation between manual and mental labour, rigorously subjected workers to the law of accumulation and turned scientific progress against them as a power serving the uniform expansion of value." But for this work regime to be successful, worker consumption had to be

commodified. Workers had to be sold the products they created. To ensure the success of this work regime, bureaucracies were created to advertise and distribute the new mass cultural items. These various processes worked together to increase capitalist accumulation while stifling discontent among workers in the United States.

According to Piore and Sabel (1984), Fordism prevailed as it did due to wholly arbitrary institutional influences in the United States. Specifically, three different developments led to this new form of labor in the early part of the 20th century. These were the lack of a guild tradition, the malleability of American cultural tastes, and the scarcity of skilled labor. The confluence of these conditions created culturally fertile ground for the Fordist paradigm of work to take root. During the period of Fordism's rise, Europe was mired in war, allowing the United States and its new paradigm to emerge dominant over the next several decades. Because of this, the rest of the industrialized world soon followed suit, building vertically integrated industries for managers to control workers.

Fordism to Flexibility: Specialization and Service

Beginning in the 1970s, the United States faced a series of economic crises that set the stage for changes in consumer culture, production, and labor. With broader economic and social changes occurring in the U.S., management processes began to focus on new forms of work. Less vertically designed firms began emerging in the latter part of the 20th century, allowing networks to become the reigning model of industrial work. On top of this, service work has become increasingly important in wealthy nations like the United States.

One of the changes within developed nations was the development of more flexible forms of production, changing the way that many workplaces operated. This change in work regime is

steeped in larger economic and cultural changes within capitalism (Gartman 1998; Aglieta 2000). The change, the second major industrial divide, according to Piore and Sabel (1984), is the emergence of flexible networks of firms with less bureaucratic overhead. The conditions that promoted the Fordist paradigm of management have largely disappeared. In their wake is left flexible management of more precarious job positions. These changes have seen increasing de-unionization of workers in the United States since the 1970s (Brody 1980). Along similar lines, government policies of deregulation in industries has changed how firms operate and deal with labor. As a result, firms are more likely to expand to lower-wage areas, oftentimes outside of the United States. These changes are characteristic of the continuing expansion and development of capitalism in the capitalist world-economy (Wallerstein 2004).

The changes in industry and work have been linked to broader changes in culture and society that are intertwined by the logic of contemporary capitalism. Zygmunt Bauman described the shifts in terms of “solid modernity” and “liquid modernity” (Bauman 2000). According to Bauman, classical critical theory (such as Marx, Weber, Adorno, and Marcuse) examined a different type of modernity than that which confronts the present generation. While we still live in modernity in this framework, it is nonetheless different. One such difference is the decline in the belief that there is an attainable endpoint for the modernization project. Increasingly, people in liquid modernity do not see a specific end point of the current trajectory of society. Whereas in the past there may be a focus on a “good” society centered on American capitalism and democracy, today there is less discussion of any such goal. A second difference is the increasing deregulation and privatization of the various modernization tasks. Rather than utilizing the state to support projects that support modernized capitalism across the globe, private corporations

have become the foci of development of capitalism, with less funding for the domestic welfare state and international support of growing economies.

Along these lines, Bauman describes work as being fundamentally different in our current liquid world (Bauman 2000). The starting point of this change is the new, shaky hold on the present that the individual has. This new perspective on the social world came about because of the extreme flexibility that has permeated all aspects of life, including occupations. Rather than people having some control of their destiny through work, the privatized work of liquid modernity is not secure enough to build self-definitions and life-projects. Bauman argues that this flexible work offers only aesthetic importance. Rather than work building towards a future, it is “measured and evaluated by its capacity to be entertaining and amusing, satisfying not so much the ethical, Promethean vocation of the producer and creator as the aesthetical needs and desires of the consumer, the seeker of sensations and collector of experiences” (Bauman 2000: 139). In the past, work was a central part of individual lives, but now it is oftentimes a temporary arrangement built on the wants of other individuals. Much of this liquid work is based on a short-term mentality among capitalists and workers. Work is now lacking any certainty. And a large piece of this puzzle is the new focus on ideas, rather than material objects, for profit.

Similarly, Manuel Castells described the new form of society emerging as the “network society” (Castells 2000; 2010). According to Castells, there has been a technological revolution that has restructured capitalism in the contemporary world. This restructuring has caused more flexibility in management, decentralization of capitalist firms, a decline in the power of labor, higher individualization, an increase of women in the workforce, deconstruction of the welfare state, and increased global economic competition. These changes are tied together in massive changes in society and technology, which cannot be decoupled. The new capitalist regime of this

era is informational capitalism, defined by the changes discussed above. These changes are an important component of the development of new service jobs steeped in creativity, as they fit into this new regime of the network society.

With these changes, the organization of capitalism has restructured in new ways (Castells 2000; 2010). Capitalism has not been replaced but has had new informational technologies fundamentally alter how it operates in the new millennium. One of the changes has been the switch from vertical organizational model corporations to a “multidirectional network model enacted by small and medium business and the licensing-subcontracting model of production under an umbrella corporation” (Castells 2000: 172). Many different firms use this new networking model to find market niches via small businesses that appeal to different types of consumers than mass-produced products.

In this new form of capitalism, work has fundamentally changed for people in countries like the United States (Castells 2010). Rather than work being centered on the production of goods, it is centered on maximizing knowledge through information development. This change in work is what is often referred to as postindustrial (Bell 1973). While industrial labor is still prevalent in different parts of the world, the reality for the wealthiest nations and capitalism within them is based on information technologies (Castells 2010). This has led to a polarization of income among people, with different types of service jobs paying vastly different amounts for knowledge-based work. These jobs are oftentimes either very high paying or very low paying. One of the biggest differences in income in the global economy is the ability to access information in this type of society (Cartier, Castells, and Qiu 2005). Getting access to the emerging structures of the network society can prove vital to social mobility. Along these lines, work is typically divided among three types of workers: deciders, participants, and executants.

Deciders make the ultimate decisions in these information-based jobs. Participants are involved in the decision-making process. And executants merely implement decisions from others.

These changes are relevant as the newer network-based economy means that commodity chains can easily spread and develop outward (Gereffi and Korzeniewicz 1994; Castells 2010). As urban centers become only focused on financial capitalism, flows of commodity chain inputs (including human labor) are forced to become more malleable to economic movements across geographies. The network economy means that commodity chains are able to race to the bottom of labor and material costs (Wallerstein 2004). As firms race to the bottom of costs, manufacturing and raw material extraction is sought out in the places that offer the absolute cheapest labor and loosest labor laws.

With these changes to more networked capitalism, work has become more precarious (Beck 2000). Individuals do not typically find a job for life as they did in previous decades. Rather, a higher percentage of the workforce is left to fight for more temporary jobs, while the welfare state continues to erode. And with these various developments, the political mantra of flexibility becomes all the more important. Risk is being shifted from the state and employers to working individuals. This means that employers can fire individuals more easily, and work skills are changing at a much quicker pace.

One aspect of this shift is a change in managerial control from directing workers' behavior, to shaping workplace culture. Michael Buroway examined how this shift began occurring with the change in production regimes of the United States (1985). He describes this historical shift as a change from "despotic" to "hegemonic" industrial regimes. That is, instead of pure coercion, the contemporary managerial style attempts to create consent from the workers.

This new type of labor regime uses the individuals' belief that they are part of interesting work culture. This may take the form of work as performed by the new creative class of wealthy nations.

The Creative Class

As labor regimes and capitalism as a whole have changed, using new forms of work and structure within the capitalist system, urban ecology remains important as a focal point for the social dynamics of the contemporary world. Accordingly, inequalities across geographies and the development of craft beer breweries can be explained in part through the cultural theory of the creative class. Of particular interest to this theory is the way that urban centers have changed and grown in the past several decades. The theory does this by attributing social power to a new class of people who bring jobs with them to new localities. The creative class of people can be seen as a group whom beer breweries are attempting to cater to and might locate near.

An explanation of the phenomenon of work and culture changing in urban centers may be found in the original theory of the creative class by Richard Florida (2014). Per this theory, modern cities must develop a bohemian class of young people to create a stronger economy, based on tourism and knowledge. Florida argues that cities must do this, or they will go the way of Detroit, Michigan, dying a slow death from their inability to change with the times. According to Florida, the rise of human creativity is the driving force of change in the economy and society at large today. Because of this, firms seek out geographic locations that have a large creative population, making geography even more important for economic growth.

This argument is advanced in part through the theory of postindustrial society, which focuses less on industry and more on management, administration, and science (Bell 1999; Brint

2001). In the U.S., knowledge work is becoming more influential as a form of employment (Brint 2001). Knowledge-based work includes more focus on education, health, legal services, computer equipment, and other technology-based jobs. College-educated individuals do not make up the creative class on their own. Rather, there is overlap with other forms of investing in one's self, as many creative class members have higher human capital (Stolarick and Currid-Halkett 2012). According to James Coleman, "human capital is created in by changes in persons that bring about skills and capabilities that make them able to act in new ways" (1988: 100). Gaining knowledge, skills, experience, and other embodied forms of intangible aspects of one's marketability is at the heart of human capital.

According to Florida, groups such as the LGBT community, artists (broadly defined), and other bohemian populations increase housing values upon moving into a neighborhood (Florida and Mellander 2010). This economic growth happens because it creates a more tolerant and open culture, as well as creating aesthetic interest in the area. The creative class creates a vibrant community, with spillover effects into other types of workers in the area (Stolarick and Florida 2006). Noncreative workers reap the benefit of the creative class' growth as ideas spread throughout the community. These mechanisms then lead to job growth and, over time, a booming economy (Florida 2014). Growth in creative jobs leads to higher income in the neighborhood as the culture causes a rising tide of living conditions vis-à-vis the creative class. The bohemian lifestyles of these communities go hand-hand-in-hand with high-tech jobs in new economies that reflect a marriage of technological savviness and cultural aesthetics (Roberts 2012). Individuals who seek out such places are looking for communities with weak ties and inclusive attitudes (Florida 2014). In other words, these creative individuals seek out places where they can compartmentalize relations between anonymity and community (Milligan 2003).

Part of this appeal is based on the increasing number of Americans who seek to create urban tribes (Watters 2004). Urban tribes are the close-knit friends who substitute for the roles of families in cities. These types of ties among the creative class allow for self-expression in ways traditional families may not appreciate (Florida 2014). In attempting to create these types of ties, the creative class requires places outside of the home and work for enjoying the company of friends. Typically, these locales might include coffee shops, bookstores, or even brewpubs. These types of establishments can make communities seem more attractive as they develop.

In examining such cities, it is important to take into account factors that sociological frameworks like “creative cities” and the “creative class” do not examine. One of the most important aspects of every type of economy in modern capitalism is the underlying inequality. Class, race, and gender still feature heavily in defining who lives where and participates in each sector (Peck 2005; Bedore and Donald 2011). The theory of the creative class outright ignores the visible hand of municipal development and a working service-sector economy. The theory can be seen as supportive of neoliberal beliefs because it rejects the use of the welfare state for urban development (Tochterman 2012). These tenets are arguably culpable in the economic recession of the 2010s, as the theory pushed cities to sell overpriced housing to the so-called creative class.

Florida also blatantly ignores the role of the service economy and workers in his work (2014). As stated early in the *Rise of the Creative Class*: “Although the Creative Class remains somewhat smaller than the Service Class, its crucial economic role makes it most influential. The creative class is dominant in terms of wealth and income, with its members earning nearly twice as much on average as members of the other two classes and as a whole accounting for more than half of all wages and salaries” (2014: 9). Here the theory conflates economic power with

material importance. Florida argues this while simultaneously discussing the need for amenities in cities to attract the creative class.

These issues in the theory of the creative class can be remedied by also examining the forms that inequality takes within the U.S. While Florida offers one aspect of how urban areas develop in the new economy, other theories can be used in conjunction with it. Cultural capital offers an alternative but related views on how beer breweries develop in the U.S. The creative class examines specific types of artistic locales in a region. Adding cultural capital allows for the examination of education and other forms of inequality as different measures of growth.

Cultural Capital

Another perspective of inequality between geographic areas is cultural capital or the knowledge and skills utilized by those with formal or informal education valued by society (Bourdieu 1984; 1993). Bourdieu (1993) describes cultural capital as “economic or political capital that is disavowed, misrecognized and thereby recognized, hence legitimate, a ‘credit’ which, under certain conditions, and always in the long run, guarantees ‘economic’ profit.” He elaborates: “when the only usable, effective capital is (mis)recognized, legitimate capital called ‘prestige’ or ‘authority’, the economic capital that cultural undertaking generally require cannot secure the specific profits produced by the field – not the economic’ profit they always imply – unless it is reconverted into symbolic capital” (1993: 75). This means, in short, that cultural knowledge lends itself to creating authority and prestige for those who can afford to get knowledge on a certain class-specific artistic field. Cultural consumption can reproduce inequality by reifying the conception of who seemingly deserves to be higher in the stratification system. It helps create the idea of the undeserving poor and the meritocratic wealthy. By creating the illusion of natural differences between the social classes, differences in cultural consumption

lead to beliefs in those who deserve their positions in society. It also leads to the creation of social networks vis-à-vis the same cultural tastes, giving those within a network a leg up in future opportunities.

Pierre Bourdieu (1984; 1993) originated many of the theories that are used to examine consumption inequalities between social classes. In his study of French class culture, Bourdieu develops the theory of habitus to describe how lifestyles are molded by one's upbringing and education. Habitus is the internalized dispositions that generate meaningful practices and perceptions (Bourdieu 1984). Habitus helps individuals at the micro level routinize the everyday so that it becomes reality. In this way, social structure is created through everyday activities, which then structures the way we organize our world in a dialectical process. These dispositions are deeply ingrained, and the actor is rarely aware of them. Dispositions become ingrained through habitual practice that is built by one's class positions (Perry 2012). Bourdieu defines habitus as being both a structuring structure (affecting individual behavior) and a structured structure (the product of social class) (Bourdieu 1984). This habitus reveals one's cultural capital to others.

Cultural capital, in the long run, lends itself to gaining profit of economic capital (Bourdieu 1984; 1993). It does this, in part, because to gain cultural capital, one must have enough free time to consume culture. Furthermore, one's habitus structures how and what each class consumes (Gartman 2002; Perry 2012). Cultural products to be consumed by the bourgeoisie are oftentimes not produced at the mass-scale, limiting the market available to them (Bourdieu 1993). This restricted production thus helps create the cultural recognition of a particular product as being distinctive. When a field is recognized as highbrow, those who consume it are seen as 'naturally' higher in the social order because they consume these products

the ‘correct way’ (Bourdieu 1984). Furthermore, cultural boundaries recreate inequality by segregating people by education and taste (Lamonte 1992). Cultural boundaries exist between the different classes in society and each class consumes differently (Bourdieu 1984; Lamonte 1992; Bourdieu 1993; Gartman 2002). These class boundaries and differences are shown through one’s habitus (Bourdieu 1984; Bourdieu 1993).

More recently, the theory of a cultural omnivore has been proposed to better describe American cultural consumption patterns (Peterson and Simkus 1992; Peterson and Kern 1996; Johnston and Baumann 2009). In this theory, the upper classes are not defined by consuming only distinct types of culture, but rather, by consuming from every part of the hierarchy of culture. Cultural omnivores do this by sampling specific aspects from lower-class culture. Rather than be so lowbrow as to completely consume lower classes products, they pick specific aspects that are worthy of intellectualization, such as specific foods from working, lower, and middle-class restaurants. Those with more cultural capital in America, define sophistication through cosmopolitanism (Lamont 1992). Upper class “Americans tend to have a wide range of cultural repertoires within which they can encompass much of mainstream culture” (Lamont 1992: 104). To be a cultural omnivore, one cannot indiscriminately consume from lower classes; one must sample from them, leaving out much of the lower-class culture (Johnston and Baumann 2009).

Important to this cosmopolitan character is the intellectualization of lower cultural products through dialogue (Johnston and Baumann 2009). Those with more education tend to do this intellectualization, increasing their omnivorousness (Bryson 1996). This is because the education system creates within the actor a mode of consumption that is considered legitimate (Bourdieu 1993). To know what parts of lower-class culture to intellectualize, the cultural

omnivore validates some of it as ‘authentic’ (Johnston and Baumann 2009). This authenticity is highly subjective but is generally agreed upon by a community through dialogue (Bourdieu 1993; Johnston and Baumann 2009). Dialogue about authentic lower-class culture legitimates the boundaries being created by the cultural omnivore (Johnston and Baumann 2007). This dialogue can occur in many forms, including magazines, television, books, and face-to-face conversations with other cultural omnivores (Johnston and Baumann 2007; Johnston and Baumann 2009).

Cultural omnivores give the illusion of being ‘down-to-earth’ by including a large variety of cultural products in their consumption habits (Erickson 1996). The only way one can afford to be a cultural omnivore who intellectualizes various strata is by having enough free time to sample from the different cultural strata (Johnston and Baumann 2009). Central to being able to afford the time and money it takes to be a cultural omnivore is education (Bourdieu 1993; Bryson 1996). Cultural inclusion increases with different levels of education. Thus, the more education attained, the more cultural capital is accumulated and more one is likely to lead a life with enough time to enjoy multiple cultural levels (Bryson 1996; Johnston and Baumann 2009). Cultural capital through education, whether informal or formal, allows for intellectual appreciation of the common, opening it up for consumption by the cultural omnivore.

The most concrete way that cultural capital recreates and reinforces economic inequality is through network creation (Erickson 1996; Lizardo 2006). Higher cultural capital allows the expansion of social networks to accumulate more social capital, and, eventually, economic capital (Lizardo 2006). It does this by allowing for better first impressions, streamlining the network creation process (Erickson 1996). Consuming the ‘correct way’ allows for increased esteem with others in the upper classes (Veblen 2007). Culture allows for sociability and

inclusion in social circles (DiMaggio 1987). Cultural omnivores have an advantage in this sociability due to cultural variety (Erickson 1996). The cultural variety allows for the penetration of many different social groups, thus expanding one's networks and social capital. This cultural capital helps to recreate inequality over time by creating and strengthening social networks that can be utilized for social resources (Lizardo 2006). This works in part by creating the social capital needed to discover different job opportunities more easily (Lizardo 2013).

The cultural omnivore is more likely to be able to break through symbolic boundaries created by exclusionary groups (Lizardo 2006). On the other hand, "The American individuals who do draw boundaries on the basis of cultural sophistication often tend to define as 'different' or even as 'undesirable' people they see as less cosmopolitan or refined than themselves" (Lamont 1992: 105). Lacking interest in a wide variety of cultures can lead to symbolic exclusion from important social networks. Oftentimes a lack of cosmopolitanism can cause those with higher cultural capital to view those with purely lowbrow tastes as 'ignorant' or 'uninformed' in America.

With cultural capital, educational inequality can be taken into account to supplement the theory of the creative class. While the development of niche products and services can be attributed in part to the bohemians that cluster in such areas, cultural capital may also explain the development of beer breweries. However, material inequalities accompany geographic inequalities across the U.S. as well. Each of these sociological theories ultimately rests on the different economic inequalities that define different groups.

Economic Inequality

Another important point of discussion for the geographic differences in these occupations is the economic inequality that defines modern American society (Wright 1996; Piketty 2014). Economic capital maintains an important determinant in how well a given community develops and changes with broader societal trends. Inequality in the United States has been increasing in recent decades despite previous reductions in class differences in the 20th century (Reardon and Bischoff 2011; Piketty 2014; Jacobs and Dirlam 2016).

Rising inequality in recent decades is caused by a system that sees the return of capital for the bourgeoisie outpacing the overall growth of the economy, leading to much more wealth moving toward the upper tier of the class system (Piketty 2014). In the middle of the 20th century, these two movements were closer to the same rate, allowing more wealth to flow to the lower tiers of society. In contrast to the era before World War II and the current 21st century, income was more evenly distributed among different classes in the U.S.; however, today inequality is increasing to what is historically the norm of modern capitalism (pre-1945). This pattern of reverting to past inequalities is the direct result of neoliberal states pulling apart the welfare state and other economic regulations that were featured in the late 20th century. These changes only illustrate the continuing importance of economic differences between groups (Wright 1996). Those who own property will find themselves better off in capitalist society. At the same time, the size of social classes has remained relatively stable since the 1980s while personal income has increased for the upper class during the same time (Wodtke 2016). Relatedly, as income inequality has increased between the top earners and lower earners, the affluent are increasingly segregated from the rest of society (Reardon and Bischoff 2011).

Economic capital remains an important factor in overall inequality between communities and groups in the U.S. (Wright 1996; Reardon and Bischoff 2011; Piketty 2014; Jacobs and Dirlam 2016). Income and wealth inequality are at the base reality of society's institutions (Marx 2000). While other conceptions of inequality can play a part in why different regions develop unevenly, ultimately economic capital must be considered in a capitalist society like the U.S. At the most basic level of capitalist society is the logic of turning a profit by the bourgeoisie, who look to expand their profit-making abilities into different markets.

While economic capital has always been an important determinant in life chances in a capitalist society, in recent years capitalism and stratification have taken on new forms and logic (Piketty 2014). Though the income gap between the classes in American society narrowed during the mid-20th century, it has been widening since (Reardon and Bischoff 2011; Jacobs and Dirlam 2016). This widening is related to the neoliberal regime that focuses on cutting down the welfare state and increasing globalization of manufacturing jobs (Harvey 2005; Jacobs and Dirlam 2016). This newly emerged regime of capitalism is different from previous regimes in that it has a different focus for profit-making (Agglieta 2000). It is different from the decades between 1945 and 1980 in part because of a lessening of the welfare state safety net in the U.S. and changes in the forms of manufacturing. Rather than ensuring American workers in assembly lines are paid enough to buy products, flexible part-time workers in the U.S. are paid less to maximize profit.

Material differences play out in many ways in contemporary society, but a particularly important function of social class is the organization of people into class communities (Collins 2009). The types of occupations one can have effects the culture, communication, and ultimately type of community that can be participated in by a given individual. This leads to geographic

segregation by class and reifies class positions as seeming normal. These types of class differences shape individuals through occupations (Weeden and Grusky 2005). Different occupations in different areas lead to people self-selecting lifestyles, recruitment opportunities for other jobs, and socialization. This all manifests in uneven geographic developments.

David Harvey views the uneven geographic developments of contemporary society through a Marxian lens (2014). For Harvey, spatial inequality is a key to capitalism in general: “Without uneven geographical development and its contradictions, capital would long ago have ossified and fallen into disarray” (2014: 147). Capitalist activity is defined, in part, by how it uses different geographies. The further the distance between important points of geography, the more capital is expended, because it takes more time out of the producers to move things. The problem of geographic expenditures in production is overcome by producers through innovations that cut costs. Cost-cutting can happen by improving transport and communication, or more importantly to local craft economies, by clustering many related capitals near each other. This clustering of production needs near each other leads to regional economies that tend to become richer while other regions become poorer.

Income inequality directly effects how people live in contemporary society. For instance, food diets in the U.S. are differentiated along class lines (Otero, Pechlaner, Liberman, and Gurcan 2015). Higher-income families typically have healthier diets, while lower-income families feature more energy-dense unhealthy foods. Furthermore, luxury food items are much more prominent among upper-class families than lower-class. These differences come from structural deterrents in contemporary neoliberal society. Being in a less wealthy area leads to less access to healthy foods, and by extension luxury foods such as beer breweries and restaurants associated with them.

This final concept, economic capital, is related to other aspects of this study. By including material inequalities, other concepts like cultural capital and the creative class are made more salient. Cultural capital and the creative class are forms of inequality that exist in the realm of the ideal world, as opposed to the material world in Marx's words (2000). This study will use variables related to these sociological concepts as types of control variables for the broader study of value chains in beer brewing in the U.S. Each of these is arguably important downstream factors related to the chains and will be treated as potential control explanations along with the material upstream and downstream inputs of beer commodity chains.

Chapter 3 - Theory & Hypotheses

Prior research and theorizing on commodity chains, cultural capital, the creative class, and brewing can be integrated to create a model predicting the geographic distribution and proliferation of beer breweries. To this end, the current chapter synthesizes the previously discussed scholarship to advance testable hypotheses concerning brewery prevalence and distribution.

Commodity Chains

Commodity chains are the economic linkages for a given industry across the capitalist system (Hopkins and Wallerstein 1977; Gereffi, Humphrey, and Sturgeon 2005; Sturgeon, Van Biesebroeck, and Gereffi 2008). A commodity chain traces the elements involved in the processes of production from start to finish including the extraction or cultivation of raw materials, the manufacturing of the product, and the consumption of the product (Kaplinsky, 2005). This type of analysis brings the spatial aspect of production into sharp relief as linkages in commodity chains can be traced across local, national, and international spheres of production.

The ingredients, parts, etc. that go into producing an item are called the upstream components of the commodity chain (Kaplinsky 2005). Upstream elements can be gathered through multiple sources. Some firms may have resources shipped to them from distant locations. Others may handle resource extraction, cultivation, processing, and other factors related to commodity production in-house—a tendency referred to as “vertical integration.” Ingredients, parts, services, and other relevant elements can also be obtained from nearby sources. Certain types of industries, like craft beer, often promote their product as “locally sourced” to appeal to location-oriented consumers to sell more products. This leads to more local and regional businesses being used for the final product.

While some firms may locate themselves near upstream components to reduce costs and increase the efficiency of production, others may prioritize locations with a strong consumer base—situating their business near their target audience (Kaplinsky 2005). In commodity chain analysis, such considerations are referred to as downstream effects. Locating near consumers who can buy the product allows more sales at the point of origin, an important aspect of local breweries in the United States. For beer production, this analysis contends that beer breweries are likely to locate themselves near upstream elements—components involved in the production—where they can locally source raw materials like barley and hops. In addition, this study argues that breweries are also likely to be present in locations with a significant consumer base for their product—electing to set up shop near beer consumers. As such, this analysis advances the following two hypotheses:

Hypothesis 1: Beer breweries are more likely to locate in counties that produce upstream component of the beer commodity chain.

Hypothesis 2: Beer breweries are more likely to locate in counties that have populations to consume beer as the downstream components of the beer commodity chain.

Creative Class

The creative class is a sociological concept describing a relatively new class of people who create jobs in urban areas (Florida 2012; Stolarick and Currid-Halkett 2012). This concept examines young urban people who work in high-tech industries and are more tolerant of social diversity. For instance, these people are more likely to work with computers and software and are more welcoming to outsiders like immigrants and individuals who identify as LGBTQ. For this study, the creative class is a larger theory acting as a control variable to the analysis of value chains in the U.S.

The theory states that jobs will follow members of the creative class as they lift the economy when they locate in a city (Stolarick and Florida 2006). Among other types of jobs, this includes consumption-based companies like microbreweries and taprooms. These types of companies will locate in areas where people are young and involved in social activities. The economic function of this group is to create new ideas in society that are defined by information technologies. Occupations associated with this group require higher education and creative thinking. These groups are also associated with the consumption of craft beer and microbrews (Florida 2012). As such, these populations may present a noteworthy marketing opportunity for beer entrepreneurs. For this reason, firms may establish themselves in locations with a greater presence of the creative class. The study, therefore, advances the following hypothesis:

Hypothesis 3: Beer breweries are more likely to be located in counties with higher populations of the creative class.

Cultural Capital

Cultural capital is another sociological concept that explains consumption in countries like the United States. Much like creative class, this is a sociological concept that attempts to understand the forms of consumption that define the contemporary social world. Unlike the creative class, however, cultural capital examines how these practices lead to inequality rather than new jobs and development (Bourdieu 1984; Gartman 2002; Perry 2012). While the creative class examines how occupations follow people with more contemporary and cosmopolitan interests, the theory of cultural capital focuses on the ways that such interests are the by-product of economic class positions in society. In this way, the theories examine similar subjects from different points of view. Similar to the creative class concept, this theory is being used as a type of control variable for the brewery value chain located in the U.S.

Cultural capital is the group of cultural markers that separate different class groups in society (Bourdieu 1984). Upper, middle, and lower-class groups have different consumption patterns, which typically have class markers attached to them. Upper-class products oftentimes are treated as ‘important’ and ‘high art.’ Middle-class cultural products are typically dispositions that pretend to be a higher class, despite not fitting in with upper-class groups. Lastly, lower-class products are seen as more ‘common’ and ‘utilitarian’ than anything else.

According to the theory of cultural capital, class culture helps recreate class differences (Bourdieu 1984). It does this by reifying class differences. The inequalities in society seem more natural as different groups have different cultural interests, oftentimes justifying their place in society through the dialogue of the more powerful groups. Because of this, variables for cultural capital are variables that measure social class beyond income or wealth. Because cultural consumption acts as class signifiers, it reifies and recreates social class over time. One way of thinking about this is the way that alcohol is consumed by different class groups. Drinks like craft and microbrewery beer lend themselves well to the middle class. This happens because it is seen by its consumers as a more cultured beverage than mass-produced beers. Yet they are still not upper class akin to certain wines and liquors. It is different from the typical lower-class drinks, but still, a pretender compared to the upper-class drinks.

Hypothesis 4: Beer breweries are more likely to be located in counties with higher populations with more cultural capital.

Chapter 4 - Research Methods

This study uses data from the United States Census Bureau and Department of Agriculture to examine the distribution of breweries throughout the United States by county (using location quotient measures) as well as conduct regression analyses to examine the relationship between local brewery concentration and factors like cultural capital, the creative class, as well as upstream and downstream elements of the value chain involved in the production, distribution, and consumption of beer. Included are measures that are drawn from the Census Bureau's County Business Patterns survey, which records all legitimate businesses in the U.S., including beer breweries. Relevant county demographic information is drawn from the Decennial Census as well as the American Community Survey, which draws a representative sample of the entire U.S. for further demographic questions useful for this type of study. Lastly, the U.S. Census of Agriculture (U.S. Department of Agriculture) provides measures of farmland use by the county.

Unit of Analysis and Study Population

The unit of analysis for this study consists of counties in the United States in the year 2010. The study population for this research consists of all counties and county-equivalent areas (Louisiana and Alaska parishes) in the U.S. in 2010. The number of county and county-equivalents in 2010 totals 3,143. Not included in this study are U.S. territories. This is because the American Community Survey does not measure U.S. territories for supplemental information to the decennial census. The lowest level of disaggregation provided by one of the key datasets included in this study, the County Business Patterns survey, is at the county level. For this reason, this study focuses on the county level as it is the most granular unit permissible by the data while also permitting consistency between datasets. While some of the variables discussed below can be

measured at lower levels, only the county level includes all the variables of interest for the present study.

Data Sources

The purpose of the present study is to uncover beer brewery growth and concentration by county across the U.S. and to examine the relationship between this expansion and density and various sociocultural factors. This dissertation will feature three primary foci of research. The first focus of this study is to determine which counties have seen the growth of beer breweries between the years 1990 and 2010. The second focus is examining the upstream inputs into the commodity chains of beer breweries. Lastly, the third focus is examining the downstream components of the commodity chains for beer breweries. These research foci will be studied using several datasets from the U.S. Census Bureau and the U.S. Department of Agriculture.

The first data source used in this study is the U.S. decennial census. The U.S. Census Bureau attempts to capture in their surveys various aspects of American life via quantitative measures. The most thorough of these is the decennial census, most recently conducted in 2010. This census has the goal of measuring all people within the U.S. every ten years. To improve the response rate, only ten questions were asked in 2010. If a household did not return the form, enumerators visited the household that was non-responsive. The 2010 census features questions related to residence, race, ethnicity, gender, and age.

The second data source for this study is the County Business Patterns (CBP). This data is also gathered by the United States Census Bureau and compiled into the County Business Patterns dataset. The locations of commercial entities such as breweries are gathered at the local level for all known establishments where a legitimate business is conducted, or services and/or industrial operations are performed. For data on beer breweries, all firms that are part of the

industry code for beer brewing are counted. This does not count brewpub restaurants, as they are included in the restaurant codes in the County Business Patterns. Similarly, all firms in the U.S. related to measures of cultural capital and the creative class are found in the CBP. The firms used for these measures include organizations related to cultural capital (museums, coffee shops, and other arts institutions) and the creative class (computer shops, software industries, and creative design shops). Such businesses and institutions are used as indicators for the presence of cultural capital and the creative class.

The third data source comes from the United States Census of Agriculture (USCoA). The Census of Agriculture is gathered by the United States Department of Agriculture. The goal of the census is to capture all establishments from which \$1,000 or more of agricultural products were produced or sold. The National Agricultural Statistics Service (NASS) maintains a list of farmers and ranchers from which the Census Mail List (CML) is compiled. Data collection was accomplished primarily by mail out/mail back but supplemented with Electronic Data Reporting (EDR) on the internet. NASS telephone call centers targeted selected groups of census non-respondents. This data set has some limitations, as it only measures establishments that have sold \$1,000 or more in products. As a result, very small farms are excluded. It is possible some of the farms that provide for local breweries are not included in this survey. Despite this, most commercial farms fall into this data set.

The fourth data source is from the American Community Survey (ACS). Like the CBP, this is a dataset created by the U.S. Census Bureau. The ACS does not measure the entire population of the U.S., but a representative sample that is representative of all geographic regions of the U.S. This survey includes various questions that are not included in the decennial census, such as sexual orientation, immigration status, types of occupations, religion, and

income. The American Community Survey takes a sample of housing units from the decennial census with known residence in the 3,143 counties and county-equivalents in the United States. Five sub-frames within a census tract (or strata) are created of representative samples of addresses in counties. Sub-frames are representative county samples that rotate each year. Following this, a sample of addresses is selected from a given county's sub-frame. The survey is distributed via the internet, mail, telephone, and personal visits. For group quarters that have multiple families (such as apartment buildings), a somewhat different approach is taken. All large group quarters in a state are sorted and systemic samples of groups of ten are created in each one. When an interviewer visits to conduct interviews, an automated listing instrument randomly selects the 10 people to be included, with one from each group of ten being interviewed. If the group quarters have a population of less than ten, all are chosen. This resulted in a total number of 1,917,799 interviews of housing units and 144,948 interviews in group quarters in 2010.

Because this survey uses a sample of the U.S. population, there are some limitations. The ACS sometimes has a gap in rural communities. Data must be aggregated across five years in rural areas to reach a statistically significant sample size. This makes it harder to compare different years of the ACS for rural areas. This leads to another potential issue with the ACS: rural areas provide smaller sample sizes. Rural areas have a higher sampling error than urban and suburban areas as a result. This makes data for rural areas slightly less reliable.

Using these data sets, we can consider several research questions related to the U.S. brewing industry. Because the Census Bureau attempts either to capture all of the numbers of industries and populations in a given county or to be able to generalize from samples, this study can use the entirety of the U.S. as a study population for considering geographic distributions of

breweries and its related social phenomena. With these data sets, we can develop four research questions for this study.

Research Questions

Research Question 1: What counties in the U.S. had the highest concentration of beer breweries in 1990?

This research question is addressed through the creation of location quotients for beer breweries in 1990. The descriptive analysis of this includes the top 20 county location quotients to examine high concentration. Based on the history of beer brewing in the U.S. 1990 should have been a pivotal year for the growing spread and concentration of breweries. Examining this year's concentrations allows us to call to mind some of the geographic changes in the intervening years.

Research Question 2: What counties in the U.S. had the highest concentration of beer breweries in 2010?

This research question is addressed through the creation of location quotients for beer breweries in 2010. The descriptive analysis of this includes the top 20 county location quotients to examine high concentration. To follow up on the concentration of breweries in 1990, we will use 2010 as a stand-in for the location of breweries 'today.' 2010 is the most recent full census. Thus, this year provides more robust data than any of the years after.

Research Question 3: How has the concentration of breweries changed in the U.S between 1990 and 2010?

This research question is addressed by measuring the raw number of breweries added between 1990 and 2010. This is followed by comparing the top counties in both years by the percentage of county businesses that are breweries. Thirdly the location quotient is compared for

the two years used. And lastly, the difference in location quotient is calculated for the two years to examine the counties that saw the largest growth of relative concentration.

Research Question 4: How does the location of upstream components for beer affect the location of beer breweries?

This research question is addressed through the estimation of statistical models designed to identify the relationship of beer ingredients and the equipment required to produce beer at an industrial level, and the location of beer breweries. One possibility is that breweries cluster in areas that provide the needed ingredients and industrial equipment to operate. These are called upstream inputs in commodity chain analysis. Linking these material variables also allows us to paint a more complete picture of the brewing chain. The location quotients for 2010 are broken down into nominal level categories for regression analysis of the various value chain variables.

Research Question 5: How does the location of downstream consumer components for beer affect the location of beer breweries?

This research question is addressed through the estimation of statistical models designed to identify the relationship between groups who are more likely to consume craft beers and the location of beer breweries. Among these downstream effects are related to sociological theories of consumption that are being used as control variables. Beyond material requirements for industry, the interest here is in the types of people these breweries cater to. The location quotients for 2010 are broken down into nominal level categories for regression analysis of the various value chain variables.

Measurement of Study Variables

Dependent Variables/Outcomes

This dissertation will use the relative concentration of breweries in the United States as a dependent variable for the fourth and fifth research questions, as well as for the measure used in questions one, two, and three. To measure the distribution of breweries while accounting for population issues, breweries' location quotient will be used. The data on beer breweries are gathered by the County Business Patterns for the 3,144 counties in the continental United States. The dataset contains indicators of whether a beer brewery is in operation within a given county. Every brewery in operation in the United States is counted except for brewpubs, thus including both craft breweries and corporate breweries.

Independent Variables

This study includes variables designed to measure the determinants of the location of beer breweries. These determinants have been placed into four different groups: Upstream components, downstream components, creative class, and cultural capital. Measures of the creative class and cultural capital are considered control variables for the commodity chain of beer brewing. Other control variables are used for urbanity, race, and Hispanic ethnicity. Because the research questions are focused on brewery locations vis-à-vis industry concentration, not population centers, the control variable for urban is specified in the models. Similarly, while race and ethnicity may play a role in the location of breweries, they are outside the scope of this study and have control variables specified in the models.

Upstream Components

Upstream components of beer breweries are the aspects of the beer commodity chain that goes into the creation of beer. This includes basic ingredients and the equipment used to produce beer

at an industrial level. These variables are upstream aspects of beer brewing that are located in the U.S., potentially making it easier to create products via the lowering costs of shipment through smaller geographic space. These components include two of the primary ingredients for almost all beers (barley and hops) as well as equipment needs to create beer on a large scale.

- Percentage of cropland planted with barley in a county (2007)
- Percentage of cropland planted with hops in a county (2007)
- Percentage of businesses manufacturing metal tanks in a county (2010)
- Percentage of businesses manufacturing pumping equipment in a county (2010)
- Percentage of businesses manufacturing refrigerators in a county (2010)
- Percentage of businesses manufacturing packing equipment in a county (2010)

Downstream Components

Downstream components of the beer industry include people who are available to consume the products breweries are creating. These are demographic aspects of U.S. counties that measure people and places that are related to alcoholic beverage consumption. As with the upstream components, looking at only the U.S. allows for consideration of lower costs due to the locality of the chain's components. It also can shed light on how many breweries may sell locally to create their brand. These components include places that sell beer, people who can legally drink alcohol, and the income to buy beer.

- Percentage of businesses that are bars (2010)
- Percentage of businesses that are liquor stores (2010)
- Percentage of population over 21 (legal drinking age) (2010)
- The median income in a county (2010)
- Whether a county is dry or not (no alcohol sales allowed at any time) (2017)

Measures of the Creative Class

The creative class is characterized by social tolerance and interest in technology/talent-based jobs. For these analyses, measures of the creative class will be treated as control variables. Tolerance in this case particularly includes acceptance of the LGBTQ community and immigrants from different cultures. As a group defined by their talent and interest in technology, jobs related to software, computers, and creative designing captures their interests. These jobs require the high talent that is part and parcel of the creative class. They are also high technology jobs that are required to be a part of this new class group.

- Percentage of a county that identifies as lesbian, gay, bisexual, transgender, or queer (2010)
- Percentage of a county that is foreign-born immigrants (2010)
- Percentage of businesses in a county that are software jobs (2010)
- Percentage of businesses in a county that are jobs related to creative designing (2010)
- Percentage of businesses in a county that are computer jobs (2010)

Measures of Cultural Capital

Cultural capital is the measure of inequality that is based on the culture consumed by groups of people. For these analyses, cultural capital will be treated as control variables. For this aspect of the study, the focus is on indicators for high cultural consumption. This includes coffee shops due to their proximity to high cultural capital populations, art production/consumption, and museums. Arts and museums are indicators of higher culture in an area due to the required interest in consuming such cultural objects. It also includes measures for education, as increasing education leads to higher cultural capital.

- Percentage of businesses in a county that are coffee (or otherwise non-alcoholic) bars (2010)

- Percentage of businesses in a county that are related to art creation and/or consumption (2010)
- Percentage of businesses in a county that are museums (2010)
- Percentage of people in a county with a high school education or higher (2010)
- Percentage of people in a county with a bachelor's degree or higher (2010)

Control Variables

Lastly, this study includes control variables for concepts that are outside this dissertation's research focus. These control variables are measures for theories that may explain some of the distribution of breweries yet are not related to the thesis of this study. These include measures for urbanity, race, and Hispanic ethnicity. Controlling for these variables allows for the study to examine the commodity chain more robustly.

- Percentage of a county that is urban (2010). This controls for the urbanity of a county and population density. Because this study is focused on how brewery growth is related to industry, breweries per capita are not used. Urbanity acts as a proxy measure to control for this alternate hypothesis.
- Percentage of a county that is white (2010). This controls for the effects of race. While race undoubtedly affects the location of emerging breweries, it is outside of the scope of this study. Controlling for race allows for a more focused study on economic inequality, cultural capital, and creative class inequalities.
- Percentage of a county that is Non-Hispanic (2010). This controls for Hispanic ethnicity, which is measured as different than race in the U.S. census. As with race, ethnicity may have an actual effect on the concentration of breweries. But it is outside

of the scope of this study. Controlling for Hispanic populations further allows a focus on economic inequality, cultural capital, and creative class inequalities.

Table 1 below shows each variable’s data source and year of collection. Note that the U.S. Decennial Census, American Community Survey, and County Business Patterns were all collected in 2010. The U.S. Census of Agriculture from 2007 was used as it is the closest year to 2010 available of this data. For a complete list of counties that are dry, the National Alcohol Beverage Control Association is used. The only list available is from the more recent year of 2017. To calculate the growth of beer brewing, the 1990 County Business Patterns was used as well as the 2010 data.

Table 1 Variable Data Sources

Variable	Data Source	Year
Location Quotient	CBP	1990, 2010
Hops Farms	USCA	2007
Barley Farms	USCA	2007
Tanks Jobs	CBP	2010
Pumping Jobs	CBP	2010
Refrigerator Jobs	CBP	2010
Packing Jobs	CBP	2010
Bars	CBP	2010
Stores	CBP	2010
21 & Up	USDC	2010
Median Income	ACS	2010
Dry	NABCA	2017
LGBTQ	ACS	2010
Immigrants	ACS	2010
Software Jobs	CBP	2010
Design Jobs	CBP	2010
Computer Jobs	CBP	2010
Coffee Shop Jobs	CBP	2010
Arts Jobs	CBP	2010
Museum Jobs	CBP	2010
High School Graduates	ACS	2010
College Graduates	ACS	2010
Urban	USCA	2010
White	USCA	2010

Methods of Data Analysis

The statistical analysis for the current study consists of several steps. First, descriptive statistics were computed to address the first three research questions. The location quotients of beer breweries in the U.S. in both the years 1990 and 2010 were assessed. Lists were tabulated of the two years by location quotient, breweries per business, raw brewery growth, and location quotient growth. Finally, the fourth and fifth research questions were addressed using multinomial regression analyses. Multinomial regression analyses were used to identify correlates of the dependent variable – location quotient for breweries in American counties. This variable was regressed on a set of independent variables, which included the indicators of upstream components, downstream components, creative class, cultural capital, and other control variables.

For the descriptive analysis, the location quotient of breweries is calculated using the percentage of business in a county conducted by breweries. Location quotient has been used in the past to examine the spatial changes in industries. For example, this measure was used to examine the music industry's geographic changes over time (Moineddin, Beyene, and Boyle 2003; Florida and Jackson 2010). The location quotient of breweries in the United States will be calculated using the North American Industry Classification System data from the United States Census Bureau in the year 2010. In this measure, a "1" is exactly average with the rest of the United States. If the number is higher than one, it has more than the average amount of breweries, and if it is lower than one it has fewer than the average number of breweries in the United States. With these results, we can see the overall change in breweries in the United States over time. Furthermore, we can see where beer brewing has a higher density. The location quotient is calculated:

$$LQ = (e_i/e) / (E_i/E)$$

LQ_i = location quotient for the sector in the regional economy

e_i = employment in sector i in the regional economy

e = total employment in the local region

E_i = employment in the industry i in the national economy

E = total employment in the national economy

The location quotient is a measure of the number of a type of industry in each county, relative to the rest of the United States (Moineddin, Byene, and Boyle 2003; Florida and Jackson 2010). The location quotient can be described as “a way of measuring the relative contribution of one specific area to the whole for a given outcome” (Moineddin, Beyene, and Boyle 2003: 250). The location quotient offers a useful way to understand the concentration of an industry in an area. This form of measurement is eloquent in its simplicity, and when used in a large enough spatiality, is quite accurate (Billings and Johnson 2012). Location quotient analysis has been used to great effect in examining the geographic elements of many different industries (Knudsen, Florida, Stolarick, and Gates 2008; Florida 2012). This form of analysis has even been used specifically to measure the concentration of creative workers whom some see as important to overall economic growth. It has also been used to examine the location of cultural producers, specifically musicians in the United States (Florida and Jackson 2010). Beyond these cultural explanations of growth, location quotient is oftentimes employed to study work of various sorts. Occupational clustering has been the subject of studies using this methodology to understand the growth of regions (Anderson and Bogart 2001; Nolan, Morrison, Kumar, Galloway, and Cordes 2011). Just as with these past studies, location quotient analysis can be used to understand the cultural and industrial concentration of beer breweries in the United States today. To further visualize the changes in the

location of the brewing industry, the difference between 1990 and 2010 location quotients will be calculated. This will show which counties saw growth in concentration and those that did not. This is simply accomplished by subtracting the 1990 values from the 2010 values.

To study the effects these variables have on relative brewery growth, regression analysis will be used. The most robust form of regression is linear, or ordinary least squares (OLS). This type of analysis would allow for the use of the original ratio level of the dependent variable to be used. Location quotient as a continuous dependent variable would be the most powerful way to measure the effects described in this study. Unfortunately, linear regression analysis could not be used due to the high skewness of several variables. Power transformations were used to attempt to fix the extreme skewness. This did not, however, yield acceptable results. Using power transformations on this variable did not lower the skewness problem. Higher levels of power transformations were attempted but did not lower the skewness measure to within acceptable parameters. Due to the high skewness of the data, it did not meet the linear regression assumption of normal distribution (Berry 1993). Because of this, the study shifted to ordinal logistic regression which is more tolerant of issues regarding skewness. Ordinal regression categories were created by dividing counties into groups with no breweries at all, those who saw very small growth, and those who saw large growth between 1990 and 2010. Among the assessments of the appropriateness of this type of regression is the test of parallel lines (O'Connell 2006). This measures the assumption of proportional odds in the model. Because the test of parallel lines was significant in this test, we must reject ordinal regression as well. With linear and ordinal regression rejected, the study refocused on binary and multinomial regression models.

Binary logistic regression is an appropriate way to examine how counties' relative growth of breweries is affected by the independent variables. Logistic regression is not linear regarding

the probabilities of the dummy variable created, though the latent dependent variable is treated as if it is linear (Pampel 2000; Best & Wolf 2014). The dependent variables are discrete measures limited to two outcomes. Binary logistic regression makes several assumptions (Best & Wolf 2014). First, it requires the dependent variable to be a binary measure. Second, the independent variables must be continuous, ordinal, or nominal. Third, this type of regression must not have perfect collinearity among the independent variables. The correlations among the independent variables should be as small as possible. Among the independent variables used in this study, two of the VIF measures are slightly higher than the preferred range of collinearity.¹ Percentage of the population who are immigrants and percentage who identify as LGBTQ are 11.406 and 12.635, respectively. For no collinearity issues to be determined, the values for VIF must be between 1 and 10. However, with these values only slightly higher than the upper bound, it was decided to move forward with the analysis. Fourth, this type of regression assumes the observations are independent of each other and that the categories are mutually exclusive of each other. To create a binary measure, whether a county has any breweries or not in 2010 is used.

Using this binary measure of growth in brewery concentration then, a binary logistic regression model can be described as such:

$$P(Y) = \frac{e^{b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_{23}X_{24}}}{1 + e^{b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_{23}X_{24}}}$$

Where:

$P(Y)$: the probability of county having at least one brewery

e : natural logarithm base

b_0 : interception at Y-axis

b_1 : line gradient

¹ For collinearity diagnostics, refer to Table 12 in Appendix A

- X1*: Percentage of cropland planted with barley in a county
- X2*: Percentage of cropland planted with hops in a county
- X3*: Percentage of businesses manufacturing metal tanks in a county
- X4*: Percentage of businesses manufacturing pumping equipment in a county
- X5*: Percentage of businesses manufacturing refrigerators in a county
- X6*: Percentage of businesses manufacturing packing equipment in a county
- X7*: Percentage of businesses that are bars
- X8*: Percentage of businesses that are liquor stores
- X9*: Population over 21 (legal drinking age)
- X10*: Median income in a county
- X11*: Dry county (no alcohol sales allowed at any time)
- X12*: Percentage of a county that identifies as Lesbian, gay, bisexual, transgender, or queer
- X13*: Percentage of a county that is foreign-born immigrants
- X14*: Percentage of businesses in a county that are software jobs
- X15*: Percentage of businesses in a county that are jobs related to creative designing
- X16*: Percentage of businesses in a county that are computer jobs
- X17*: Percentage of businesses in a county that are coffee (or otherwise non-alcoholic) bars
- X18*: Percentage of businesses in a county that are related to art creation and/or consumption
- X19*: Percentage of businesses in a county that are museums
- X20*: Percentage of people in a county with a high school education or higher
- X21*: Percentage of people in a county with a bachelor's degree or higher
- X22*: Percentage of a county that is urban
- X23*: Percentage of a county that is white

X24: Percentage of a county that is non-Hispanic

Following this, a multinomial regression model was created to elaborate on these differences. The multinomial model is an extension of the binary logistic model discussed previously (Liao 1994; Best & Wolf 2014). Multinomial regression makes several assumptions that must be met, which are intrinsically similar to the assumptions of the binary model (Best & Wolf 2014). The first of these is that the dependent variable is nominal in nature, and that the variable has three or more categories. The second assumption is one or more independent variables that are continuous, ordinal, or categorical. The third assumption is the independence of observations. The dependent variable should have mutually exclusive categories. The fourth assumption is as little collinearity as possible. There cannot be any perfect collinearity between the independent variables in the model. As discussed previously, there are two variables with slightly higher collinearity values than preferred, but the study moved forward using them because they are only slightly higher than the preferred values of collinearity. Furthermore, both variables are theoretically relevant to the study. Removing one may affect the measurement for the latent concept of the creative class.

For the multinomial measure, the difference in location quotient for 1990 and 2010 is calculated. Of the counties that saw growth, only those with a location quotient over one are included. This is because having a location quotient over one implies that the county has more relative breweries than the national average. Following this, the median is found for this group of counties, and those counties in the top half are included as group 2 in the dependent variable. Those counties that are below the median of this larger group are labeled 1. All other counties, including those in the bottom half of growth, those with growth but a location quotient below 1, those that saw a decline in location quotient, and those counties without any breweries, are all

labeled as 0. The multinomial categories will be ranked as 2 (counties who saw growth in location quotient between 1990 and 2010, have a location quotient over 1, and are above the median in brewery growth), 1 (counties who saw growth in location quotient between 1990 and 2010, have a location quotient over 1, and are below the median in brewery growth), and 0 (all counties without any brewery growth between 1990 and 2010). The 0 category, in this case, includes counties that do not have any breweries in 2010 or saw a reduction in the breweries' location quotient between 1990 and 2010. Beyond this measure of growth in beer breweries, all other variables are cross-sectional from 2007 or 2010. Because of this, the model identifies cross-sectional correlates of a county being a growth center or not in 2010.

Using this classification of categories, the multinomial regression model can be described as:

$$P(Y = 2) = (1 / +e^{-(a_2 + b_1x_1 + b_2x_2 + b_3x_3)})$$

$$P(Y = 1) = (1 / +e^{-(a_1 + b_1x_1 + b_2x_2 + b_3x_3)}) - P(Y=2)$$

$$P(Y = 0) = 1 - P(Y = 1) - P(Y = 2)$$

Where:

$P(Y)$: Predicted probability of categories of brewery growth (2, 1, 0)

X_1 : Percentage of cropland planted with barley in a county

X_2 : Percentage of cropland planted with hops in a county

X_3 : Percentage of businesses manufacturing metal tanks in a county

X_4 : Percentage of businesses manufacturing pumping equipment in a county

X_5 : Percentage of businesses manufacturing refrigerators in a county

X_6 : Percentage of businesses manufacturing packing equipment in a county

X7: Percentage of businesses that are bars

X8: Percentage of businesses that are liquor stores

X9: Population over 21 (legal drinking age)

X10: Median income in a county

X11: Dry county (no alcohol sales allowed at any time)

X12: Percentage of a county that identifies as Lesbian, gay, bisexual, transgender, or queer

X13: Percentage of a county that is foreign-born immigrants

X14: Percentage of businesses in a county that are software jobs

X15: Percentage of businesses in a county that are jobs related to creative designing

X16: Percentage of businesses in a county that are computer jobs

X17: Percentage of businesses in a county that are coffee (or otherwise non-alcoholic) bars

X18: Percentage of businesses in a county that are related to art creation and/or consumption

X19: Percentage of businesses in a county that are museums

X20: Percentage of people in a county with a high school education or higher

X21: Percentage of people in a county with a bachelor's degree or higher

X22: Percentage of a county that is urban

X23: Percentage of a county that is white

X24: Percentage of a county that is non-Hispanic

Using this multinomial logistic regression model, the predicted probabilities of each outcome in the categorical measure. The multinomial measure for brewery growth between 1990 and 2010 will be regressed on the independent variables based on upstream inputs, downstream inputs, the creative class, and cultural capital. Holding each of these theories constant, this study

will examine how each concept affects the location and concentration of breweries in U.S. counties in the year 2010.

Chapter 5 - Empirical Findings

Using data from the 1990 and 2010 United States Census, every 1990 and 2010 county in the U.S. was represented in the study population. As a reminder, the research questions we are interested in for this study are:

What counties in the U.S. had the highest concentration of beer breweries in 1990?

What counties in the U.S. had the highest concentration of beer breweries in 2010?

How has the concentration of breweries changed in the U.S between 1990 and 2010?

How does the location of upstream components for beer affect the location of beer breweries?

How does the location of downstream components for beer affect the location of beer breweries?

To address the first and second research questions, location quotients of beer breweries were calculated on all 1990 and 2010 U.S. counties. For the third research question, the raw numbers of breweries, breweries per business, and location quotients are used to compare 1990 and 2010 breweries in the U.S. To address the fourth and fifth research questions, binary logistic regression and multinomial regression analyses are performed using the variables for 2010 county statistics and a variable measuring the growth in breweries between 1990 and 2010. This chapter addresses each of these research questions, beginning with the concentration of breweries in 1990.

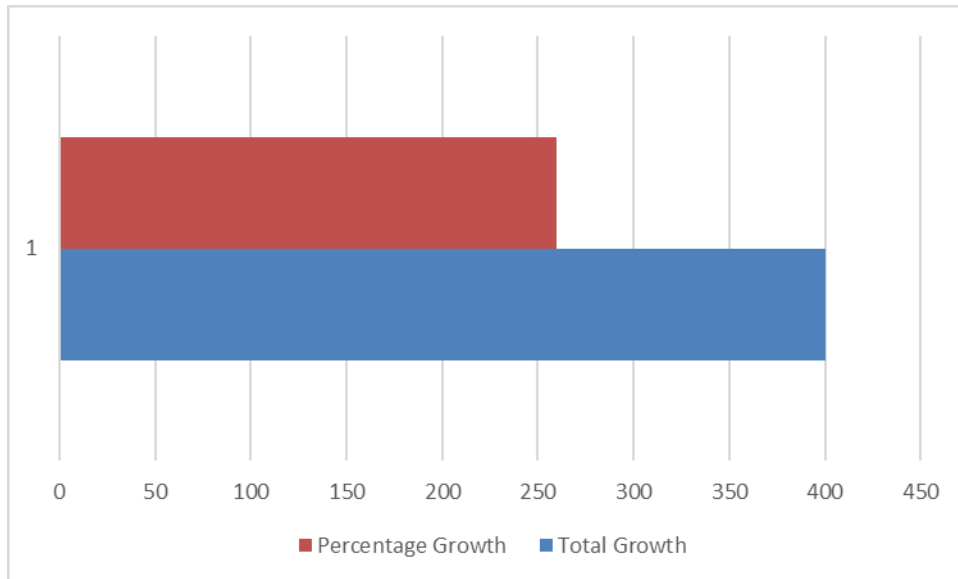
Growth and Location of Beer Breweries

The location and expansion of beer brewing in the U.S. can be viewed from several different angles with the available data. To better understand how brewery locations in the U.S. have changed and grown, several different types of descriptive analyses are performed

comparing the years 1990 and 2010. The most straightforward is the top counties by raw numbers of breweries added between these years. Next, the top counties by the percentage of breweries per business in a county are examined. Following this, the location quotient is calculated for each year and compared. Lastly, the top counties by the difference in location quotient are described. Between these different methods of describing brewery growth in the U.S., commonalities and differences can be seen among the different counties.

Figure 1 shows the raw number of breweries added between 1990 and 2010, as well as the rate growth of the same years. 400 breweries were added during this 20-year period, for a rate of over 250 percent growth between 1990 and 2010. With this overall growth in mind, the breakdown of county-level growth is discussed below.

Figure 1 Overall Brewery Growth 1990 to 2010



It is also useful to examine the overall raw growth of breweries in U.S. counties. This is especially appropriate because the forthcoming tables that focus on the counties with the highest location quotients have very few total breweries. While this is interesting, it does not show the entire story of brewery growth in the U.S. during this time. Using raw number difference

between 2010 and 1990 will show a different top 20 counties than location quotient measures.

Table 1 below lists the top 20 counties by the raw number of breweries.

Table 2 Raw Brewery Growth

County, State	Location Quotient Difference	Total Brewery Growth
San Diego County, California	1.804196	13
Travis County, Texas	2.817625	6
Gallatin County, Montana	14.02744	5
Yellowstone County, Montana	12.12213	5
Buncombe County, North Carolina	9.273034	5
Summit County, Ohio	4.906767	5
Bernalillo County, New Mexico	4.187203	5
Charleston County, South Carolina	4.595582	4
Kent County, Michigan	3.47849	4
Snohomish County, Washington	3.135399	4
Kings County, New York	1.107717	4
Otsego County, New York	27.75741	3
Kenai Peninsula Borough, Alaska	20.36296	3
Green County, Wisconsin	7.788622	3
Jackson County, Oregon	6.922562	3
Whatcom County, Washington	6.414789	3
Mendocino County, California	5.894013	3
Santa Barbara County, California	3.574011	3
Washoe County, Nevada	3.419614	3
Kern County, California	3.358821	3

Looking at the top counties by total brewery growth offers a different view of the brewing industry since 1990. Here different counties are shown than in the upcoming descriptive tables. Table 2 shows counties that have seen a large growth in the raw number of breweries, while also having more industry in general. While the location quotient is not the highest among

counties with breweries in the U.S., these counties still have an above-average relative concentration of breweries compared to the rest of the country and growth in the relative concentration of breweries since 1990.

The second step in describing brewery growth data is examining the top counties by breweries as a percentage of businesses. Table 3 is the top twenty counties in 2010 by percentage of their businesses that are breweries. The percentage of breweries for all business in the counties are listed, along with the total raw number of breweries added since 1990.

Table 3 Percentage of Businesses 2010

County, State	Breweries as Percent of Businesses	Total Brewery Growth
Haines Borough, Alaska	0.0077%	1
Worth County, Iowa	0.0058%	1
Tucker County, West Virginia	0.0057%	1
Skagway Municipality, Alaska	0.0053%	1
Teton County, Idaho	0.0047%	2
Green County, Wisconsin	0.0042%	4
Jackson Parish, Louisiana	0.0039%	1
Blanco County, Texas	0.0039%	1
Ouray County, Colorado	0.0036%	1
Lincoln County, Washington	0.0035%	1
Wallowa County, Oregon	0.0029%	1
Mariposa County, California	0.0028%	1
Shoshone County, Idaho	0.0027%	1
Schuyler County, New York	0.0027%	1
Nelson County, Virginia	0.0025%	1
Carbon County, Montana	0.0025%	1
Jackson County, Wisconsin	0.0024%	1
Gasconade County, Montana	0.0024%	1
Aitken County, Minnesota	0.0023%	1
Asotin County, Washington	0.0023%	1

It is important to note that all but two of the counties in Table 3 only have one brewery in 2010. This means that they have a small number of businesses, with one brewery being a very

large percentage of their businesses. Green County, Wisconsin offers an interesting case, however. Four breweries and being in this table implies that beer brewing is a large part of their local social ecology. This may also be true of Teton County, Idaho, which has two breweries. This is less drastic than Green County but is the only other county with more than one brewery that is in the top 20 breweries as a percentage of businesses.

For Table 4, location quotients were calculated using the 1990 County Business Patterns survey. With location quotient, a number above '0' is interpreted as having business concentration above the national average. A number below '0' is interpreted as having a business concentration below the national average. Table 4 lists the top 20 U.S. counties in 1990 in descending order of brewery location quotient. A notable feature of all top 20 counties for brewery concentration in 1990 is that each only has one brewery total. This is a function of the small number of breweries in the U.S. altogether at this time. Furthermore, this is the result of counties with a brewery in them, but not a large number of total industries, having higher concentrations of the newly emerging phenomenon of brewery growth. The highest concentration of breweries in the U.S in 1990 was in Iowa County, Iowa. With this analysis, Wisconsin has the most counties represented in the top 20 of brewery concentration, with three.

Table 4 Location Quotient 1990

County, State	Location Quotient	Total Breweries
Iowa County, Iowa	96.39678	1
Hood River County, Oregon	73.31089	1
Stevens County, Washington	63.15127	1
Summit County, Utah	62.75596	1
Brown County, Minnesota	52.4883	1
Green County, Wisconsin	48.78474	1
Elk County, Pennsylvania	47.73936	1
City and Borough of Juneau, Alaska	45.72527	1
Muscatine County, Iowa	41.81549	1
Rockingham County, Virginia	38.93307	1
Teton County, Wyoming	36.65545	1

Chippewa County, Wisconsin	34.71953	1
Williamsburg City, Virginia	33.41755	1
Salt Lake County, Utah	32.97784	1
Siskiyou County, California	31.15855	1
Portage County, Wisconsin	29.72651	1
Eagle County, Colorado	28.9957	1
Lewis & Clark County, Montana	25.70581	1
Adams County, Pennsylvania	25.64006	1
Rockingham County, North Carolina	24.49668	1

For the more recent past, location quotients of breweries were calculated for the year 2010. Table 5 lists the top 20 U.S. counties in 2010 in descending order of brewery location quotient. With 20 years of change in the brewing industry between 1990 and 2010, most of the counties found in the top 20 concentration by location quotient have changed. Only Green County, Wisconsin remains in the top 20. Again, there are many counties with only one brewery. But unlike 1990, there are three counties with two or more breweries, reflecting the continued growth and expansion of the number of breweries in general during these decades. The highest concentration of breweries is found in Haines Borough, Alaska. Unlike in 1990, the states with the greatest number of counties with a high concentration of breweries are spread out amongst three. Wisconsin remains, but is joined by Alaska and Washington.

Table 5 Location Quotient 2010

County, State	Location Quotient	Total Breweries
Haines Borough, Alaska	103.4986	1
Worth County, Iowa	77.62392	1
Tucker County, West Virginia	76.73169	1
Skagway Municipality, Alaska	71.01763	1
Teton County, Idaho	63.42667	2
Green County, Wisconsin	56.57336	4
Jackson Parish, Louisiana	52.98141	1
Blanco County, Texas	52.56423	1
Ouray County, Colorado	48.90591	1

Lincoln County, Washington	47.17779	1
Wallowa County, Oregon	39.26857	1
Mariposa County, California	37.82242	1
Shoshone County, Idaho	36.88208	1
Schuyler County, New York	36.67943	1
Nelson County, Virginia	34.5889	1
Carbon County, Montana	34.14658	1
Jackson County, Wisconsin	32.56418	1
Gasconade County, Missouri	32.17184	1
Aitkin County, Minnesota	31.41486	1
Asotin County, Washington	30.90582	1

With the vast majority of these counties only having one brewery despite the high location quotient, it is useful to look at the counties with the largest growth in location quotient between 1990 and 2010. Here the data is reorganized based on the highest difference in 2010 and 1990 location quotient. Table 6 lists the difference in location quotient between 1990 and 2010 in descending order.

Table 6 Location Quotient Growth

County, State	Location Quotient Difference	Total Brewery Growth
Haines Borough, Alaska	103.4986	1
Worth County, Iowa	77.62392	1
Tucker County, West Virginia	76.73169	1
Skagway Municipality, Alaska	71.01763	1
Teton County, Idaho	63.42667	2
Jackson Parish, Louisiana	52.98141	1
Blanco County, Texas	52.56423	1
Ouray County, Colorado	48.90591	1
Lincoln County, Washington	47.17779	1
Wallowa County, Oregon	39.26857	1
Mariposa County, California	37.82242	1
Shoshone County, Idaho	36.88208	1
Schuyler County, New York	36.67943	1
Nelson County, Virginia	34.5889	1
Carbon County, Montana	34.14658	1
Jackson County, Wisconsin	32.56418	1
Gasconade County, Missouri	32.17184	1
Aitkin County, Minnesota	31.41486	1

Asotin County, Washington	30.90582	1
Jersey County, Illinois	29.40818	1

Again, the top counties in the measure are mostly made up of counties that had one brewery in 2010. The top growth counties by location quotient are defined by counties without much industry and have one or two breweries founded since 1990. This is interesting in that it shows that the reach of American breweries continues to expand into more rural areas. It is not defined only by cities with large populations.

Each of these approaches shows how breweries are expanding to different parts of the U.S., even while some counties remain primary hotbed areas of beer brewing. Some rural areas are seeing growth by relative concentration, even while only adding one or two breweries. Meanwhile, some urban areas have added many breweries, giving them a larger growth in the raw number of breweries.

Descriptive Statistics

Using the location quotients created in the previous section, regression analyses can be estimated on the available data. Before discussing the regression analysis results, it is useful to look at the descriptive statistics for the variables used. The descriptive statistics for the 2010 brewery location quotient, as well as the various independent variables, are presented below. Tables 7 and 8 show the univariate analysis of the study variables. Table 7 shows the sample mean, sample median, standard deviation, skewness, minimum values, and maximum values for each variable used in this study. Table 8 shows the quartiles for each variable used in this study. The implications of this analysis are discussed below.

Table 7 Descriptive Statistics

Variable	\bar{x}	SD	Skewness	Min	Max
Location Quotient	0.92	5.09	10.14	0	108.55
Location Quotient Difference	0.39	5.60	3.96	-68.17	103.50
Hops Farms	0.009%	0.0009	14.31	0%	1.83%
Barley Farms	1.71%	0.05	5.25	0%	61.22%
Tanks Jobs	0.004%	0.0003	16.47	0%	0.9%
Pumping Jobs	0.009%	0.0005	9.47	0%	0.82%
Refrigerator Jobs	0.03%	0.00001	9.78	0%	2.5%
Packing Jobs	0.004%	0.0003	11.37	0%	0.61%
Bars	0.8%	0.02	33.94	0%	100%
Stores	0.45%	0.005	3.03	0%	6.69%
21 & Up	71670.59	227279.51	14.244	72	7106647
Median Income	\$29638.76	5618.92	1.43	\$15223	\$69076
LGBTQ	0.004%	0.02	52.0	0%	0.8%
Immigrants	0.05%	0.16	45.62	0%	8.2%
Software Jobs	.03%	0.001	24.26	0%	5.0%
Design Jobs	0.14%	0.002	2.51	0%	2.22%
Computer Jobs	0.61%	0.009	4.67	0%	12.02%
Coffee Shop Jobs	4.21%	0.005	4.7	0%	10.0%
Arts Jobs	.06%	0.003	37.46	0%	15.0%
Museum Jobs	0.13%	0.003	6.08	0%	5.0%
High School Graduates	83.09%	0.07	-0.89	32.2%	99.3%
College Graduates	19.03%	0.09	1.54	3.70%	71.00%
Urban	41.33%	31.51	0.16	0%	100%
White	82.89%	16.86	-1.6	2.7%	99.3%
Non-Hispanic	91.72%	13.19	-3.27	4.3%	100%

Table 8 Variable Quartiles

Variable	Min	25th	50th	75th	Max
Location Quotient	0	0	0	0	108.55
Location Quotient Difference	-68.17	0	0	0	103.50
Hops Farms	0%	0%	0%	0%	1.83%
Barley Farms	0%	0%	0%	0.6%	61.22%
Tanks Jobs	0%	0%	0%	0%	0.9%
Pumping Jobs	0%	0%	0%	0%	0.82%
Refrigerator Jobs	0%	0%	0%	0%	2.5%
Packing Jobs	0%	0%	0%	0%	0.61%
Bars	0%	0%	0.43%	1.0%	100%
Stores	0%	0.05%	0.34%	0.63%	6.69%
21 & Up	72	8183	19076	49332	7106647
Median Income	\$15223	\$26039	\$28709	\$31843	\$69076
LGBTQ	0%	0.002%	0.003%	0.005%	0.8%
Immigrants	0%	0.01%	0.02%	0.05%	8.2%
Software Jobs	0%	0%	0%	0%	5.0%
Design Jobs	0%	0%	0%	0.22%	2.22%
Computer Jobs	0%	0%	0.36%	0.8%	12.02%
Coffee Shop Jobs	0%	0%	0.36%	0.63%	10.0%
Arts Jobs	0%	0%	0%	0.07%	15.0%
Museum Jobs	0%	0%	0%	0.14%	50%
High School Graduates	47.90%	78.40%	84.60%	88.60%	99.3%
College Graduates	3.70%	13.1%	16.9%	22.6%	71.0%
Urban	0%	11.59%	40.46%	66.69%	100%
White	2.7%	75.2%	89.1%	95.5%	99.3%
Non-Hispanic	4.3%	91.8%	96.7%	98.4%	100%

Dependent Variables

The original dependent variable attempted in this study is the location quotient of breweries in 2010. The descriptive statistics for the brewery location quotient can be found in Table 7. The univariate statistics indicate that most counties have zero breweries, largely skewing the dependent variable data. The location quotient of breweries ranges from 0 to 108.55, with a mean of 0.92. Similarly, the descriptive statistics for the difference in 1990 and 2010 location quotient shows all but the extreme ends of the percentiles as being zero. With the number of overall breweries having grown in these years, some counties saw a large decrease in

their location quotient due to only having one brewery both years. Others saw large increases in location quotient through the expansion of breweries to more rural and less populated counties. The lowest location quotient difference is -68.17, while the highest is 103.50. Because the location quotient features extreme skewness and cannot be fit into acceptable parameters with power transformations, the ratio level dependent variable had to be abandoned. Ordinal regression was then attempted but then abandoned because of a failure to pass a test of parallel lines. To further clarify the shape that 2010 brewery data takes, binary logistic and multinomial regression analyses are conducted—two analytic approaches that accommodate the peculiarities of the data. The binary model is based on whether a county had any breweries at all in 2010.

For the multinomial analysis, the dependent variable is computed using the difference in 1990 and 2010 brewery location quotient, then using only those which saw growth and had a location quotient over 1 (showing the county has a higher relative concentration of breweries than the national average). Narrowing down counties this way was chosen because this study is interested in the growth of breweries between the years 1990 and 2010 and where there is an overrepresentation of breweries relative to the rest of the U.S. Of these, the counties that saw a total brewery growth of three or more since 1990 were categorized as ‘2.’ Of those counties meeting the first two requirements, those that saw a total growth of one or two breweries since 1990 were categorized as ‘1.’ The study population is all 3143 U.S. counties and county-equivalents. Of these, there are 24 counties in category ‘2,’ 174 counties in category ‘1,’ with 2,945 counties making up category ‘0.’

Control Variables

Control variables for the analysis include measures of the percentage of the white population and Hispanic ethnicity, as well as the percentage of county that is urban. Descriptive

statistics for the control variables are displayed in Table 7. The findings indicate that the majority of counties are at least half rural, with a range from 0 percent urban up to 100 percent urban, and a mean of 41.33 percent. The findings also indicate that most counties are majority white, with a range of 2.7 percent white up to 99.3 percent white, and a mean of 82.89 percent. Similarly, the findings indicate that most of the counties are majority Non-Hispanic, with a range of 4.3 percent Non-Hispanic, up to 99.2 percent Non-Hispanic, and a mean of 91.72 percent.

Table 8 displays the quartiles for the control variables. Race and ethnicity show very large changes from the minimum to the 25th percentile. Some counties are over 95 percent Hispanic or non-white, but most counties are majority non-Hispanic white, as shown with the large percentage jump here. The percentiles of for urban percentage is more gradual and a more normal curve of change, from 0 to 11.59, to 40.46, to 66.69, and 100 percent of counties as urban areas.

Upstream Inputs

Indicators used to measure upstream inputs into the commodity chain of breweries include the percentage of farmland used for hops and barley, as well as the percentage of places of employment for pumps, refrigerators, tanks, and packing equipment. All of these measures were highly skewed due to the high concentration in specific counties for farmland and the factories for such heavy equipment and a large number of counties recording zeros.

Table 8 describes the quartiles for these upstream inputs to the commodity chain. All of the manufacturing occupations related to the chain of beer production have zeros across the quartiles. These jobs only show up beyond the 75th percentile. Even the maximum percentage of these is quite low as compared to other types of occupations in this study. For pumping equipment manufacturing, the maximum is 0.82 percent. For tanks manufacturing the maximum

is 0.9 percent. For packing equipment manufacturing, the maximum is 0.61 percent. And for refrigerator manufacturing, the maximum is 2.5 percent. This is also true of hops farmland. The only quartile this shows is in the maximum of county's farmland, at 1.83 percent. Barley farmland does have the 75th percentile of 0.6 percent, indicating a somewhat lower skewness than the other upstream inputs. The maximum percentage of a county's farmland that is barley is 61.22 percent.

Downstream Inputs

As with upstream inputs, indicators related to the commodity chain of beer brewing are measured. Downstream inputs are measures for people who consume alcoholic beverages. This includes whether a county is 'dry' or not, percentage of the population who is 21 and up, median income, percentage of workplaces that are liquor stores, and percentage of workplaces that are bars. Table 7 shows the average 21 and up population to be 71,670.59, the average median income to be \$29,638.76, the average liquor store percentage to be 0.45, and the average bar percentage to be 0.8.

Table 8 indicates the drinking age population and median income to be less skewed than the various occupations used for this study. For ages 21 and up, the minimum is 72, followed by 8,183 at the 25th percentile, 19,076 at the 50th percentile, 49,332 at the 75th percentile, and finally a maximum of 7,106,647. For median income, the minimum is \$15,223, followed by \$26,039 at the 25th percentile, \$28,709 at the 50th percentile, \$31,843 at the 75th percentile, and finally a maximum of \$69,076. As discussed above, the occupations are more skewed. Unlike the upstream occupations, however, the downstream measures are less skewed. The minimum for both liquor stores and bars is zero as well. However, the 25th percentile for liquor stores is 0.05 percent, the 50th percentile is 0.34 percent, the 75th percentile is 0.63 percent, and the maximum

is 6.69%. For bars, the 25th percentile is 0 percent, the 50th percentile is 0.43 percent, the 75th percentile is 1 percent, and the maximum is 100 percent (an extreme outlier county with only one place of employment).

Measures of the Creative Class

Indicators used to measure the creative class include measures for the percentage identified as belonging to the LGBTQ community, percentage immigrants, percentage of software jobs, percentage of computer jobs, and percentage of design jobs. The descriptive statistics for these measures are located in Tables 7 and 8. The concentration of all three occupational measures of the creative class feature large numbers of zeros, skewing the data to an extent. Software jobs are particularly limited to a low number of counties, skewing these numbers worse than other occupations related to the theory of the creative class. Design and computer jobs are skewed to a less extreme extent but features large amounts of zero values. However, these are fewer extreme examples of concentration than in breweries, with lower location quotients for the highest-ranking counties. LGBTQ and immigrant percentages are both consistently low across the U.S. Part of this is a function of the difficulty in measuring LGBTQ and immigrant populations. The true numbers of these may not be reflected as well in the U.S. Census data as other populations. Nevertheless, these low percentages offer a glimpse into the open-mindedness of a given county. Because the skewness of these variables does not interfere with the assumptions of the regression model, no transformations were conducted on these independent variables.

Table 8 displays the quartiles for these measures of the creative class. The quartiles show the skewness discussed previously. For most of these variables, there is a high concentration in the highest value counties. The minimum is 0, while most of the quartiles remain 0 as well, or

very low percentages/location quotients. The percentage of a county that is immigrant is the least skewed of these measures. The 25th percentile is 0.01 percent, the 50th percentile is 0.02 percent, then 0.05 percent in the 75th. The maximum percentage of a county that is immigrant is 8.2 percent. LGBTQ populations are also less skewed. The minimum is zero for this as well, but the 25th percentile is 0.002 percent. The 50th percentile is 0.003 percent. The 75th percentile is 0.005 percent. And the maximum percentage of a county that identifies as LGBTQ is 0.8 percent. Software jobs are only found in the very top percentiles of U.S. counties, with none at all found below the 75th percentile. The maximum percentage of a county's businesses that are software companies is 5 percent. Computer jobs have spread further, with 0.36 percent at the 50th percentile. The 75th percentile is 0.8 percent. And the maximum percentage of a county's businesses that are computer jobs is 12.02 percent. Creative design jobs show up in the 75th percentile with 0.22 percent of businesses, and a maximum of 2.22 percent of businesses in a county.

Measures of Cultural Capital

Indicators used to measure cultural capital include measures for percentage with bachelor's degrees, the percentage with high school diplomas, percentage of businesses that are coffee bars, percentage of museums, and percentage of other arts jobs. The descriptive statistics for these measures can be found in Tables 7 and 8. As with the previous occupational measures, there is high skewness due to a large number of zeros. However, coffee shops and museums have noticeably smaller skewness than arts jobs (4.7 for coffee, 6.08 for museums, and 37.46 for arts jobs). The percentage of a county with a bachelor's degree ranges from 19.03 percent up to 71 percent, showing high inequality in this type of education. The 25th percentile is 13.1 percent, the 50th percentile is 16.9 percent, and the 75th percentile is 22.6 percent. The percentage of a county

with a bachelor's degree then rises noticeably between the 75th percentile and the maximum. The percentage of a county with a high school diploma ranges from 83.09 percent to 99.3 percent. The difference between the minimum and maximum for this measure is much smaller than that of bachelor's degrees. The 25th percentile is 74.4 percent, the 50th percentile is 84.6 percent, and the 75th percentile is 88.6 percent.

For occupational measures of cultural capital, skewness is more prevalent. Coffee jobs only show up at the 50th percentile with 0.36 percent, growing slowly beyond this. The 75th percentile is 0.63 percent. The maximum for this measure is 10 percent of companies in a county. Museum jobs only show up at the 75th percentile with 0.14 percent. The maximum for this 50 percent of a county's occupations. And other arts jobs only show up at the 75th percentile with 0.07 percent and a maximum of 15 percent. As with the skewness of the creative class, there are no assumptions violated for the model with the skewness. Because of this, no transformations are conducted on these independent variables.

Binary Logistic Regression Analysis

To clarify research questions four and five, a binary logistic regression is estimated to examine counties that had a brewery in 2010 and those that did not. While this type of regression is not measuring the changes in growth that are of interest for questions four and five, this analysis offers a more in-depth examination into where breweries are located in 2010 and how the independent variables affect this likelihood. The results for this binary regression can be found in the tables below.

Table 9 Binary Logistic Analysis

Effect	B	SE	Exp(B)	p
Hops Farms	172.358	52.816	7.149	.001
Barley Farms	1.542	1.164	4.674	1.85
Tanks Jobs	44.377	298.035	1.874	.882
Pumping Jobs	-180.808	258.106	.000	.484
Refrigerator Jobs	122.584	57.462	1.729	.033
Packing Jobs	353.673	222.466	3.964	.112
Bars	1.713	3.474	5.545	.622
Stores	-34.583	20.544	.000	.092
Ages 21 & Up	.028	.227	1.028	.903
Median Income	.000	.000	1.000	.219
Dry	-1.415	1.115	.243	.204
LGBTQ	115.649	21.560	1.681	.000
Immigrants	4.092	1.660	59.830	.014
Software Jobs	27.424	49.128	8.129	.577
Design Jobs	76.884	32.882	2.455	.019
Computer Jobs	-23.229	9.224	.000	.012
Coffee Shop Jobs	51.788	15.039	3.101	.001
Arts Jobs	23.094	21.945	1.070	.293
Museum Jobs	-13.147	36.596	.000	.719
High School Graduate	.086	.022	1.090	.000
College Graduate	.049	.013	1.050	.000
Urban	.020	.003	1.020	.000
White	-.006	.006	.994	.337
Non-Hispanic	-.008	.008	.992	.347
N = 3140				
$\chi^2 = 618.699$				
P = .000				
Cox & Snell $r^2 = 0.179$				
Nagelkerke $r^2 = 0.370$				

The binary logistic model is significant, as shown in the omnibus test of model coefficients in Table 9. All these models are the same because there were no stepwise variables in this regression model. Because of this, we can use this model to examine how the independent variables affect the odds ratio for a county having a brewery or not. Though nominal regression does not have a true r^2 , several pseudo- r^2 measures are estimated. The Cox and Snell r^2 is 0.179. This is the lowest of the two pseudo- r^2 . The Nagelkerke r^2 is 0.370. There are several different pseudo- r^2 because there is no broad consensus on how to measure the predictive relationship of log-linear analysis (Menard 2010). Because of this, the pseudo- r^2 is not used to measure goodness-of-fit as OLS r^2 shows. Instead, these measures are used to compare which model better predicts the outcome being studied. For the pseudo- r^2 to be meaningful, one must compare the measures across different models with the same outcomes.

Table 9 also shows the breakdown of the different variables in this model. For variables measuring the commodity chain of beer brewing, only two upstream and no downstream components are significant in this model. Percentage of a county's farmland that grows hops ($p = .001$; $\text{Exp}(B) = 7.149$) and refrigerator job manufacturing ($p = .033$; $\text{Exp}(B) = 1.729$) are significant for this commodity chain .033. Counties that have more land for growing hops and businesses involved in refrigeration equipment are more likely to feature breweries in 2010. All other upstream and downstream variables of the commodity chain are not significant in this model. This includes the percentage of a county's farmland that is for barley, percentage of businesses that is tanks manufacturing, percentage of businesses that are pumping equipment manufacturing, percentage of businesses that are packing equipment manufacturing, percentage of businesses that are liquor stores, percentage of businesses that are bars, percentage of the population who are drinking age, whether a county is dry or not, and median income.

The creative class variables that are significant is percentage of a county's population that identify as LGBTQ ($p = .000$; $\text{Exp}(B) = 1.681$), percentage who are immigrant ($p = .014$; $\text{Exp}(B) = 59.830$), percentage of businesses who work in creative design ($p = .019$; $\text{Exp}(B) = 2.455$), and percentage of a county's businesses that are computer focused ($p = .012$; $\text{Exp}(B) = 0.000$). This means that the only variable related to the creative class that is not significant for whether a county has any breweries at all is software jobs as a percentage of all firms. The control theory of the creative class is a very strong predictor for a county having a brewery or not as a result.

Lastly, for measures of cultural capital, percentage of the population with high school diplomas ($p = .000$; $\text{Exp}(B) = 1.090$), percentage of the population with bachelor's degrees ($p = .000$; $\text{Exp}(B) = 1.050$), and percentage of businesses that are coffee shops ($p = .001$; $\text{Exp}(B) = 3.101$) are all significant. These three aspects of cultural capital are more likely to be in counties that have breweries as well. All other measures of cultural capital (percentage of a county's businesses that are museums and arts jobs) are not significant and cannot be used as an explanatory factor in this model.

It is also worth noting that holding all other variables equal, one control variable is still significant: the percent of a county that is urban ($p = .000$; $\text{Exp}(B) = 1.020$). This measure implies that more urban areas are more likely to have breweries than more rural areas. This seems to be true even with various downstream measures for consumers and upstream measures of brewery creation in the model.

Multinomial Regression Analysis

To further elaborate on research questions three and four, multinomial regression analysis was performed on the data. Multinomial regression was used to study the effects the study variables have on the location quotient of beer breweries in the U.S. The final population size for

the 2010 analyses is 3143 counties. As discussed in the previous chapter, a multinomial measure was created via a multi-step process. For the multinomial regression, the ‘0’ category is compared to the ‘1’ and ‘2’ categories separately. The results for this multinomial regression can be found in tables 10 and 11 below.

Table 10 Multinomial Analysis

Group 1 Compared to Group 0	B	SE	Exp(B)	p
Hops Farms	52.717	80.920	7.847	.515
Barley Farms	.976	1.947	2.654	.616
Tanks Jobs	92.556	650.309	1.573	.887
Pumping Jobs	-56.476	387.750	2.970	.884
Refrigerator Jobs	102.436	119.292	3.072	.391
Packing Jobs	243.395	536.621	5.072	.650
Bars	-34.888	19.518	7.055	.074
Stores	3.922	35.301	50.484	.912
Ages 21 & Up	.111	.578	1.117	.848
Median Income	.000	.000	1.000	.834
Dry	.944	1.071	2.569	.378
LGBTQ	62.779	26.067	.016	.000
Immigrants	-5.858	2.504	.019	.014
Software Jobs	73.291	85.632	6.758	.392
Design Jobs	64.408	51.905	9.377	.215
Computer Jobs	-33.300	16.109	3.451	.039
Coffee Shop Jobs	75.000	22.852	3.734	.001
Arts Jobs	30.124	79.625	1.210	.705
Museum Jobs	-126.227	107.600	1.514	.241
High School Graduate	.063	.036	1.065	.084
College Graduate	.031	.021	1.031	.146
Urban	.053	.007	1.055	.000
White	.003	.010	1.003	.735

Non-Hispanic -0.026 .012 .974 .024
 N = 3141
 $\chi^2 = 363.719$
 P = .000
 Cox & Snell $r^2 = 0.109$
 Nagelkerke $r^2 = 0.255$
 McFadden $r^2 = 0.207$

Table 11 Multinomial Analysis (cont.)

Group 2 Compared to Group 0	B	SE	Exp(B)	p
Hops Farms	129.983	58.552	2.825	.026
Barley Farms	1.565	1.367	4.783	.252
Tanks Jobs	-462.582	839.406	1.268	.582
Pumping Jobs	-381.121	513.204	3.028	.458
Refrigerator Jobs	34.021	85.855	5.959	.692
Packing Jobs	299.012	258.956	7.232	.248
Bars	.687	4.924	1.987	.889
Stores	-24.588	26.708	2.097	.357
Ages 21 & Up	-.019	.315	.981	.951
Median Income	.000	.000	1.000	.092
Dry	-19.734	.000	2.688	. ²
LGBTQ	42.686	26.676	3.453	.110
Immigrants	-.3.329	2.690	.036	.216
Software Jobs	-32.717	72.338	6.182	.651
Design Jobs	39.892	44.397	2.113	.369
Computer Jobs	-22.658	19.927	1.445	.256
Coffee Shop Jobs	50.584	18.159	9.301	.005

² The variable for whether a county is dry or not has a 0 standard error and missing probability value in this comparison group. The model was run without the variable, but no changes in the overall model occurred. Similarly, median income has a 0 standard error in this comparison group. The model was run without it, with no changes to the overall model.

Arts Jobs	1.046	58.217	2.848	.986
Museum Jobs	5.010	32.996	149.876	.879
High School Graduate	.090	.033	1.094	.006
College Graduate	.061	.019	1.062	.001
Urban	-.001	.004	.999	.889
White	.020	.013	1.020	.125
Non-Hispanic	-.010	0.15	.990	.508

N = 3141
 $\chi^2 = 363.719$
P = .000
Cox & Snell $r^2 = 0.109$
Nagelkerke $r^2 = 0.255$
McFadden $r^2 = 0.207$

The multinomial regression analysis is significant at the .000 level. This means we can use this model to measure how the independent variables affect the multinomial measure of brewery growth. Just as with the logistic regression above, multinomial regression does not have a true r^2 , several pseudo- r^2 measures are estimated. The Cox and Snell r^2 is 0.109. This is the lowest of the estimates the multinomial model has. The Nagelkerke measure of r^2 is the largest and is 0.255. And lastly, the McFadden measure of r^2 is 0.207. Because these measures are lower than the pseudo- r^2 for the binary model discussed previously, this multinomial analysis does not capture the differences in counties' brewery growth as well. Nonetheless, this model is still useful despite explaining less of the change in the dependent variable compared to the logistic regression model.

Interestingly, none of the upstream or downstream components of the brewery commodity chain are significant for the difference between counties with no breweries and those who have at least one brewery and saw the least amount of growth in the industry. Measures of

the creative class also have three significant variables. Percentage of a county's population who identify as LGBTQ is significant in this model ($p = .000$; $\text{Exp}(B) = .016$). Similarly, percentage of a county who are immigrants is significant ($p = .014$; $\text{Exp}(B) = .019$). Interestingly, these odds ratios indicate that higher LGBTQ and immigrant populations lower the odds of being in the category for at least one brewery and being in the bottom half of growth.³ Third, the percentage of firms that are focused on computer work is significant in this group ($p = .039$; $\text{Exp}(B) = 3.451$). Other measures of the creative class are not significant in this model. This includes the percentage of businesses that are software jobs and the percentage of businesses that are occupations related to creative design.

Lastly, only one variable for cultural capital is significant in the model for comparing no brewery counties and those with at least one brewery and in the bottom half of growth. Only coffee shops as a percentage of businesses are significant in this part of the model ($p = .001$; $\text{Exp}(B) = 3.734$). Counties with more coffee shops are more likely to have at least one brewery and be in the bottom half of growth than have no breweries at all. All other variables for cultural capital (percentage of businesses that are arts, percentage of businesses that are museums and percentage of the population with high school diplomas, and percentage of the population with college diplomas) are not significant.

It is worth noting again that the control variable for percent of a county that is urban is significant in the difference between counties with no breweries and counties that had at least one brewery and were in the bottom half of growth between 1990 and 2010 ($p = .000$; $\text{Exp}(B) =$

³ Note that this may be caused by collinearity of the two variables. VIF for the independent variables showed slightly elevated collinearity between immigrants and LGBTQ. Collinearity issues like this can cause independent variables to be less efficient, taking on a wider range of values.

1.055). Urbanity of a county is important to the difference in no breweries and a small amount of brewery growth relative to other businesses. Similarly, the variable for the non-Hispanic population is significant in the difference between the counties with no breweries and the bottom half of brewery growth ($p = .024$; $\text{Exp}(B) = .974$). The control variable for race (percentage of a county that is white) is not significant in this model.

Comparing counties with no breweries to those counties with at least one brewery and in the top half of brewery growth, several variables are significant. In terms of the variables for the commodity chain of beer breweries, only the hops variable is significant ($p = .026$; $\text{Exp}(B) = 2.825$). Counties with hop farms are more likely to be in the top half of brewery growth among those with at least one brewery, as compared to counties with no breweries at all. No other variables for upstream components of the commodity chain and none of the downstream components are significant. Percent of land that is barely farming, percent of businesses that manufacture refrigerators, packing equipment, pumping equipment, and tanks are all not significant. Percent of people who are of legal drinking age, whether a county is dry or not, percent of businesses that are bars and liquor stores, and median income are also not significant.

Lastly, three variables related to cultural capital are significant for the difference in categories for no breweries and at least one brewery and the top half of growth. High school graduates ($p = .006$; $\text{Exp}(B) = 1.094$), college graduates ($p = .001$; $\text{Exp}(B) = 1.062$), and coffee shops ($p = .005$; $\text{Exp}(B) = 9.301$) are all significant. Counties with higher percentages of people who have completed high school are more likely to be in the counties in the top half of brewery growth instead of no breweries at all. Similarly, counties with higher percentages of people who have completed a four-year college degree are more likely to be in the top half of brewery growth as well, as compared to no breweries at all. And as with the binary measure of counties

and the previous comparison group, coffee shops are significant. Counties with more coffee shops are more likely to be in the group that saw the most growth of breweries as compared to having no breweries at all.

None of the control variables are significant. This is interesting as urbanity has been significant in the first two analyses discussed. Race and ethnicity also do not matter for the difference in these two categories. For the creative class, none of the variables are significant. No measures for creative class (percent of the population who are LGBTQ, percent of the population who are immigrants, percent of businesses who are creative design, percent of businesses who are software development, and percent of businesses who are computer focused) in this analysis can be used for the difference between a county with no breweries and those with at least one brewery and in the top half of growth.

Chapter 6 – Discussion

This research study focused on the geographic distribution of the brewing industry and some of the social factors theorized to be related to it. Using location quotients, descriptive analyses, and regression analyses, the research questions discussed in this dissertation were explored. Because this study is exploratory in nature, the answers provided are limited in scope. Nonetheless, several interesting aspects of the data emerged.

Descriptive Analyses Discussion

The descriptive statistics used to answer questions about the location of counties in the U.S. and the changes found therein were the differences in the raw number of breweries from 1990 to 2010, the breweries per business in 1990 and 2010, the location quotients of breweries in 1990 and 2010, and the difference in location quotients in 1990 and 2010. For each of these types of descriptive analyses, the top 20 counties by each measure are listed for comparison.

Question one of this study is: *What counties in the U.S. had the highest concentration of beer breweries in 1990?* To answer this question, several lists of top counties of breweries by different measures was created. The top twenty counties by location quotient in 1990 illustrates where breweries were focused at the beginning of the period of growth discussed in this dissertation. This descriptive statistic did not show much, as each high location quotient only had one brewery in the county, and many of the related areas were rural in nature. The top twenty counties by location quotient for 2010 does add some interesting aspects to the comparison, as three counties feature more than one brewery. These counties are Haines Borough in Alaska, Teton County in Idaho, and Green County in Wisconsin. Lastly, the difference in location quotients for these years was calculated. The top counties stayed the same as the location quotients of 2010 with one exception. The only difference is Green County, Wisconsin, is

replaced by Jersey County, Illinois. Green County had a large location quotient in both the years 1990 and 2010, leading to the difference being smaller.

The list of top counties by raw growth in breweries is interesting in that it heavily features California, but also shows the spread of brewing across the U.S. California is one of the historical hotbeds for the contemporary brewing industry (Tremblay and Tremblay 2005; Ogle 2007). After the consolidation of brewing by the largest few firms in the 1940s, the new breweries that did emerge did so on the West Coast, including California (Ogle 2007). With New York and Montana included as states with multiple high growth counties, we can see the different avenues of growth in recent decades. New York is a population center akin to California and has had breweries founded to serve those populations and tourists. Montana, on the other hand, offers an alternative point. It is more rural, though it does have tourism focused on parks and nearby towns. It also shows the rural spread of brewing since 1990, a point also shown with several other counties in the top growth list. Lastly, one of the most interesting points is the inclusion of Green County in Wisconsin, as it has a much higher location quotient while also having a large total number of breweries added. This implies beer brewing is a central aspect of the area, which includes a university. As with a few of the other counties, the theory that college education leads to more craft drinking may explain the relatively high number of breweries here (Tremblay and Tremblay 2005).

The top breweries by percentage do not tell us much. Most counties only have one brewery, meaning there are not many businesses in the area at all. This does imply the rise and spread of brewing in more rural areas, and it attests to the overall spread across the U.S. (Tremblay and Tremblay 2005). The other interesting aspect is the position of Green County in

Wisconsin again. As with raw growth (as well as location quotient), it is high on the rankings of breweries per business. Again, it appears this area is important to brewing.

One interesting fact about the list of 1990 counties is that each of them only has one brewery. This means that they do not have much in the way of businesses of any sort. The one brewery may either be the major workplace for the area or part of a small town. Several of these counties are more rural and small-town areas not typically associated with brewery growth. Though this list does include a handful of counties associated with the rise in craft brewing (such as Wisconsin and Washington) (Tremblay and Tremblay 2005).

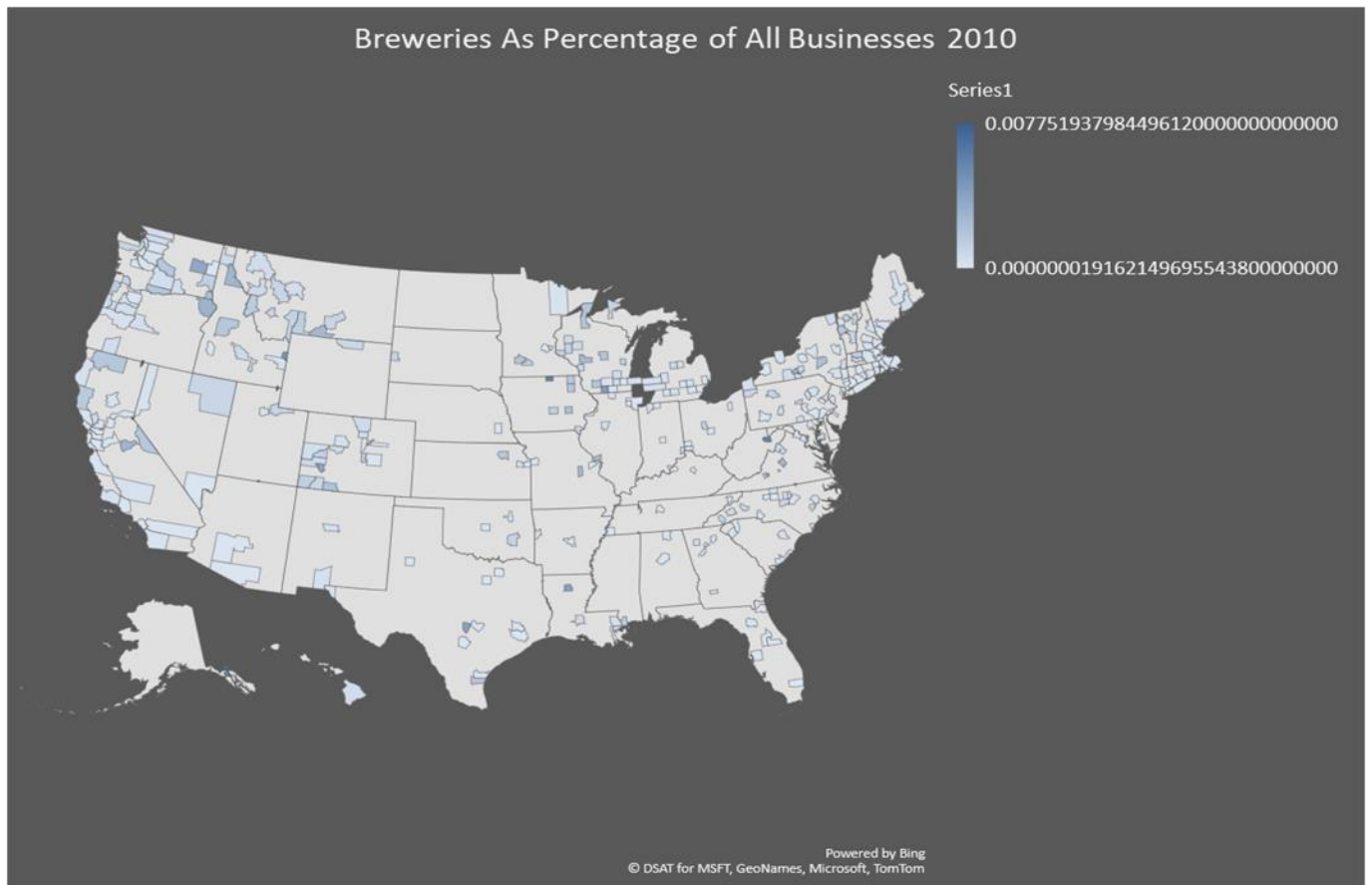
The biggest takeaway of a list of top brewery counties in 1990 is that having any brewery in each area increases the relative concentration for that area. The total number of breweries in the United States had bottomed out by the 1980s (Ogle 2007). Because of this, the breweries in 1990 were either part of those few left from the early 20th century or the earliest founded craft breweries that would come to define industry growth of recent decades. Some of these counties with one brewery may have only had a branch brewery for one of the major corporate brewing companies of the time (Anheuser-Busch, Coors, Miller). This offers a stark contrast to the state of brewing in the U.S. in 2010.

Question two of this dissertation is: *What counties in the U.S. had the highest concentration of beer breweries in 2010?* As with the question on 1990 breweries, list of top counties in brewing by different measures was created. Comparing the 2010 counties by location quotient, the notable similarities are how high several counties are with just one brewery again. This includes more places that seem not to be part of the areas typically associated with craft brewing but are different counties than those that appear in 1990. Just as with 1990, this implies rural or small-town counties without many places of employment. This may also be caused by

the general spread of breweries, which by the 2000s had spread significantly from 1990 (Tremblay and Tremblay 2005). Unlike 1990, however, three counties feature more than one brewery while still being in the top echelons of brewery location quotient. Two of these are in areas not particularly associated with craft beer by the literature (Alaska and Idaho). This supports the idea that beer brewing has spread to all corners of the U.S. in the intervening years. The third county is important, as it is Green County in Wisconsin. This county appeared in the 1990 top location quotients as well. This implies this is an important area for the rise of craft brewing.

The descriptive statistics used for this study show an interesting pattern of brewery growth in metropolitan areas as well as in less densely populated counties. Using heat maps for some of these measures of the brewing industry shows some of these interesting aspects, as well as the challenges of attempting to locate the geography of beer production in 2010. Figure 2 shows the United States' brewing per business in 2010. The darker shades show higher percentages. What this shows is more remote areas tend to have the highest concentrations, with a few higher concentrations located in various high-population centers in California.

Figure 2



Along the same lines, Figure 3 shows a heat map for the location quotient of beer brewing in the U.S. in 2010. This map offers more information on what brewing looks like in the U.S. Some more sparsely populated areas still show up. However, there are more urban and suburban areas that show up. This includes counties in states typically associated with the rise of craft brewing in California, Washington, and Wisconsin. This heat map shows the importance of these areas for breweries, while also pointing to some of the expansion into other areas of the country.

Figure 3



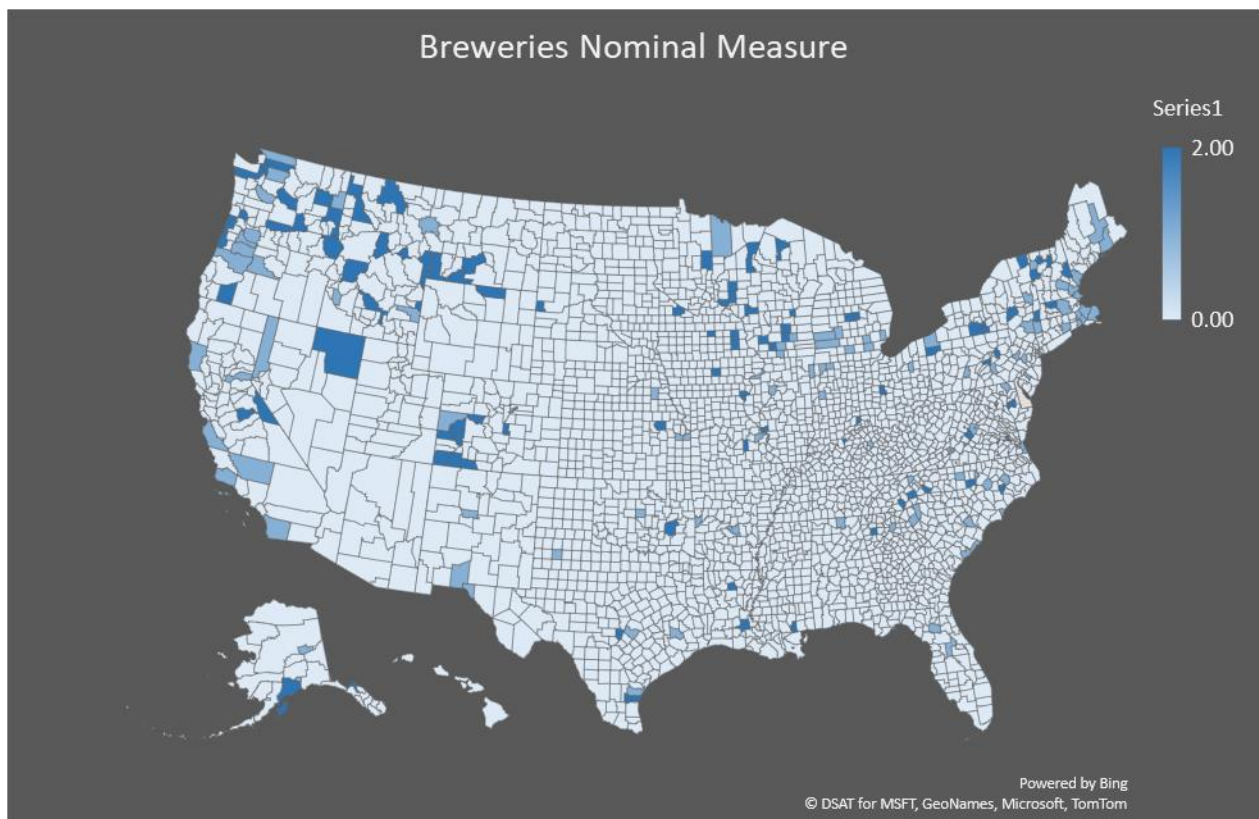
Figures 2 and 3 show the challenges of attempting certain types of analyses on this dataset. The large amounts of zero values with each different brewing variable make it difficult to assess the relationships between brewing and other variables. As figure 4 shows, a nominal measure of brewing in 2010 offers a much more intuitive way of examining the data, while also fixing the issues related to the skewness of these variables.

Question three of this dissertation is: *How has the concentration of breweries changed in the U.S between 1990 and 2010?* To answer this research question, measures of growth in breweries by county were calculated. The raw brewery growth was calculated by finding the difference in total breweries in 2010 and 1990. The resulting counties in the top had above average location quotients, but not the highest found in each year, apart from Green County in

Wisconsin. The highest total raw growth between these years is San Diego County in California. In total, there are four California counties at the top of this measure, two each from New York and Montana, with the rest of the top counties spread out across the U.S. Each of these 20 counties added at least three breweries between 1990 and 2010.

Another way that brewery growth was examined is the breweries per business. This is the simple percentage of breweries by all businesses in each county. The counties in this ranking mostly only have one brewery and are located throughout the U.S. Teton County in Idaho and Green County in Wisconsin appear in this list with more than one brewery. Other than these two, the counties appear to have inflated percentages due to the small number of total firms in more remote areas.

Figure 4



The map in Figure 4 shows the three levels of brewing attributed to the nominal scale

used in the regression analysis. This heat map allows for the location of beer brewing to be examined much more clearly. Brewing is still focused in a few regions of the U.S. but has also expanded to all parts of the U.S. The Pacific Northwest, California, Rocky Mountains, Great Lakes Region, New York, and New England all appear to have counties with breweries and more counties with high growth. The South, Southwest, and rest of the Midwest appear to be lagging behind these areas.

Regression Analyses Discussion

Following the descriptive analyses of county-level data in regard to research questions one, two, and three, regression analyses were used to answer questions four and five. Question four of this dissertation is: *How does the location of upstream components for beer affect the location of beer breweries?* Question five of this dissertation is: *How does the location of downstream components for beer affect the location of beer breweries?* Each of these questions was examined using both binary logistic regression and multinomial regression models. Using the different models, upstream and downstream components of the value chain were tested for correlation with brewery location and concentration.

Using the nominal measure created and mapped in Picture 6.3, a multinomial regression analysis is used to examine the correlates for brewing and the related commodity chains. A binary logistic regression model was also estimated based on whether a county had any breweries or none in 2010. This binary measure is used as a type of starting point to bridge the gap between descriptive statistics and the more nuanced multinomial measure.

Examining the binary measure of breweries, in 2010, 322 counties had at least one brewery. The model is significant, with pseudo- r^2 of .179 and .370. These are higher than the pseudo- r^2 of the multinomial model, meaning that this logistic analysis better fits the data of this

study. Ten different variables are significant in this model: percent of a county that is urban, percent of people with a high school diploma, percent of people with a bachelor's degree, percent of businesses that are coffee shops, percent of people who identify as LGBTQ, percent of the population who are immigrants, percent of occupations that are computer jobs, percent of occupations that are creative design, percent of occupations that are manufacturing refrigerators, and percent of farmland that is hops farming. Upstream components of the commodity chain, the creative class, and cultural capital are all represented as significant correlates. The control variable for urbanity is also significant in this model. No downstream components of the value chain are significant in this model.

The multinomial model created for brewery growth between 1990 and 2010 features three categories: counties with no breweries in 2010 or saw a reduction in their breweries' location quotient between 1990 and 2010 (0 category), counties that saw growth in location quotient between 1990 and 2010, have a location quotient over 1 and are below the median in brewery growth (1 category), and counties who saw growth in location quotient between 1990 and 2010, have a location quotient over 1 and are above the median in brewery growth (2 category).

The multinomial model was also significant, allowing us to reject the null hypothesis for it. For this model, the pseudo- r^2 is a bit lower than the binary logistic model. The lowest estimate is only .109, with others estimated at .255 and .207. Though still explaining the change in counties breweries' growth in the years discussed, the binary model better explains the categories of brewery development than this multinomial model. In analyzing these categories, the reference point is comparing both types of counties with breweries to counties that have no breweries.

The first comparison group is counties with no brewery growth and counties with at least one brewery and in the bottom half of growth between 1990 and 2010. Among this group, six variables are significant: percentage of a county that is urban, percentage of a county that is non-Hispanic, percentage of the county who identifies as LGBTQ, percent who are immigrants, percent of businesses that are computer focused, and coffee shops as a percentage of businesses. The creative class and cultural capital have variables that are significant correlates for brewing. Two of the three creative class measures lower the odds of being in the first category of brewery growth compared to no breweries, while all other significant variables increase the odds of being in the first category. ³The control variables for urbanity and Hispanic ethnicity are also significant. No upstream or downstream components of the value chain are significant for this comparison group.

Lastly, counties with no brewery growth are compared to counties with at least one brewery and in the top half of growth between 1990 and 2010. Four variables are significant correlates in this comparison group: percentage of a county with high school diplomas, percentage of a county with a bachelor's degree, percentage of businesses that are coffee shops, and percentage of a county's farmland that is hops. No creative class or control variables are significant for this comparison.

These findings are interesting for multiple reasons. The binary model seems to suggest the creative class is particularly important to counties having any breweries. Social tolerance and high technology jobs are important aspects of the contemporary creative class (Florida 2014).

³ As discussed previously, this change in direction may very well be related to the collinearity issue with the variables for immigrants and the LGBTQ population. By examining the same data with two comparison groups, the variables may be less efficient.

Measures of both aspects are significant, and they may be related to the economic developments that allow for breweries to exist in certain counties. Similarly, cultural capital is important to the counties with at least one brewery in this model. Education and cultural consumption are important aspects of cultural capital (Bourdieu 1984). Measures for both aspects are significant in the binary model. This suggests that brewing is related to people with more education and the cultural sensibilities related to it. Those with more cultural capital vis-à-vis education may be concentrated in counties that are more likely to have breweries and other facets of conspicuous consumption. People with more cultural cache are including breweries in their consumption habits to separate themselves from those who do not.

Lastly, breweries tend to be in counties with some upstream components of their commodity chain. Of these, hops farming is particularly interesting, as hops are not used for many products outside of beer. As research has shown, many breweries use local iconography. Local hops would be a logical extension of this mindset. Though hops used for beer usually frozen or pelletized for storage, beer still tends to be made in areas that hops grow. As a specialty ingredient, it offers a different type of branding that is exclusive to beer. Breweries are able to advertise the local origin of this particular ingredient. As far as industrial companies for parts related to the brewing process, only refrigeration is significant. Though having such large equipment close by may matter, it is logical that it does not affect brewery location very much. Refrigeration units may be more important to have close by, as it can minimize the amount of time previously created beers are left outside of refrigeration.

It is also worth noting the control variable that is significant for this binary model: urbanity. Even with other aspects of the beer value chain controlled for, the percentage of a county that is urban still matters for whether a county has any breweries. Though not part of this

specific study, this is an interesting finding. This suggests that being in a city rather than a rural area is still one of the most important factors for the growth of consumer industries like breweries. This also suggests that the more rural counties with high location quotients are more outliers than the norm of the location of beer brewing. Though the industry has spread all over the U.S., including more rural counties, the percentage of a county that is urban is still a strong predictor for the chances of a county having at least one brewery.

Breaking down counties into groups of different amounts of growth also has interesting findings. Comparing counties that saw growth and that are below the median of growth to those that saw no growth at all, cultural capital is somewhat important. Cultural consumption seems linked between different industries in these places (Bourdieu 1984). Counties with more coffee shops tend to have more breweries, connecting these two cultural consumption practices. Tolerance of minority groups and high technology jobs tend to characterize the creative class, though only one variable supports the theory that increasing the creative class leads to higher odds of a county being in the first group of growth compared to no breweries at all (Florida 2012). Interestingly, measures for tolerance (immigrant and LGBTQ populations) are significant in this comparison group while lowering the odds of a county being in the group below-median growth compared to no breweries. Beer brewing may be related to the work some of the creative class perform, or they may consume craft beers in their downtime. Immigrants and people who identify as LGBTQ would theoretically be a part of this group and look for amenities like breweries, adding to the consumer-base of the brewing industry and cities with more of the creative class. This change in direction may be attributable to different stages of new urban development. Florida (2012) discusses how creative individuals bring jobs to cities. More diversity offers a marker of this specific emigration as more people from different backgrounds

come to areas with more creative freedom and amenities. In this case, the counties below the median in growth may be seeing a delayed effect in this development. Breweries may be founded in places with more computer jobs. And, according to the binary model, more diverse populations follow once the counties have breweries established, though this model does not establish a time-order series for urban development of the creative class. Lastly, the value chain of brewing has no significant variables for this comparison. This indicates that when a county has smaller growth compared to those who have no breweries or saw a decline in brewing activity, it is not related to nearby farming, manufacturing, or consumer bases.

Beyond these hypothesized correlates, it is worth discussing control variables for this model as well. Urbanity and non-Hispanic populations are significant in comparing these groups. As with the binary measure, the amount of a county that is urban still matters for whether a county has small brewing industry growth compared to those without any. Being an area with more urban infrastructure and populations tends to lead to small brewery growth. Similarly, having a higher percentage of Hispanic people tends to lead to being in this low brewery growth group. This is also interesting, as it means that areas with higher Hispanic populations tend to have some brewery growth, even with other demographics held constant.

The final regression group is comparing counties in the top half of growth between 1990 and 2010 to those with no brewery growth. In this comparison, cultural capital is the most important by the number of variables. Education and cultural consumption are related to counties being in the top half of brewery growth (Bourdieu 1984). Cultural capital seems to matter more for counties having this higher level of growth in relative concentration than those in the lower half. Cultural capital seems particularly linked to counties being in the top half of brewery growth between the years 1990 and 2010. On the other hand, the creative class does not seem to

matter at all in this comparison group, as no variables are significant.⁴ Lastly, one upstream input is important to counties falling into this group: hops farming. This is interesting because hops are not used for many products outside of beer brewing.

Implications and Future Research

Taken all together, there are several larger points to be taken from this series of analyses. The expansion of brewing from 1990 to 2010 in the United States has been extremely large-scale. Previous scholars have noted this growth (Tremblay and Tremblay 2005; Ogle 2007). Yet the expansion across different counties in the U.S. is nonetheless extraordinary. This expansion can be viewed in stark detail in Figures 5 and 6 below. Future research may focus on variables related to tourism and amenities to account for this expansion. One clue shedding light on this theory is the importance of coffee shops on brewery location. Focusing on this aspect in the future may account for the importance of urbanity while also explaining the rise of less urban breweries since 1990. By linking consumable products as variables, the focus can be recontextualized into counties with an economy seeking to serve different groups who purchase local products such as tourists. In this way, the service economy can be measured in terms of both urban counties with large populations and rural counties that are destinations for different groups. Rural amenities related to retirement or vacation destinations could be estimated in a future statistical model. These amenities may include breweries, as well as tourist destinations like coffee shops, candy shops, restaurants, gift shops, parks, hotels, and other service resources.

⁴ Immigrant and LGBTQ population variables may not be significant in this comparison group due to collinearity issues. Collinearity may cause efficiency issues with variables like this.

Figure 5

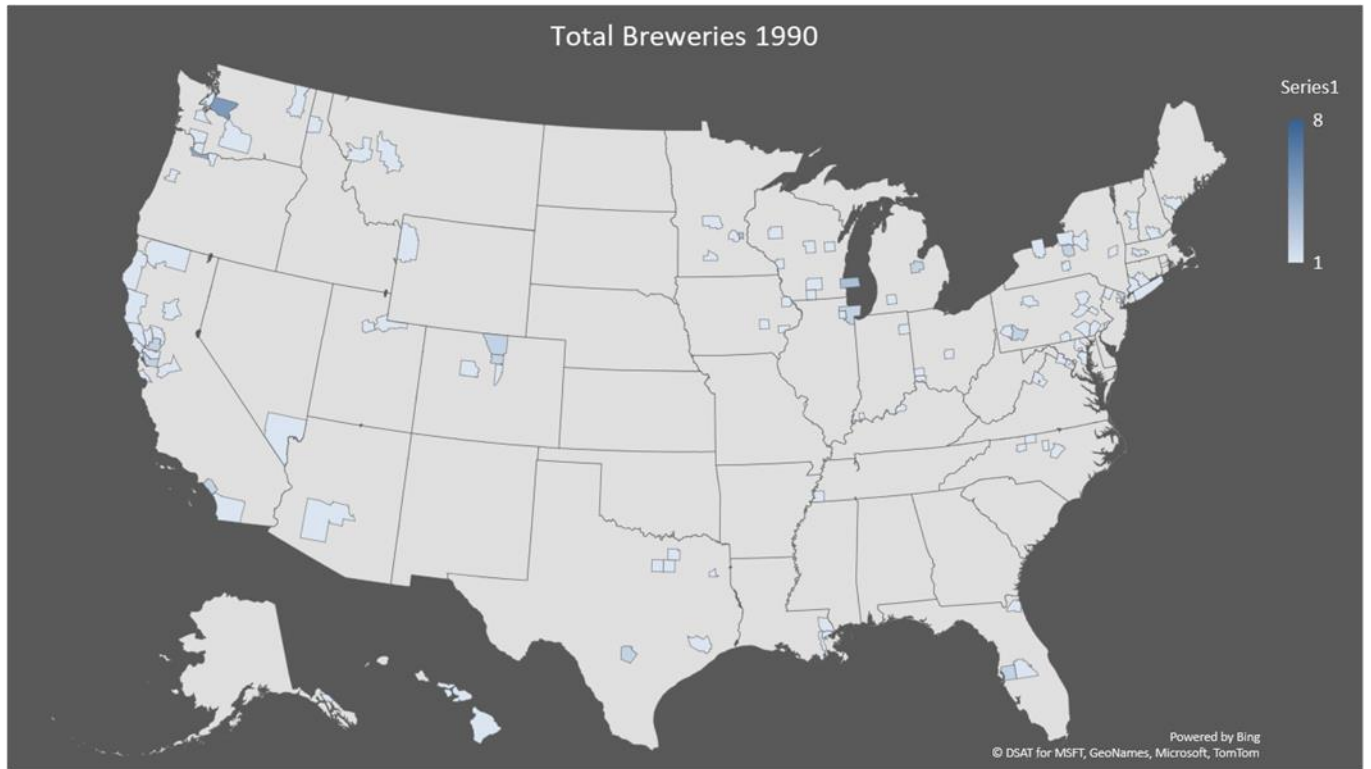


Figure 6



As the maps generated from the data above shows, brewing has expanded in the total number of counties and the regions of the U.S. Unsurprisingly, the beer industry is still primarily

focused in the regions that have hosted it since 1990. Yet it has grown to include counties in nearly every state by 2010. This makes sense concerning the increasing use of breweries for tourism in areas that previously featured very little beer brewing (Flack 1997; Schnell and Reese 2003; Alonso 2011; Baginski and Bell 2011; Fletchall 2016; Reid and Gatrell 2017; Argent 2018). This continued growth is also related to the economic theory of resource partitioning, which examines how small craft firms can coexist with large corporate structures like Anheuser-Busch (Carroll and Swaminthan 2000). It will be very interesting to examine how this expansion has continued or stalled out in future studies. Future research may utilize 2020 data to reexamine these trends.

Green County, Wisconsin seems to be an especially interesting hotbed of activity for beer brewing in the U.S. It consistently showed up across multiple different measures of the top counties for brewing. This county is the home of the city of Madison and its metro area. It is also a part of the traditional geographic region of the U.S. that much beer brewing appeared in before the 1930s. Future research would do well to focus on this county for a more detailed approach to the social ecology of beer brewing and the continued expansion of the industry. Though it is somewhat surprising that this county is the most consistently important U.S. county for brewing, it does offer a snapshot of the phenomenon being explored here.

In terms of the material world aspects of creating beer, hops farming is particularly important to the local value chain of brewing. Breweries may be located near areas that are naturally good for hops to minimize the costs associated with this specialty input to their value chain (Gerrefi and Korzeniewicz 1994; Jernigan 2000). This would offer an immediate incentive to founding such businesses in certain latitudes. On the other hand, hops farms may be founded to support local breweries in counties with large growth. If the industry seems to be taking off, it

would be logical to try and supply local specialty ingredients. Future research would do well to examine the relationship between hops farming and beer brewing in the U.S. Qualitative studies of specific breweries and their choice in hops farming and/or purchasing could offer a fascinating insight into why this crop is unique in the beer industry. Another method for future research in this area might involve examining the history and process of hops production, offering a lens into the forms that the value chain takes, despite many breweries potentially growing their own. The value chain of hops still exists even with local farms providing to breweries. The only other value chain input with any significance is the manufacture of refrigerators for one of the models. Refrigeration may be particularly important to certain types of breweries, as some beers cannot be left to warm up (Bamforth 2009). Because of this, some groups may form breweries with the location of the refrigeration industry in mind.

Though no other value chain inputs related to upstream or downstream facets of the brewing industry seemed important, the sociological control theories of the creative class and cultural capital do seem to affect the industry's location. The creative class seems important to counties having small brewery growth, albeit not in the ways initially theorized in this study (Florida 2012). This may even explain the development of a brewing industry for counties that previously had no breweries at all. The theory of the creative class creating initial economic growth in cities may have some explanatory power (McGranahan and Wojan 2007). Future research should consider expanding on the definition of the creative class for statistical studies of counties with breweries. Perhaps by zeroing in on the creative class, a more robust relationship between beer brewing in the U.S. and this group of people may be found. Expansion of the definition of the creative class may show that it related in more ways than this study has found.

Cultural capital also was significant as a sociological control theory in this study. This study suggests that cultural capital is especially important for delineating counties that have high brewery growth, perhaps marking them as different from the low growth counties that feature more of the creative class. Cultural capital may exist as a marker of counties that have a long history of brewing, as compared to those who are attempting to catch up with this growing industry (Bourdieu 1984). This would lend itself to the idea that groups in these areas have created cultural capital as exclusionary networks previous to more recent growth in other areas (Bryson 1996; Erickson 1996; Lizardo 2006). As multiple variables for cultural capital in the different analyses were significant in their influence on breweries in U.S. counties, it would be interesting to expand on the definition of cultural capital for future statistical studies of this nature. As with creative class, zeroing in on cultural capital as variables may offer more nuanced results of the specific types of this phenomenon at the county level. Beyond this, a qualitative examination of the cultural capital at play in specific counties may show how and why it matters for the locations of these establishments. Interviews and participant observations of breweries and their social ecology in specific counties may show the process of cultural capital. One approach to this would be visiting the sites of brewing in the counties that saw the most growth in breweries. Institutional analyses of breweries in these counties could offer very fruitful qualitative data. Similarly, participant observation of groups of higher education individuals in these areas could offer interesting information.

The results of this exploratory study suggest multiple paths of future research. With more up-to-date data becoming available in the coming months and years, this commodity chain can be explored more fully. This study also points the way forwards for qualitative research on the value chain, creative class, and cultural capital related to the brewing industry. The surprising

and unsurprising findings of these data analyses can be used to inform the way forwards for research on this fast-growing social phenomenon. From this study, we may conclude that the brewing industry has expanded across the U.S. at a fast pace, though it is still primarily focused on a few areas historically related to beer brewing. Furthermore, these locations are related to hops farming, and to an extent, groups related to the creative class and cultural capital.

Chapter 7 – Conclusion

This dissertation sought to answer questions related to where the brewing industry was located in 1990 and 2010, where the growth of brewing occurred between those years, and what the value chain of the industry looked like in 2010. To answer the research questions laid out at the beginning of this study, the location quotient was calculated for beer breweries in all counties in the U.S. in 1990 and 2010. Using this measure, the relative concentration of all counties is examined. Following this, the growth of brewing between these years was examined in several different ways, including whether counties saw a growth in the total number of breweries, breweries per business, and growth of location quotient. Lastly, this dissertation examined the correlates for the value chain of the brewing industry using binary and multinomial regression models. These models were used to examine how upstream and downstream inputs to the commodity chain were related to the location of breweries, as well as the control theories of the creative class and cultural capital.

As such, the research questions laid out at the beginning of this project were:

What counties in the U.S. had the highest concentration of beer breweries in 1990?

What counties in the U.S. had the highest concentration of beer breweries in 2010?

How has the concentration of breweries changed in the U.S between 1990 and 2010?

How does the location of upstream components for beer affect the location of beer breweries?

How does the location of downstream components for beer affect the location of beer breweries?

Regarding the first question, the relative concentration of breweries in 1990 is particularly high for several surprising U.S. counties, and several that fit the hypothesis of the location of this

early period. Iowa County in Iowa is the highest, a surprising finding due to Iowa's more rural geography and not being a traditional beer creation area. Other surprising counties include Summit County in Utah, the City and Burrough of Juneau in Alaska, Muscatine County in Iowa, Rockingham County in Virginia, Teton County in Wyoming, Williamsburg City in Virginia, Salt Lake County in Utah, Lewis & Clark County in Montana, and Rockingham County in North Carolina. Each of these counties are in regions or states that are not part of the traditional beer brewing industry. Nonetheless, in 1990 these counties had very high location quotients. These are mostly rural counties without much industry. One brewery increases the relative concentration substantially. Counties near the top of relative concentration in 1990 that fit the narrative of brewery location better are: Hood River County in Oregon, Stevens County in Washington, Brown County in Minnesota, Green County in Wisconsin, Elk County in Pennsylvania, Chippewa County in Wisconsin, Siskiyou County in California, Portage County in Wisconsin, Eagle County in Colorado, and Adams County in Pennsylvania. These are in states more typically associated with the beer industry.

Regarding research question number two, the top county by relative concentration in 2010 is Haines Borough in Alaska. As with 1990, this is surprising due to Alaska not being a traditional brewery locale. Other surprising top counties for breweries in 2010 are: Worth County in Iowa, Tucker County in West Virginia, Skagway Municipality in Alaska, Teton County in Idaho, Jackson Parish in Louisiana, Blanco County in Texas, Shoshone County in Idaho, Nelson County in Virginia, Carbon County in Montana, and Gasconade County in Missouri. These are counties in non-traditional brewing areas. Like 1990, many of them do not have much industry at all, with one brewery increasing their relative concentration. Counties with high location quotients in 2010 who fit the narrative of the traditional beer industry better are: Green County in Wisconsin, Ouray

County in Colorado, Lincoln County in Washington, Wallowa County in Oregon, Mariposa County in California, Schuyler County in New York, Jackson County in Wisconsin, Aitken County in Minnesota, and Asotin County in Washington. Of note is that Green County in Wisconsin remains high in relative concentration across the 20-year period covered. Beyond this county, several more traditional brewery states show up in this list.

Related to research question three, the concentration of breweries has changed substantially between 1990 and 2010. The top 20 of breweries by location quotient completely changed except for Green County in Wisconsin. The total number of breweries and number of counties with at least one brewery increased during this period. Almost every state had at least one brewery in 2010, which is not true of 1990. This leads to very different counties having high relative concentration, as less urban places with just one brewery still dominate the top 20 list in 2010, as different ones did in 1990. Nonetheless, states associated with beer brewing like Oregon and Washington still tend to dominate the industry.

Regarding question four, only hops farming and refrigerator manufacturing affect the odds of a county having a brewery in 2010. When examining counties by growth categories between 1990 and 2010, hops are the only upstream component that affects a county being a high growth center. However, it does not affect whether a county is a low growth center. All other hypothesized upstream components of the brewing industry do not increase the odds for a county having a brewery or being a growth center.

Lastly, regarding question five, several downstream components affect the odds of a county having a brewery in 2010. Three cultural capital and creative class variables each increased the odds of a county having a brewery. These variables are percent who graduated high school, percent with a bachelor's degree, percent of the industry that are coffee shops, percent who identify as

LGBTQ, percent who are immigrants, and percent of industry that are focused on creative design. Breaking down counties by growth categories, only coffee shops as percentage of industry and percent who identify as LGBTQ affect the odds of a county being in the low growth group. Thus, one cultural capital and creative class variable are significant. For high growth areas, three cultural capital variables are significant: percent with high school diplomas, percent with bachelor's degrees, and percent of industry that are coffee shops.

These analyses found a niche industry that has exploded geographically across the U.S. since 1990. Though beer brewing businesses have expanded and grown, it has not done so equally for different regions and social groups. Inequality continues, as cultural capital seems to matter for those who have seen the most growth versus everyone else. Despite this, the creative class seems to have led to more immediate growth for those counties that originally had no breweries or low growth overall. There are limitations to this research and these conclusions. Despite the numerous variables included in these models, the control variable of the percentage of a county that is urban was oftentimes important to the location of breweries. The fact it remains an important correlate means that these models are missing some facet of the development of breweries in the U.S. Conversely, the expansion of breweries into more rural counties in general shows another limitation of this study. Tourism amenities may be tied to the location of breweries and is not included in this study. This may account for the importance of urbanity in a county as well as the expansion into less urban areas across the U.S.

Another limitation is the non-inclusion of brewpubs, which are not included in this data. These extremely small-scale breweries may require more local value chain production than the mid-level and larger breweries discussed in this dissertation. Another limitation is related to the collinearity of the tolerance of the creative class. Though it improves the odds of a county having

a brewery, it lowers the odds of being in the bottom half of brewery growth between 1990 and 2010. This relationship should be explored further with different variables focused on tolerance of the creative class in the future. Lastly, this data will soon be out-of-date from current trends, as 2020 data becomes available in the coming years. 2010 is used as the closest marker for “current” in this study. It is not hard to imagine that these trends have continued and potentially changed in the past ten years.

With these conclusions in mind, future research may focus on either the creative class or cultural capital as causal factors in the development and inequality of U.S. counties. The brewing industry can be seen as a symptom of these inequalities for these types of studies. 2020 data may be more informative of these trends as it becomes available. Similarly, the value chain may be explored more fruitfully if hops farming becomes the focus, as other inputs of the chain are introduced. As discussed previously, fleshing out the creative class in future quantitative studies may help explain the conflicting results of tolerance in these models. Lastly, qualitative studies may be performed on specific areas found to be important in this study. Of particular importance is Green County, Wisconsin. Institutional ethnographies, participant observations of local beer groups, and other qualitative research could give helpful insight into how this county has stayed on the leading edge of brewery growth. Urban ethnographies of specific counties would also offer insight into the development of breweries in urban areas. These future research directions may be able to address the limitations of this study.

As this industry keeps growing and develops its subculture, it will be fascinating to see what localities it will and will not expand into. While smaller communities have seen breweries built, it seems that this is the outlier and not the norm. Breweries seem to be another factor in the ever-growing rural-urban divide that is shaping 21st century America. Increasing urbanization

and structural changes to the economy are leaving rural America behind, and cultural foci like beer are symptoms of these large-scale changes.

It is important to keep in mind how these cultural and consumption changes reflect very real material differences in our society. Beer brewing's locations may seem trivial on the surface, but as a reflection of greater inequalities, it is related to the larger sources of social ills.

Conspicuous consumption shows these real material inequalities via the ways the groups can spend their leisure time. Cultural capital created through leisure time like this recreates our class system (Bourdieu 1984). By distancing ourselves from lower class groups, we reify the idea that we are somehow different or better than those who do not consume more middle-class amenities like local breweries. Thorstein Veblen succinctly described this phenomenon: "In order to gain and to hold the esteem of men it is not sufficient merely to possess wealth or power. The wealth or power must be put in evidence, for esteem is awarded only on evidence" (1899: 36). With the middle class shrinking in the U.S. and American society becoming more polarized between upper classes and everyone else, inequality via consumption will become more important to distinguish different socioeconomic groups.

Tracing the lines from the spread of brewing, especially craft brewing, back to the social source of its demand, we can challenge why middle- and upper-class Americans seek out conspicuous consumption. Specifically, it is worth asking ourselves why we feel more comfortable with a craft brewery in our neighborhood than a bar. We need to consider why craft breweries have become part and parcel of gentrified neighborhoods across the U.S. Confronting why we feel the call to recreate these class differences is the first step to making a more equitable social and cultural world.

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Appendix A: Collinearity Diagnostics

Table 12 Collinearity Diagnostics

Variable	Tolerance	VIF
Hops Farms	.982	1.019
Barley Farms	.948	1.055
Tanks Jobs	.989	1.011
Pumping Jobs	.982	1.019
Refrigerator Jobs	.989	1.011
Packing Jobs	.981	1.019
Bars	.929	1.076
Stores	.947	1.056
21 & Up	.992	1.008
Median Income	.411	2.432
Dry County	.876	1.142
LGBTQ	.088	11.406
Immigrants	.079	12.635
Software Jobs	.757	1.322
Design Jobs	.652	1.534
Computer Jobs	.506	1.975
Coffee Shop Jobs	.823	1.215
Arts Jobs	.889	1.125
Museum Jobs	.846	1.182
High School Graduates	.345	2.896
College Graduates	.279	3.590
Urban	.553	1.808
White	.716	1.397
Non-Hispanic	.519	1.928