5-2016

Essays on Mandated Vertical Restraints

Jacob E. Burgdorf
Clemson University, jburgdo@g.clemson.edu

Follow this and additional works at: https://tigerprints.clemson.edu/all_dissertations

Essays on Mandated Vertical Restraints

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Economics

by
Jacob E. Burgdorf
May 2016

Accepted by:
Dr. Matthew Lewis, Committee Chair
Dr. F. Andrew Hanssen
Dr. Daniel Miller
Dr. Charles Thomas

Abstract

This dissertation examines the impact mandated vertical restraints have on market outcomes using the US brewing industry. In particular, I examine the impact of beer franchise laws, which restrict when a brewer can end a contract with a wholesaler, mandated exclusive territories which require a brewer to grant a geographic region to a wholesaler in which no other wholesaler is allowed to sell the contracted brands, and divorcement of brewers and wholesalers, which are laws that prohibit brewers from wholesaling their products to retailers. The first chapter explains the industry and these restraints in detail.

The second chapter examines the impact of franchise termination laws, mandated exclusive territories, and prohibitions of vertical integration between brewers and wholesalers on the entry and production decisions of craft brewers in the US beer market. I identify the effects by exploiting variation in policies across states and time between 1984 and 2013. I estimate that franchise termination laws significantly reduced net brewery entry and craft beer production. The impact is larger in states that prohibit self-distribution by brewers. Mandated exclusive territories reduced brewery entry as well, though the estimates are not statistically significant in all specifications and are estimated to have very little effects on production. Lastly, allowing vertical integration between brewers and wholesalers accounts for 60-78% of the difference in the number of breweries between states that prohibit integration and led to 178-251% more craft beer production.

The final chapter examines a case study of the effect on price and quantity of law changes regarding vertical restraints in the beer industry. In May of 2004, Wisconsin enacted beer franchise laws which legally restricted when a brewer could terminate a contract with

a beer wholesaler. Subsequently in January of 2006, Wisconsin mandated that brewers must assign each wholesaler to an exclusive wholesale territory. Using scanner data from a large number of chain grocery stores, I examine the impact of these laws on prices and quantities sold. The impacts differ depending on whether the brewery is a large, domestic brewery, import brewery, smaller craft brewery or located in-state. I find that craft beer prices increased by approximately 2.34-3.40% after franchise laws were implemented and increased 3.31-3.92% after exclusive territories were mandated. The latter effect was larger for craft brewers located within Wisconsin. These results are robust and consistent across several control groups. I do not find robust results, consistent across control groups, on sales quantities. Using surrounding states as a control group, which may better account for local shocks, finds overall beer quantity sold decreased. Results are consistent with the laws causing an increase in costs of distribution and reducing competition.

Acknowledgments

Many thanks to my advisor, Matthew Lewis, for his invaluable help, guidance, and mentoring. Without it, my last few years at Clemson and completing this dissertation would have been undoubtedly much tougher. I would also like to thank the rest of my committee, Andy Hanssen, Dan Miller, and Chuck Thomas for their comments and suggestions and also for being some of the greatest teachers I have had the privilege of taking classes with. Thanks as well to all the participants in the I.O. workshop for useful feedback.

I owe a debt of gratitude to my undergraduate economics professors from NC State University, specifically Michael McElroy and Stephen Margolis. Your teaching, advice and support motivated my interest in economics and in pursuing a graduate degree.

I am also indebted to the many friends and fellow econ PhD classmates I met at Clemson. Thanks for spending countless hours in Sirrine hall with me. It made the windowless offices a lot brighter.

Lastly, to my parents, Erik and Lynn, and my grandparents, Min and Papa, for always supporting me in my education throughout whatever turn it took.

Table of Contents

List of Tables

List of Figures

Chapter 1

Background of the Brewing Industry and Vertical Restraints

The brewing industry in the United States is one characterized by heavy state and federal regulation. Much of the state level regulation focuses on the vertical components of the industry and limits how firms along the supply chain can interact. This dissertation examines the impact of three of these so-called vertical restraints: prohibitions on brewers acting as wholesalers (divorcement); beer franchise laws, which restrict when a brewer can end a contract with a wholesaler, and mandated exclusive wholesale territories.

In addition to being heavily regulated, the brewing industry is also very concentrated (Tremblay, Iwasaki, and Tremblay, 2005). Over the past 35 years however, a niche market of "craft" brewers has emerged, and now captures a sizable portion of the industry. These brewers are typically small enterprises compared to the national brewers that dominate the market, but are regulated similarly in most states.[1]

To fully understand the implications of these restrictions in the beer industry, some background about the policies being considered and the history and structure of the market will be helpful. This chapter will discuss both specifics of the brewing industry and

---

[1] For more institutional details on the brewing industry and craft brewers, see Tremblay and Tremblay (2005).

theoretical considerations of the mandated VRs.

1.1   Three-Tier System

The "three-tier system," as it is commonly referred to in the beer industry, was implemented in most states following prohibition in alcoholic beverage industries. This "three-tier" system places various levels of restrictions on the vertical components of the brewing industry. This system of regulations was instituted to maintain independence between manufacturing (1st tier), wholesaling or distributing (2nd tier), and retailing (3rd tier). The details described here are specific to the brewing industry, though wine and liquor industries have similar restrictions and is also referred to as a "three-tier system." Under this system, brewers manufacture the beer, sell it to wholesalers, who in turn sell to retailers, who then sell to consumers. Figure 1.1 depicts a representation of the structure of the brewing industry. All states have distinct licenses for all three tiers, and most do not allow multiple tier's licenses to be held by the same person, company, or interest.[2]

A motivating factor of this was the perceived abuses of the "tied-house" system, common prior to prohibition, in which breweries were integrated vertically up to the retail level and required bars and saloons to exclude purchases of other brands in order to purchase from them.[3] After prohibition ended, most states fought aggressively against this and enacted a number of laws to prohibit this.[4]

While there is some amount of overlap allowed in some states between manufactur-

---

[2]Most breweries use the services of an independent wholesaler, so even when exceptions exist to the common restrictions of complete independence between tiers, it is often still referred to as the "three-tier system."

[3]This arrangement is not uncommon outside the US. Slade (1998), for example, studies the effect of a government ruling in 1989 mandating divestitures of many "tied-house" arrangements by brewers in the UK.

[4]A summary given by the California Supreme Court in California Beer Wholesalers Assn., Inc. v. Alcoholic Bev. etc. Appeals Bd. (1971) 5 C3d 402 reads, "Following repeal of the Eighteenth Amendment, the vast majority of states, including California, enacted alcoholic beverage control laws. These statutes sought to forestall the generation of such evils and excesses as intemperance and disorderly marketing conditions that had plagued the public and the alcoholic beverage industry prior to prohibition... By enacting prohibitions against "tied-house" arrangements, state legislatures aimed to prevent two particular dangers: the ability and potentiality of large firms to dominate local markets through vertical and horizontal integration ... and the excessive sales of alcoholic beverages produced by the overly aggressive marketing techniques of larger alcoholic beverage concerns."

ing and wholesaling, no states permitted either brewers or beer wholesalers to also act as retailers, with the recent exception of brewpubs,[5] where a restaurant also has a brewery operation on site, and in some states, direct shipping to consumers and on-brewery-premise sales. With these exceptions, all states have continued to enforce prohibitions against tied-house arrangements.

In addition to restrictions between retailers and other tiers, most states have strict rules governing the relationship between wholesalers and manufacturers of beer. However, there is variation among the states regarding the allowed level of vertical integration. Some states, which I will define as "two-tier" states, had no bans on breweries distributing their own beer, as allowed either by the brewery license or by allowing breweries to obtain a separate wholesaler's license in addition to the brewery license. Twenty states are here categorized as "two-tier" and have allowed self-distribution over the entire sample of chapter 2's study from 1984-2013.[6]

Many had laws passed directly after prohibition, and all states defined as "two-tier" allowed self-distribution for in state breweries well before entry of craft brewers began. The other states had strict prohibitions on individuals or firms owning both wholesale and manufacturing permits or operating as both. These states allowed no overlap in ownership of manufacturers, wholesalers, or retailers. Recently, however, states began passing exceptions for small breweries. Typical laws define small brewers as those producing only so many barrels, usually on the order of thousands to tens of thousands with a high variance across states, and allow self-distribution only up to a limited number of barrels.[7] Fourteen states still have no exceptions for small breweries and require breweries to distribute through an independent wholesaler. For a broader discussion of alcohol industry regulations and the three-tier system including beer, wine, and liquor industries, see Whitman (2003).

---

[5]Washington was the first state to legalize brewpubs in 1982, and most followed shortly after. Mississippi was the last state in 1999.

[6]These states are Alaska, California, Colorado, Connecticut, Hawaii, Iowa, Massachusetts, Minnesota, Montana, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin. Kentucky until 2015 allowed out of state breweries to act as wholesalers, but the permit for small breweries does not allow wholesaling activities by small breweries.

[7]A barrel of beer is equivalent to 31 gallons.

1.2 Franchise Termination Laws

In the United States the relationship between franchisors and franchisees is governed by the Federal Trade Commission (FTC) at the federal level. Additionally, beginning in the 1970s, many states passed laws governing the relationship between franchisors and franchisees. These laws, to varying degrees across states, among other things, restrict when franchisors or franchisees are able to terminate or fail to renew a contract. Although the relationship between breweries and wholesalers are not necessarily a traditional franchise in the common use of the term, some state level "traditional" franchise laws may apply to these relationships in a limited extent.[8] Many states, beginning around the same time "traditional" franchise laws were passed also enacted so-called "beer franchise laws." These laws put legal restrictions on when a brewer is allowed to cancel, terminate, or fail to renew a contract with wholesalers.

While only eighteen states have traditional franchise laws, almost all states as of 2013 have beer franchise laws. Kurtz and Clements (2014) present a useful overview of the similarities and differences between traditional and beer franchise laws. Beer franchise laws in name often encompass many different regulations, including mandated exclusive territories. In this dissertation however, the variables constructed for franchise laws are only those laws specifically requiring "good cause" (or similar terms) to terminate, cancel, or fail to renew a contract between brewers and wholesalers in the brewing industry.[9]

---

[8]For example, in Wisconsin, prior to 2004, Wisconsin's "Fair Dealership Law" governed termination restrictions between wholesalers and brewers if the brand in the contract represented 15% of the wholesaler's business. This would cover only the largest brands. In 2004 the legislature passed Senate Bill 489 which applied only specifically to brewers and beer wholesalers, restricting further the ability of brewers to terminate contracts. On the other hand, California as Kurtz and Clements (2014) described defines a franchise when "(1) the franchisee's business is substantially associated with the franchisor's trademark; (2) the franchisee pays the franchisor a fee to engage in the business and use its trademark; and (3) the franchisee operates the business under a marketing plan or system prescribed in substantial part by the franchisor." Very few brewery/wholesaler relationships are likely to fit this definition.

[9]Virginia's Beer Franchise Act is representative of the type of restrictions these laws place on termination of contracts. Virginia's Code of statutes § 4.1-505 "Cancellation" reads, "Notwithstanding the terms, provisions or conditions of any agreement, no brewery shall unilaterally amend, cancel, terminate or refuse to continue to renew any agreement, or unilaterally cause a wholesaler to resign from an agreement, unless the brewery has first complied with § 4.1-506 and good cause exists for amendment, termination, cancellation, nonrenewal, noncontinuation or causing a resignation. Good cause shall not include the sale or purchase of a brewery."

Good cause typically includes things that could be considered gross violations of the agreed upon contract such as selling outside a designated sales territory, or blatant disregard for the storage and shipment of the product that could lead to spoilage or other quality problems. Further, most laws require that prior notice, commonly of 90 days, must be given before termination or nonrenewal of a contract occurs. If the wholesaler corrects the perceived grievance within that time period termination or nonrenewal is voided. The burden of proof is often on the brewery to show any failure of meeting the agreed upon terms and may be difficult to show.[10]

These beer franchise laws give protection to wholesalers from potential opportunistic acts from brewers. As Blair and Lafontaine (2011) point out, franchisees (which would correspond to wholesalers in the brewing industry) have often "complained that they do not reap the benefit of their hard work because once they make a market profitable, the franchisor behaves opportunistically and simply terminates or does not renew their contract. The franchisor then presumably appropriates the profits of the outlet either by operating the outlet directly, or by selling it to a new franchisee..." Given that common roles of beer wholesalers are promotional activities and quality investment (keeping beer refrigerated, unexposed to sunlight, and fresh, for example), this complaint could fit the brewing industry as well. However, protections against terminations may also encourage opportunism from wholesalers. If it becomes more costly to terminate a wholesaler, there will be less incentive to undertake costly promotional and quality investment, and thus may harm upstream brewers.

Several empirical studies have examined the impact of franchise laws outside the brewing industry. For example, Smith II (1982) investigates the impact of VR in the automobile industry and finds that implementing franchise termination restrictions similar to

---

[10]Costly legal battles that the Brooklyn Brewery and the Dogfish Head Brewery have had over disagreements with distributors are discussed in a NY Times Op-ed here: www.nytimes.com/2014/03/30/opinion/sunday/free-craft-beer.html. This can be prohibitively costly for many brewers and may prevent brewers from entering. Additionally, a more extreme response to franchise laws, Bell's Brewery pulled their entire line of beer out of the state of Illinois rather than deal with franchise laws after a dispute with a distributor. See "Bell's Brings Beer Back to Area." Chicago Tribune, August 1, 2008, www.articles.chicagotribune.com/2008-08-01/business/0807310746_1_brewers-association-new-distributors-craft-brewer.

those in the brewing industry increased the number of automobile dealerships, but mandated exclusive territories decreased this number. Brickley et. al (1991) find that the passage of state franchise laws reduced the percentage of units franchised in non-repeat customer industries and decreased stock prices of franchising firms. More recently, Klick et. al (2012) examine the number of franchise contracts from selected fast food restaurants and find that binding franchise termination laws significantly reduced franchising activities. This dissertation seeks to examine empirically the effects of beer franchise laws, and finds support for the hypothesis that these laws encourage opportunism by wholesalers and increase costs to brewers as these laws decreased craft brewery entry and production and increased prices.

1.3 Exclusive Territories

Exclusive territorial agreements between manufacturers and wholesalers designate a specific geographical area in which only one wholesaler may sell a specific brand produced by the manufacturer. Exclusive wholesale territories are used voluntarily in many industries (Katz, 1978; Azoulay and Shane, 2001, e.g.), but 35 states mandate that brewers use exclusive wholesale territories, with Georgia being the first to do so in 1965.[11] Brewers, especially large breweries, often employ the use of multiple wholesalers. In states that mandate exclusive territories, this is allowed so long as there is no overlap in the geographical areas in which the same brand is sold by two different wholesalers. Figure 1.2 depicts a graphical representation of exclusive territories where one manufacturer sells to two wholesalers, but the wholesalers are not selling to overlapping retailers. With the exception of Indiana from 1979 to 2002, no states explicitly prohibited granting exclusive territories by brewers to wholesalers.

---

[11]These states are Alabama, Arkansas, Colorado, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, West Virginia, and Wisconsin. Utah and Oklahoma are not counted as having exclusive territories in the regressions presented. This is since when Utah passed in 2011, an exception was given for small brewers. Oklahoma's 1993 law only applied to producers of "low-point" beer below 3.2% alcohol by weight. Most craft beer is above this level.

The theoretical impact of exclusive territories is ambiguous. While the voluntary use of exclusive territories may serve to reduce competition (Rey and Stiglitz, 1995) or prevent entry (Asker and Bar-Isaac 2014), it may also serve to align incentives between brewer and wholesaler and prevent wholesalers from free-riding on the efforts of other wholesalers (Klein and Murphy, 1988). Mandating that exclusive territories may alter either of these effects. It may prevent anti-competitive uses which stemmed from threatening to end exclusive contracts but the removal of this threat may alsoreduce welfare enhancing uses since it could increase a wholesaler's incentive to shirk on product investment.

Mandated exclusive territories have been examined empirically by several researchers and almost all studies focus on price or quantity effects. Jordan and Jaffee (1987) and Culbertson and Bradford (1991) are two early studies that find mandated exclusive territories increase prices. They both conclude mandated exclusive territories decrease welfare. On the other hand, in a series of studies, Sass and Saurman (1993, 2001) examine mandated exclusive territories and find evidence that, although higher prices may result from exclusive territories, price increases can be consistent with increasing welfare because beer quality may have increased as well. They come to similar conclusions in a 1996 study where they find Indiana's *ban* of exclusive territories led to a decrease in consumption. More recently, Rojas (2012) examined the impact that mandated exclusive territories had in Arkansas, which began mandating exclusive territories in 1991.[12] He finds that this increased brand level sales significantly and had a small impact on price, and thus concludes that mandating exclusive territories, net of any externalities of alcohol consumption, was likely welfare improving. Both Sass and Saurman (1993) and Rojas (2012) argued that these mandates were valuable to brewers who would have not used exclusive territories without a mandate for fear of litigation. During this earlier time period lawsuits were brought against brewers for the use of exclusive territories.[13] Since the positive findings are presumably a result

---

[12]Included in the same legislation that mandated exclusive territories, however, are beer franchise termination laws. Therefore it is not clear that exclusive territories is the policy effect being identified.

[13]See for example, Adolph Coors Co. v. FTC, 497 F.2d 1178 (10th Cir. 1974), cert. denied, 419 U.S. 1105 (1975). This is not likely the environment today, as the FTC recently has argued against implementing beer franchise laws and mandating exclusive territories: Federal Trade Commission. (2005). Comment on (California's) Proposed Beer Franchise Act, August 24, available at www.ftc.gov

of being able to use exclusive territories without the cost of litigation, following Slade and Lafontaine (2008), I consider these to be evidence for welfare increasing uses of *voluntary vertical restraints*. This study is distinguished from these previous studies by focusing on entry and production in a niche market rather than prices or total quantities of all products, and finds evidence for negative welfare effects, as entry of breweries is decreased, and prices are increased.
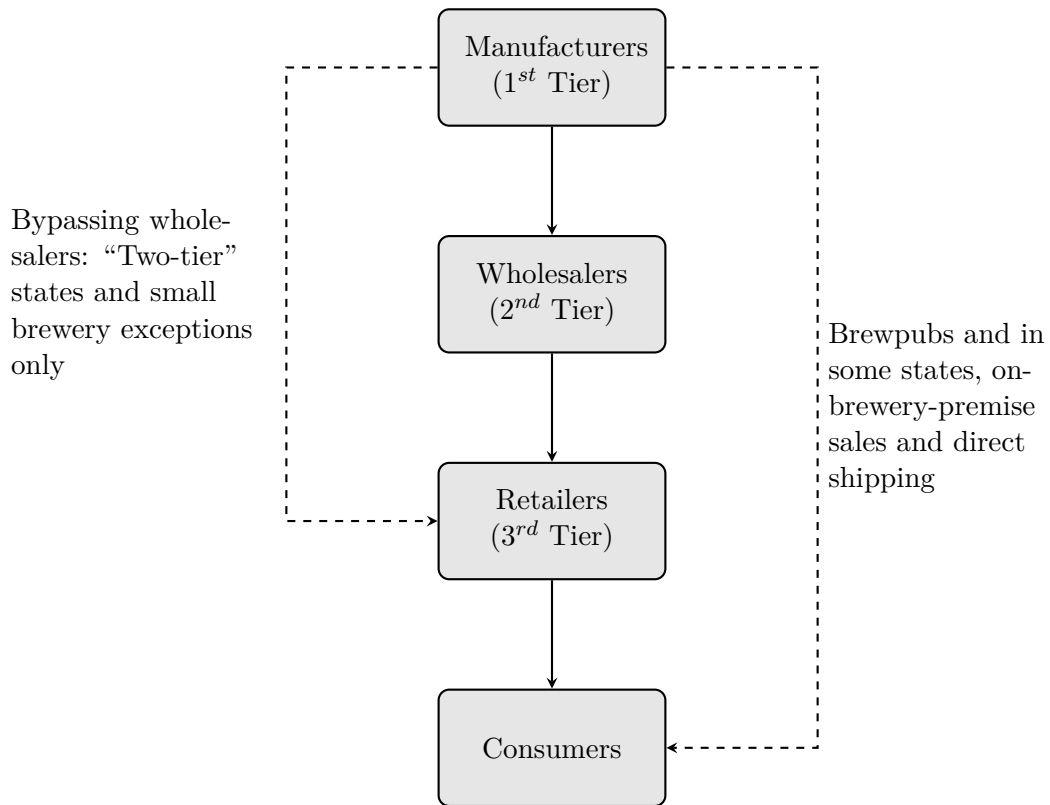
Figure 1.1: Depiction of Brewing Industry Tiers
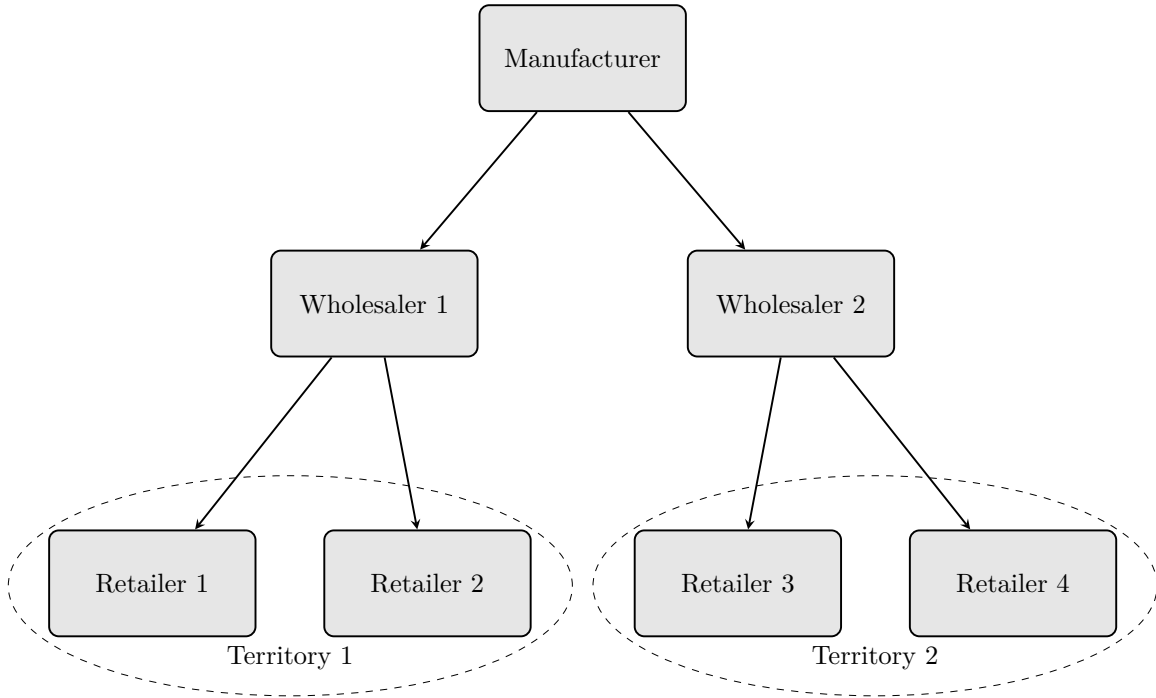
Figure 1.2: Depiction of Exclusive Wholesale Territories

Chapter 2

Impact of Mandated Vertical Restraints on Craft Brewery Entry and Production

2.1 Introduction

Over the past thirty five years, the United States has had an enormous growth in the number of breweries. Figure 2.1 shows that the number of permitted breweries rose from 42 in 1984 to nearly 4,000 in 2013; craft beer production levels have similarly risen. This has almost entirely been driven by the enormous growth of the craft beer industry, or as it is sometimes referred to in the economic literature, "specialty breweries." This growth has been seen across the entire country, and although demand for these products has grown quite rapidly, some states have seen more breweries enter than others. This paper uses the emergence of the craft beer industry to investigate the role mandated vertical restraints had on upstream entry and production decisions.

The brewing industry has many features that make it useful for studying vertical economic relationships, and particularly mandates of vertical restraints (VRs). After prohibition ended on December 5, 1933, each state implemented its own regulatory policies

on alcohol consumption and industrial behavior.[1] This has yielded a variety of regulatory policies across states, and individual states have also varied regulations over time. Much of this regulation of the brewing industry concerns the relationship and allowable overlap of manufacturers (brewers), wholesalers or distributors, and retailers. This so-called "three-tier" distribution system separates the tiers distinctly and integration between the tiers is often restricted by law.

This paper examines the impact three common state level regulations mandating vertical restraints had on craft brewer entry and production: beer franchise laws which restrict the ability for a brewer to cancel, terminate, or fail to renew a contract with a wholesaler; mandates of exclusive territories where a brewer must designate a geographic territory in which only one wholesaler can sell to retailers for the brands in the contract; and restrictions on self-distribution by brewers (prohibitions on vertical integration between manufacturers and wholesalers, known as divorcement). The wide variation of policies across both states and time creates a quasi-experimental environment that allows the causal effects of the policies to be identified. A number of empirical studies have examined the impact of mandated exclusive territories in the brewing industry (Jordan and Jaffe, 1987; Culbertson and Bradford, 1991; Sass and Saurman 1993, 1996; Rojas, 2012), franchise laws (Smith II, 1982; Brickley et. al, 1991; Klick et. al, 2012), vertical integration and divorcement (Barron and Umbeck, 1984; Slade, 1998; Blass and Carlton, 2001), and craft breweries (Carroll and Swaminathan, 2000; Chen, 2014; Elzinga, Tremblay and Tremblay, 2015; Gohmann, 2015), but this is the first study to examine the impact these mandated VRs had on entry and production of brewers.

Vertical restraints are often used by firms *voluntarily* for a wide number of potential reasons. The theoretical impact is mixed. Voluntary use of VRs is often viewed to be anti-competitive (Stiglitz and Rey, 1995; Asker and Bar-Isaac, 2014) or incentive aligning

---

[1]Section 2 of the 21st Amendment reads, "The transportation or importation into any State, Territory, or possession of the United States for delivery or use therein of intoxicating liquors, in violation of the laws thereof, is hereby prohibited." This has been interpreted as giving states the authority to regulate the alcoholic beverages industry.

and efficiency enhancing (Klein and Murphy, 1988; Blair and Lafontaine, 2011).[2] Mandating that VRs must be used however, may actually remove either the anti-competitive or efficiency enhancing effects their voluntary use may have. For example, VRs may be used to prevent competitor entry, as in Asker and Bar-Isaac (2014), by using VRs to pass rents to a downstream firm that must accommodate upstream entry. Entry may be prevented by the threat of severing the contract or VR if entry occurs. Mandating these VRs be used should increase entry if threats were used in such a way, as the threat to end the contract or contractual provision is no longer legal. This paper finds the opposite occurs, giving more credence to the benefit of voluntary VRs.

Vertical relationships are often regulated to prevent potential opportunism from either the upstream or downstream firm where moral hazard issues may arise. In the brewing industry, when a brewer contracts distribution rights over a product to a wholesaler, the wholesaler may have incentives to act in a way that is not in the best interest of the brewer. For example, it may find it profitable to distribute outside assigned territories, charge higher prices, shirk on quality and promotional activities, etc. to the detriment of brewer profits. Alternatively, it may be the brewer that has incentives to act opportunistically, by threatening to terminate contracts once costly investment by the wholesaler is made. The three mandates discussed in this paper are geared towards preventing opportunism from brewers. I find that they reduce upstream brewery entry and production, consistent with encouraging opportunism from the wholesalers.

This paper uses a unique dataset on the legislation of mandated VRs over 30 years (1984-2013) across all fifty states and DC. To identify the impact of mandated exclusive territories and beer franchise laws on the entry and production choices of craft brewers, I implement a difference in differences model. Identification requires exogeneity of the passage of these laws. It is plausible to believe these laws are exogenous to the growth of the craft beer industry, since these laws were passed largely in response to nationwide increasing market concentration in the brewing industry[3] which raised concern over large firms being

---

[2]See Rey and Verge (2008) for a summary of theoretical work on vertical restraints.

[3]See for example, Tremblay, et. al (2005) for a discussion of increasing concentration in the brewing

able to exert undue influence over relatively smaller wholesalers. I find that state passage of beer franchise laws decrease net entries by 0.190 to 0.383 brewery entrants per year per million people. This is a large effect. Mean entry over this period was 0.577 breweries per year per million people, so this is a reduction of 33-66% compared to the mean. Further, this effect is larger in states that have prohibited self-distribution by brewers and is estimated to have almost no effect in states without these restrictions. Mandated exclusive territories are also estimated in baseline results to decrease entry by 0.211 brewery entrants per year per million people than states without, though this result is not statistically significant all specifications, and it is estimated to be smaller when controlling for surrounding breweries. The results on production are similar. Exclusive territory mandates are not found to have robust effects, but franchise laws reduce craft brewery production by approximately 40%.

Finally to estimate the impact of divorcement, in a cross-sectional study I find that states that did not restrict breweries from acting as wholesalers across the entire sample time from 1984-2013 have had 6.80 to 8.82 more breweries per million than other states. States that did not restrict brewery distribution had an average of 23.77 breweries per million people in 2013, while states that did restrict brewery distribution only had on average 12.43. This accounts for approximately 60-78% of the difference in breweries between those states. States that did not restrict breweries from acting as wholesalers also had 178-251% more craft beer production.

This paper contributes to the literature on mandated VRs by examining the impact on upstream entry decisions. Empirical work in this area is of particular importance since theoretical work yields varied predictions. Two studies, Lafontaine and Slade (2008) and Cooper et. al (2005), present overviews of empirical work that has been done on VRs across many industries, and find that almost uniformly all studies that examine mandates of VRs are welfare decreasing. My findings fit in line with this literature as I find mandated VRs decrease both craft brewery entry and production, and thus lead to less variety and consumer choice.[4] These results also have important implications outside of the brewing

---

industry and the emergence of craft brewers.

[4]This result alone is not conclusive that these mandated VRs decrease welfare, as perhaps they lead to

industry. The wine and spirits industries are regulated by states in a similar way, and have their own "three-tier systems." The automotive industry also has a similar set of regulations between auto manufacturers and automobile dealers, restricting when auto manufacturers can terminate contracts with dealers, mandating exclusive territories, and requiring sales be through independent dealerships. Indeed, many states ban direct sales of automobiles by manufacturers, and many have passed specific legislation to prevent Tesla Motors from selling cars this way. The petroleum industry is also singled out in many states with franchise laws. Lastly, this work sheds light on traditional franchise arrangements and laws, which are common and account for a large amount of business in the US,[5] and it provides some evidence against anti-competitive uses of *voluntary* VRs.

The rest of the paper proceeds as follows. In section 2 I present a theoretical framework; in section 3 I present the data; in section 4 I describe the empirical strategy used; section 5 discusses the results; and section 6 concludes.

2.2   Theoretical Framework

It will be worthwhile to discuss possible ways in which mandating vertical restraints may affect a potential brewer's entry and production decision to frame the empirical results. A model presented by Asker and Bar-Isaac (2014) details a setting in which a number of vertical restraints may be voluntarily employed to prevent entry.

Adapting the notation to the setting at hand (the US brewing industry), the model is as follows. An incumbent monopolist brewer sells beer to n wholesalers and absent any entry earns π_i^M as a monopolist. A potential entrant brewer considers entry into the market. To enter it must sink the entry cost F_e, and, importantly, it must be accommodated by a wholesaler. This is particularly fitting in the brewing industry where many states *require* brewers to use an independent wholesaler. If entry occurs, the incumbent and entrant earn

---

lower prices and higher quantities of incumbent brands, but in light of other work in this field, I interpret my results as suggestive of being welfare reducing.

[5]The *2007 Economic Census Franchise Report* found that franchises made up over 10% of employer business, and generated almost \$1.3 trillion in sales. https://www.census.gov/newsroom/releases/archives/economic_census/cb10-141.html

π_i^C and π_e^C, respectively. The timing of the game is as follows.

- The incumbent brewer sets its price and provides a lump sum transfer of rents $T_i^w \in [0, \infty)$ to each wholesaler w;

- Wholesalers compete in prices, and all profits are realized;

- The potential entrant offers lump sum transfers $T_e^w \in [0, \infty)$ to wholesalers;

- Wholesalers choose whether to accept the transfer payment and accommodate the entrant or reject the offer;

- If accommodated the entrant pays F_e today and enters next period;

- The game is repeated infinitely.

All firms have a common discount factor δ. Asker and Bar-Isaac (2014) show that the incumbent will set $T_i^w = 0$ if entry occurs (note the only reason for the incumbent to provide a transfer was to prevent entry here). They further show that there exists an "exclusionary equilibrium" where no entry occurs if

$$\frac{\pi_i^M - \pi_i^C}{n(1-\delta)} \geq \frac{\pi_e^C}{1-\delta} - F_e$$

That is, if what the incumbent is willing to pay its wholesalers to prevent entry is greater than what the entrant is willing to pay to enter, no entry occurs.

The intuition is simple: in a market with an incumbent manufacturer, the incumbent may opt to use a vertical restraint (such as exclusive territories) as a way to transfer rents to the downstream firms. Absent this restraint, downstream firms compete in prices and earn lower profits whereas the upstream firm has higher profit. If a potential entrant upstream must be accommodated by the downstream firms in order to enter, the incumbent manufacturer may find it worthwhile to continue to grant the wholesaler a rent-transferring vertical restraint with the threat of ending it if entry occurs. Thus, the voluntary use of vertical restraints may be entry inhibiting. In the brewing industry's context, this would be applied to new brewers needing to find wholesalers who agree to carry their products (this is especially important given many states require brewers operate with a wholesaler).

This model suggests that if this is occurring, mandating vertical restraints should actually *increase* entry and potentially increase craft beer production. This is because the mandate removes the threat the incumbent employed of severing the restraint, which was the mechanism which prevented entry. Note that this argument could apply equally to exclusive territories, franchise laws and self-distribution laws. If the threat that the incumbent brewers used was to terminate contracts or contractual provisions (by ending the exclusive territory of the wholesaler, terminating the contract completely and hiring the services of another wholesaler, or beginning to self-distribute) if entry upstream occurs, mandated exclusive territories, franchise laws and prohibitions of self-distribution could increase entry by severing the viability of these threats.[6]

However, mandating vertical restraints in theory may also decrease entry and production. Mandating such provisions may encourage opportunism from wholesalers who are now protected against termination of contracts or contractual provisions. This is best illustrated by the troubles Bell's Brewery, based in Kalamazoo, Michigan, had with state franchise laws. In 2006, Bell's Brewery's Chicago wholesaler was owned by National Wine and Spirits (NWS). NWS planned to sell the rights to distribute Bell's brands to another wholesaler. Bell's opposed the sale, as they worried their brands would be ignored by the subsequent wholesaler. Rather than engaging in a costly legal battle trying to end the wholesale contract, Bell's pulled distribution of their beer out of the entire state of Illinois, despite Illinois comprising over 10% of Bell's sales. Exiting the entire state was one of the few provisions in which they could legally end their contract with NWS. Bell's returned distribution to Illinois and Chicago nearly two years later, only after NWS lost their wholesale license and the right to sue. This illustrates the potential for these laws to encourage opportunistic behavior by wholesalers, thus decreasing the profitability of craft brewers, which would lead to fewer entrants and less production.

---

[6]It is not coincidental that this is the exact sort of argument the National Beer Wholesaler's Association (NBWA) use when supporting these laws. They claim that without these protections, product variety and quality would be severely diminished. The NBWA claims these protections provide the security to build a brand, presumably putting in the investment that otherwise would not have been made. (www.nbwa.org/franchise-law-benefits, accessed 10-24-2014)

Taking the Bell's anecdote and Asker and Bar-Isaac's model together, the theoretical result of mandated VRs is ambiguous on brewery entry and production. The data will be able to identify the impact of the mandates, and a finding that mandated VRs decrease entry and production lends evidence against the model of anti-competitive *voluntary* use of VRs and support anti-competitive impacts of *mandated* VRs, though the data does not identify the exact mechanism by which the latter occurs. Further research will be required to answer this question.

2.3 Data

This study utilizes multiple unique sources of data, and each will be described below. Table 2.1 presents a brief summary description of the variables used in the analysis and sources. Summary statistics are given in Table 2.2.

Data on yearly state level brewery counts were obtained through a request from the Alcohol and Tobacco Tax and Trade Bureau (TTB). The TTB is a government organization under the Department of the Treasury. One function of the TTB is to ensure payment of excise taxes by breweries. As such, they keep a record of permitted breweries by state and year. The brewery count reports active records during the course of the specific year.[7] One potential drawback is this count does not distinguish between the type or size of breweries. Each brewery is counted equally regardless of whether it is a small brew-pub producing less than one thousand barrels of beer annually, or a large, national brand which produces millions of barrels annually. This concern is mitigated by the fact that almost all entering breweries are craft brewers and begin small. According to the Brewer's Association, as of 2013, only 54 of the 2,917 breweries in operation in the United States were not craft breweries. I use the TTB data to construct the variable of interest $Entrants_{st}$, which is defined as the difference in the number of breweries per million people across years. This

---

[7]It is possible that during the observation's year the facility could have been closed, had their permit revoked, or gone bankrupt. Additionally, this measure of brewery count may include breweries that have registered as active but have not actually started brewing yet, so this differs from other brewery counts such as those given by the Brewer's Association. This count still will be a valid measure as it represents interest in entering markets.

definition does not distinguish between entry and exits, so is a measure of net entry.

The measure of production is from Elzinga, Tremblay and Tremblay (2015). Their work details many of the factors that influenced craft brewery entries and production increases and is complementary to this work. The source for their data came from *Brewers Digest, Brewery Directory and The New Brewer.* Since the definition of a "craft" brewer is not universally agreed upon, their definition "include[s] brewpubs, microbreweries and craft regionals but do[es] not include contract brewers, national brewers and large regional brewers that were in existence before 1965."

Separately, data were also collected on the VR polices by state over time from state statutes by the author. The variable $TwoTier$ is a dummy variable equal to 1 if the state did not prevent craft breweries from distributing beer over the entire sample period (1984-2013). In all of these cases, the law allowing self-distribution for breweries pre-dated the emergence of craft breweries. $ExTerr$ is a dummy variable equal to 1 if a state mandated exclusive wholesale territories in time t, and $Fran$ is a dummy variable equal to 1 if a state has beer franchise termination laws in time t. Over the sample time period, 14 states enacted mandated vertical restraints and 16 states enacted beer franchise laws. I also use the interactions between $TwoTier$ and $ExTerr$ and $Fran$, denoted $TwoTier \times ExTerr$ and $TwoTier \times Fran$, respectively. I cross-checked the accuracy of this legislative history where available with other studies and several years' editions of the Modern Brewery Age Bluebook.[8]

Several states have passed small brewery exceptions to their prohibitions on brewer-distribution. However, this is certainly endogenous to craft brewery entry. This is due to the fact that as more breweries enter the market, if the ability to self-distribute one's product

---

[8]A few caveats exist: Rhode Island has had franchise termination laws since 1982, but they never applied to breweries located within RI, and so are not counted as franchise laws in estimation. Washington franchise termination laws were passed in 1984 and originally exempted brewers who produce under 50,000 bbls. This limit was increased to 200,000 bbls in 2009. As most brewers produce much less than either limit, WA was not counted as having franchise laws in estimation. The beer franchise laws in Colorado passed in 2007 do not apply to breweries producing less than 300,000 gallons (approximately 9,700 bbls) and so were not counted. Lastly, Nevada has had franchise termination laws since 1973, but similarly added an exemption for small brewers in 1995, but with a much lower level: 2,500 bbls. Nevada thus was coded as having franchise laws. This may raise concerns over endogeneity. Results however are robust and similar to those reported when excluding these states entirely from the regression analysis.

is profitable, these breweries would put pressure on the legislature to pass such exceptions. For this reason, without an instrument, the resulting analysis using this information will be biased. To avoid this problem and still be able to estimate the impact being able to self-distribute has, I use the variable $TwoTier$, as defined above. The growth of the craft brewing industry began approximately in 1980.[9] All two-tier states had allowed self-distribution well before the 1980s, many beginning immediately after the repeal of prohibition. Thus, the variable $TwoTier$ is likely to be exogenous from the growth of the craft brewing industry.

It will be useful to examine the growth of the craft brewing industry over time differentiating by policy. Figure 2.2 depicts the entry rates by state from 1984 to 2013. Panel (a) shows entry in $TwoTier$ states; panel (b) shows entry in the other states. From this it can be seen that there are a large number of entries in the late 1990s, with a period of shake-out in the early 2000s, followed by an increased period of renewed entry post 2005. Figure 2.3 depicts the mean number of breweries per capita on the left in panels (a), (c), and (e) and the mean number of entrants per capita in the right panels (b),(d), and (f), separated by policies. Although the means do not appear very different according to VR policy at the beginning of the sample, it is clear that the states for which $TwoTier = 1$ experienced a much larger growth of breweries and had a much higher number of entrants during both the late 1990s and post 2005. States without franchise laws started out similarly but diverged in the late 1990s and have seen higher entry rates in the later part of the sample as well. Distinguishing the impact on growth by exclusive territories is not as clear from this approach. However, looking at panel (f), we can see states without mandated exclusive territories saw more entrants in the late 1990s but have since seen similar entry to those states with mandates. Similarly, Figure 2.4 depicts the average state level production of craft beer by policy. This figure shows $TwoTier$ states and states without franchise laws experienced much higher levels of production than states with more restrictive policies.

---

[9]Anchor Brewing Company is often regarded as the first craft brewing company, after it was purchased by Fritz Maytag in 1965. Following that, New Albion, created in 1976 (closing in 1982) was the next and Sierra Nevada's founding in 1980 is often given credit as one of the first craft breweries. The Brewer's Association report that before 1980 only two craft breweries were in operation. For an excellent overview of the brewing industry, including the craft beer industry, see Tremblay and Tremblay (2005). Also see Hindy (2014) for a popular exposition on the emergence of the craft beer industry.

Exclusive territory mandates do not visibly have much effect on production. Table 2.3 shows the dates of change over the sample period (1984-2013) for self-distribution laws, exclusive territories and franchise termination laws.

Identification of the model presented in the next section depends on the variables *ExTerr* and *Fran* being exogenous to the craft brewing industry. I argue that this is likely true. The states that passed exclusive territorial mandates and franchise termination restrictions first did so before 1980, and the intent was not related to small, craft brewers. The laws were passed in response to increasing concentration in the brewing industry, and declining number of wholesalers, as this garnered concern that brewers were putting undue and anti-competitive pressures on their distributors.[10] In 1967 the Census reports that the four firm concentration ratio was 40%, and by 1992 this had grown to 90%; this was still approximately the same in 2007 at 89.5%. At the same time, the Brewer's Almanac, published by the Beer Institute, reports that in 1967 there were 6,573 beer wholesalers operating in the nation; this had decreased to 3,567 in 1992 and 2,095 in 2007. Much of the brewery consolidation was a result of increasing returns and higher efficiencies at large scales.[11] Until recently there were very few trade groups that focused specifically on the interests of craft brewers. The Brewer's Association, a national trade group, did not form until 2005, and many states did not have brewers guilds until recently.

Lastly, several control variables that may be related to brewery entry are included. I include breweries per capita in neighboring states.[12] This variable will account for potential

---

[10]Even state laws that do not explicitly express legislative intent have been interpreted similarly by courts. In Arneson Distributing Co. v. Miller Brewing Co., 117 F. Supp. 2d 905 (D. Minn. 2000), it was noted that while Minnesota's "Beer Brewers and Wholesalers Act" does not contain a statement of purpose "that, among its provisions, the statute prohibited brewers from fixing wholesale prices, coercing wholesalers to accept delivery of unordered products, or discriminating among wholesalers." Further, the ruling notes that a previous conclusion was reached in "Rex Distributing Co., Inc. v. Miller Brewing Co., Inc." where the ruling stated, "the chief purpose of dual distribution prohibitions like this one is to prevent brewers from coercing beer wholesalers into violating the liquor regulatory laws by threatening to deprive them of their distribution rights."

[11]Tremblay, et. al (2005) presents evidence on the minimum efficient scale in breweries. I am not aware of any work looking at the dynamics of concentration of beer wholesalers.

[12]Formally, it is calculated as $x_{st} = \dfrac{\sum\limits_{j=1}^{51} B_{jt} \times w_j}{\sum\limits_{j=1}^{51} Pop_{jt} \times w_j}$ where w_j is a dummy variable equaling 1 if state j is

"brewery spillover effects" from other states, where a high number of breweries per capita in nearby locations may induce entry. I also include economic and demographic controls of the unemployment rate, real GDP per capita (2009 dollars), percentage of the population that is 20 years or older, and percentage of the population that is black. This may be necessary to control for any compositional changes within a state across time that state fixed effects would not account for. I also include alcohol related controls collected from the Brewer's Almanac and published by the Beer Institute. These contain the excise tax per barrel of beer in real dollars, and beer, wine, and spirits consumed per capita in gallons. Spirits per capita for the year 2013 was obtained from the Distilled Spirits Council of the United States (DISCUS). The most current year (2013) for beer consumption is missing so this was imputed via a linear regression of the past three years.

2.4 Empirical Strategy

2.4.1 Panel Regressions

A difference in differences approach is used to investigate the impact that mandated exclusive territories and beer franchise laws had on the entry decision of brewers. Formally the specification used is

$$Entrants_{st} = \mathbf{D_{st}}\beta + \mathbf{X_{st}}\delta + \varphi_s + \varphi_t + \varepsilon_{st} \tag{2.1}$$

$$\ln(Prod_{st} + 1) = \mathbf{D_{st}}\beta + \mathbf{X_{st}}\delta + \varphi_s + \varphi_t + \varepsilon_{st} \tag{2.2}$$

where $Entrants_{st}$ is the net number of entrants per million people in state s at time t (calculated by taking the difference in number of TTB permits per million), $Prod_{st}$ is the amount of craft beer production produced in a state, measured in 100s of barrels, $\mathbf{D_{st}}$ is a vector of VR policy dummies and interactions; $\mathbf{X_{st}}$ are the control variables discussed in the previous section; φ_s and φ_t are state and time fixed effects, respectively.

a direct geographic neighbor of state s and 0 otherwise. For non-continental states, California and Hawaii were considered neighbors, as well as Washington and Alaska.

The dependent variable $Entrants_{st}$ measures the change in the number of operating breweries per million people in a state over the period of one year. This measure is used as it allows both brewery exits and entries, and is not dependent upon the number of existing breweries which is likely to be highly dependent on the number of existing breweries from the previous time period. Breweries, once founded, very rarely exit in the same year. Dividing by population is necessary as the effect of the policy will vary by the size of the market. This will allow for the effect of the mandates to have comparable estimated effects across states with different populations and market sizes. The dependent variable $\ln(Prod_{st} + 1)$ will allow for a number of zero-level of production points to be accounted for by in effect giving those states 100 barrels of craft beer production.

The time and state fixed effects in the difference in differences specification controls for nationwide fluctuations in entry rates over time as well as persistent differences in entry rates and production levels across states.

In the simplest specification, no interactions are included, so $\mathbf{D_{st}}$ consists only of $ExTerr$ and $Fran$, which will measure the impact exclusive territories and franchise laws have had over all states. A second specification interacts exclusive territories and franchise laws with the variable $TwoTier$ so $\mathbf{D_{st}}$ consists of $ExTerr$, $Fran$, $TwoTier \times ExTerr$, and $TwoTier \times Fran$. This will allow us to distinguish between the impact that these VRs have in states in which a manufacturer has been required to operate with a wholesaler, and those states in which breweries can act as wholesalers and distribute their own products. We would expect to see negative coefficients on $ExTerr$, $Fran$, and positive coefficients on $TwoTier \times ExTerr$ and $TwoTier \times Fran$ if these mandated VRs act to benefit wholesalers at the expense of manufacturers. In all specifications the parameter of interest is β, the coefficients on the dummy variables for the policies and interactions of policies.

The interaction term between exclusive territories and franchise laws may be of importance as Slade and Lafontaine (2008) point out. Granting of exclusive territories may be efficiency enhancing so long as the upstream firm can verify downstream investment and cancel the contract if it is not fulfilled. With restrictions on cancellation, any advantages to

exclusive territories may be reduced. Although this is an economically interesting coefficient, it is highly correlated with the un-interacted policies (the correlation coefficient between this interaction and $ExTerr$ is 0.91), so yields highly imprecise estimation. The results are not reported here.

2.4.2 Cross-sectional Study

One drawback of the panel data study is that given the endogeneity of the passage of laws for self-distribution, without an instrument one is not able to exploit the state and time variation to determine how large of an impact self-distribution has played in the growth of the craft beer industry. However, the two-tier states as described can be considered exogenous to the craft beer industry, as these states allowed for brewers to act as distributors well before the 1980s when the craft beer industry began to emerge. This cannot be used in the panel regressions as there is no time variance in these states, but a cross-sectional investigation can reveal the importance of self-distribution.

One illustration of the importance of self distribution, can be seen through cross sectional regressions for each year in the sample. These regressions take the form of

$$B_{st} = \alpha^t + \beta^t_{twotier} \times TwoTier_{st} + \varepsilon_{st} \tag{2.3}$$

$$Prodcap_{st} = \alpha^t + \beta^t_{twotier} \times TwoTier_{st} + \varepsilon_{st} \tag{2.4}$$

where B_{st} is the number of breweries per capita, $Prodcap_{st}$ is craft beer production (in 10,000 bbls) per million people, and $TwoTier$ is a dummy variable for "two-tier" states. Separate regressions were run for each $t = 1984, ..., 2013$. This simple specification reports the difference in the conditional mean of breweries per capita across "three-tier" and "two-tier" states. Results are depicted in figure 2.5, with a 95% confidence interval around the point estimates. The red line is placed at zero. It can be seen that results are almost always statistically significant and increase over time considerably.

To further investigate how large of a role the ability to act as a distributor played

in the growth of the craft beer industry, the following regressions are presented

$$B_{s1984} = \alpha + \beta \times TwoTier_s + \mathbf{D_{s1984}}\gamma + \mathbf{X_{s1984}}\delta + \varepsilon_s \tag{2.5}$$

$$B_{s2013} - B_{s1984} = \alpha + \beta \times TwoTier_s + (\mathbf{D_{s2013}} - \mathbf{D_{s1984}})\gamma + (\mathbf{X_{s2013}} - \mathbf{X_{s1984}})\delta + \varepsilon_s \tag{2.6}$$

where B_{s1984} and B_{s2013} are breweries per million people in state s in years 1984 and 2013 respectively, $TwoTier$ is a dummy variable for whether state s is a two-tier state, $\mathbf{D_{st}}$ is a vector of VR policy dummies and interactions, $(\mathbf{X_{s2013}} - \mathbf{X_{s1984}})$ is the difference in control variables over the time period 1984 to 2013. The same regressions will be run for production replacing breweries with $\ln(prod_{1984} + 1)$ in 2.5 and $\ln(prod_{s2012} - prod_{s1984})$ in 2.6. Equation 2.5 compares how the two tier states differed or not from the three tier states at the beginning of the data (in 1984), while equation 2.6 identifies the impact that having no restraint between manufacturers and distributors has had over the time frame in the estimation of the coefficient β. Conversely, the negative of the coefficient β can be interpreted as the impact imposing the VR between manufacturers and distributors has had on the entry and production of craft brewers over the time frame.

2.5   Results

2.5.1   Panel Regressions—Entry

Table 2.4 presents the results on entry for equation 2.1. Following Bertrand, Duflo and Mullainathan (2004), all standard errors are clustered at the state level to allow for serial correlation of the error terms within the states over time.

The coefficients of interest are those on the VR dummies. Across all specifications, both mandated exclusive territories and franchise laws are estimated to have a negative and sizeable impact on entry. In the simplest specification, column (1), exclusive territories and franchise laws are found to decrease entry by by 0.211 and 0.145 breweries per million per year, respectively, although the coefficient on franchise laws is not significant. Nevertheless,

these are large effects. The mean entry rate over this time period was 0.577 breweries per million people per year, so this corresponds to a 36.6% and 25.1% reduction in entry, respectively. When controlling for self distribution by the interaction of the $TwoTier$ variable in column (2), I find that franchise laws have a much larger effect, as the coefficient on $Fran$ is -0.317 and significant at the 1% level. The interaction term $Fran \times TwoTier$ is significant and positive, and offsets the negative coefficient on $Fran$. This implies that franchise laws have a larger effect on entry in the states where self distribution is not permitted. This makes sense since the effects of signing a contract with a distributor whose interests do not align with the brewer's can be very costly. The ability to self-distribute may give brewers the time to learn about the markets, industry and available distributors to find one which may have more common interests, whereas if a brewer is required to use a distributor from the outset it does not have this option. The estimated impact of exclusive territories is -0.131, though not significant. The interaction term $ExTerr \times TwoTier$ is -0.200 and also insignificant. It is not clear why the coefficient on $ExTerr \times TwoTier$ is negative. This implies that in states where a brewery can self distribute, mandated exclusive territories have *more* of an impact than in states where restrictions have been placed. That said, there are difficulties in identification caused by high degrees of multicollinearity between the VR dummies and interactions. Specifically with regard to exclusive territories and the interaction term, only two states for which $TwoTier = 1$ in the sample mandated exclusive territories without having franchise laws. This will be attempted to be addressed below by considering individual policy effects.

Columns (3)-(4) of Table 2.1 repeat the above analysis but include neighboring states breweries per capita. This variable is included to account for potential spillover effects and is found to be significant and positive, as expected. Additionally, it impacts the results on the VR policy dummies. When accounting for these spillovers, the VR policies are estimated to have marginally smaller effects and lose statistical significance. Additionally in all specifications, columns (1) - (4), no other control variables are statistically significant. Much of this may be explained by the state and year fixed effects, as many are significant

and may be absorbing any effect that small compositional changes within a state have.

As stated above, one difficulty is that there is multicollinearity in the policies. Indeed, franchise laws and exclusive territories are frequently passed in the same year.[13] This leaves relatively little variation to differentiate the impact of franchise laws from exclusive territories, especially so when also controlling for $TwoTier$. To explore this, I re-estimated equation 2.1 leaving out exclusive territories. This model will estimate the impact of franchise laws imposing $\beta_{ET} = 0$, a zero effect of mandated exclusive territories, and can be treated as an upper bound of the impact of franchise laws assuming no interactions occur between franchise laws and mandated exclusive territories. The estimated impact of franchise laws are reported in Table 2.5 and are highly significant (at the 1% level), decreasing entry by 0.260 breweries per million in column (1). This impact is greater in $TwoTier = 0$ states as column (2) shows, and less in two-tier states. As with Table 2.4, when accounting for neighboring breweries per capita in columns (3)-(4) the coefficients on $Fran$ are slightly smaller but are still significant statistically and economically.

I repeat this exercise imposing zero effect of franchise laws, so $\beta_{fran} = 0$ in Table 2.6. This can be treated as an upper bound for the effect of mandated exclusive territories, under similar assumptions above. The estimates are similar, finding exclusive territories reduce entry by approximately 0.308 per million, but find slightly less effect in two-tier states. When accounting for neighboring breweries per capita, the effect is estimated to be smaller.

From this analysis, I find that both beer franchise laws are consistently estimated to have significant negative impacts on brewery entry. The evidence is less robust with mandated exclusive territories. Overall, the estimates imply mandated VRs reduce entry, indicating an anti-competitive effect of these policies. These results provide evidence for raising costs of potential entrants and encouraging opportunism on the part of the wholesalers. They also provide evidence against the model in Asker and Bar-Isaac (2014). In

---

[13]Out of the 13 changes in mandated exclusive territories and 15 changes in beer franchise laws over the sample period, 7 states had both pass in the same year. These states and years are Arkansas (1991), Iowa (1995), Louisiana (1993), Mississippi (1995), New Jersey (2006), South Dakota (1990), and Wyoming (1996). Florida passed mandated exclusive territories and franchise laws just one year apart.

their model, VRs are used as a way to share rents with downstream firms. This can keep upstream entrants who need accommodation by a downstream firm out of the market by the threat of ending the VR. Thus mandating a VR to be used would remove that option and increase entry. The evidence provided suggests this strategy is likely not being used in brewing industry. Further, franchise laws seem to have the greatest impact in states in which self-distribution is not available, which is as expected.

2.5.2 Panel Regressions—Production

Table 2.7 presents the results on entry for equation 2.2. Standard errors are again clustered at the state level. The coefficients on exclusive territories, while large, are not statistically significant. Franchise laws however, are estimated to size-ably reduce production, and are statistically significant at the 5% level across all specifications. In column (1), the coefficient on $Fran$ is -0.679 which corresponds to an approximately 49.3% reduction in production.[14] When controlling for self-distribution laws in column (2), the estimated effect is larger in states that restrict self-distribution. The coefficient on $Fran$ is -0.943 which corresponds to an approximately 61.1% reduction in production. The interaction between $Fran$ and $TwoTier$ is estimated to be 0.647, partially offsetting the effect of franchise laws in states that did not restrict self-distribution. These are large effects, and are not estimated to be significantly altered when controlling for neighboring breweries and production as in columns (3) and (4).

Additionally, while this is not the primary goal of the paper, there are interesting findings on the effect of beer excise taxes. The tax rate is estimated to have a significant effect on production and appears to be elastic as the elasticity ranges from -1.21 to -1.31. There is also significantly less production in states with more beer consumption per capita. This may seem counter-intuitive, but could reflect the differing nature of craft beer compared to large brewery's products. Craft beer tends to be more expensive and higher in alcohol so this could reflect that as preferences for craft beer increases total volume consumed may

---

[14]Since the measure of production is in logs, the marginal effect is calculated by $\exp(-0.679) - 1 = 0.493$.

decrease.

As above, the high degree of multicollinearity may be problematic. Addressing this, Table 2.8 presents the results considering only franchise laws and Table 2.9 presents results considering only exclusive territories. When considering only franchise laws, the effects are reduced but still large and statistically significant. The coefficients on $Fran$ range from -0.513 to -0.527, an effect of 40.1-41.0%. The interaction term between $Fran$ and $TwoTier$ is small (0.026-0.033) but positive. In Table 2.9 no coefficients on exclusive territories are statistically significant. These findings correspond to Figure 2.4 where states with franchise laws can be seen to have much lower production levels. Not much difference is apparent when considering mandated exclusive territories.

This analysis on production mostly accords with what was found on the effect of entry; franchise laws are found to not only decrease entry, but significantly decreases craft beer production. This effect is mitigated somewhat if self-distribution by brewers is not illegal. Further, it indicates that franchise laws have a larger effect on craft breweries than exclusive territories, especially regarding production, which fits in line with the hypothesis that these laws increase opportunistic behavior of wholesalers.

2.5.3 Further Considerations and Robustness Checks

To further establish the effect and robustness of the estimation strategy above, the estimation is repeated with the addition of "placebo" treatment variables of leads of the VR dummies. The 5 year leads, defined as $\mathbf{D_{st+5}}$, are dummy variables equal to 1 if state s at time t had a VR policy in year $t + 5$. This will support that the difference in differences specification is picking up the effect of the law, and not something else that is occurring in those states with law changes. If the lead "placebo" is significant, it would cast doubt on that assumption. Additionally, regressions will be run with lags of the VR dummies, defined similarly. The lagged treatment dummies will be used similarly. However, since it would be expected that these laws would have persistent effects, we would not necessarily expect insignificant results on the lags if the timing of the law passages coincided with

exogenous national entry/exit patterns. The magnitude and size of the lags will thus give an idea of the impact of the laws over time. As figure 2.3 shows in panels (b), (d), and (f), there were two "waves" of entry over this time period. The first occurred in the early 1990s, ending with negative entry rates in the early 2000s, and the second occurred approximately starting in 2005. There is no shakeout apparent in production seen in figure 2.4.

The results on entry with the lead placebos are presented in Table 2.10 and the results on production are presented in Table 2.14. As can be seen, none of the "placebo" lead dummies are significant. The estimated impacts on entry remain largely unchanged and retain similar signifance to earlier estimates, yielding credibility to the empirical approach. The estimated impacts on production are now lower and lose statistical significance, but it should be noted that these impacts are still quite sizable economically. Table 2.11 and Table 2.15 present similar results, only including dummies for franchise laws in panel (a) and only including dummies for exclusive territories in panel (b). Results are again similar to above.

The results from estimation including lagged VR mandate dummies are presented in Table 2.12 for entry. Mandated exclusive territories are estimated to decrease brewery entry ranging from -0.335 to -0.514 breweries per million people, all significant at the 5% level. The effect is larger in $TwoTier = 0$ states. This effect is offset by the 5 year lag terms, so the effect is estimated to be only temporary. The estimated coefficients of franchise laws are small and insignificant on the un-lagged variable, but the lagged franchise dummies are negative and larger than the un-lagged dummies in all specifications except column (3). The lagged interaction term $TwoTier \times Fran$ is positive and significant at the 1% and 5% levels in columns (2) and (4), respectively. This accords with the previous results, but taken at face value, suggests that the franchise laws possibly had a larger impact in a longer run. Recall that Figure 2.3 shows two "waves" of entry: first starting in the early 1990s and ending with a plateau and period of shakeout, with the second "wave" starting around 2005. It may be difficult with several interactions and lagged policies to disentangle precise effects of the laws with this pattern of entry. For example, perhaps franchise laws simply had a

small effect during periods of near zero net entry in the early 2000s and impacted entry more during the second "wave" of entry as seen in figure 2.3. Additionally, multicollinearity is still a concern.

Eight of the thirteen law changes in exclusive territories were passed during the first "wave" of entry seen in Figure 2.3 between 1990 and 2000, and three were passed before 1990. Out of the nine franchise laws passed between 1990 and 2000, only two were in states that did not mandate exclusive territories. Multicollinearity is again a concern as from 1990-2000, six states passed both franchise laws and mandated exclusive territories the same year.

To address this concern, Table 2.13 repeats this analysis examining franchise laws and exclusive territories separately. The results in panel (a) have results that not only are easier to interpret but also are very similar to previous results without lagged VR dummies. Franchise laws are estimated to significantly (at the 5% level) reduce entry by 0.256-0.333 breweries per million per year, with the larger effects being in states with self-distribution restrictions. All lagged coefficients are insignificant and most are small. The results look very similar to Table 2.5, and lend credibility to the previous estimates. In panel (b) exclusive territories are examined. The results are also similar to Table 2.6, but find large values on the lags of $ExTerr$.

The results on production with lagged treatment variables in Table 2.16 are neater and easier to interpret. Note that Figure 2.4 does not show any shakeout periods in production as with entry. Table 2.16 finds very similar results to the estimates without lags, namely, a large decrease in production from franchise laws and larger still in $TwoTier = 0$ states. Exclusive territory mandates do not have significant effects. Table 2.17 also finds similar results as before when considering franchise laws and exclusive territories separately.

The findings in the panel regressions suggest that these laws encouraged opportunistic behavior of downstream wholesalers and decreased entry and total production of craft brewers, with the largest effects coming from beer franchise laws. These results also suggest that to any extent large brewers use VRs voluntarily in an anticompetitive way (as in Asker

31

and Bar-Isaac, 2014), the effect is small compared to the effect of increasing moral hazard problems as discussed.

2.5.4   Cross-Sectional Regressions—Entry

To assess the impact of self-distribution on brewery entry, cross sectional results are examined. Table 2.18 presents results from equation 2.5. While some point estimates on $TwoTier$ are positive and significant at the 10% level, they are relatively small. By 1984 very few craft breweries were operating, so these results may be driven by the existing non-craft breweries that were later consolidated into the larger, national breweries.[15] Additionally, the spillover effects from neighboring breweries per capita is not present and is estimated to be negative in column (4) at the 10% level. There is no significant difference in the number of breweries per million on any other VR policy or interaction term. I take this, along with figure 2.3, as evidence that at the beginning of the sample period (1984) the states looked roughly similar, even across VR policies, in terms of the number of craft breweries present in each state.

Table 2.19 presents the results from equation 2.6. The coefficient on $TwoTier$ is large and statistically significant in most specifications. The estimates range from 6.80 to 8.82. This is a large effect. For comparison $TwoTier = 0$ states have an average of 12.42 breweries per million in 2013, and $TwoTier = 1$ states have an average of 23.76 breweries per million people (this is significantly different with t=2.78, p=0.0078). Thus the impact of $TwoTier$ accounts for 60%-78% of the observed difference between the averages and a significant percentage of the increase in the number of breweries per capita within two-tier states.

---

[15]While the data I have do not distinguish between the size or types of breweries, the Brewer's Association, using a different count than the TTB, report that in 1984 there were only 18 craft breweries operating nationally. The rest were large national, regional or other non-craft breweries.

2.5.5 Cross-Sectional Regressions—Production

Similar results are found with production data. Table 2.20 presents results from equation 2.5 with $\ln(prod_{s1984} + 1)$ as the dependent variable. No coefficient on $TwoTier$ is found to be significant, indicating these states looked similar in the amount of craft beer production in 1984. Results from equation 2.6 are presented in Table 2.21 with $\ln(prod_{s2012} - prod_{1984})$ as the dependent variable. Estimates of the coefficient on $TwoTier$ range from 1.02 to 1.26, which correspond to a 178% to 251% increase in production.[16] This large effect can be readily seen in panel (a) of Figure 2.4. In 2012, $TwoTier = 1$ states produced on average approximately 673,000 bbls of craft beer whereas $TwoTier = 0$ states produced only 103,000 bbls of craft beer.

A reasonable question is whether these results indicate that these mandates are welfare decreasing or not. While they indicate they decrease the surplus of potential entrants, they do not directly indicate how incumbent producer surplus or consumer surplus is affected. If consumer choice is a valued product, these laws decrease that, but if it comes at the additional benefit of lower prices or higher quality goods, consumers may still benefit. However, I interpret the results as suggestive of being welfare decreasing.

2.6 Conclusion

This paper examines the impact various vertical restraints mandated by state regulations had on the entry and production decision of firms in the brewing industry. Theoretical work is ambiguous on the competitive nature of such restraints and their impact on the profitability of manufacturers so empirical work is of particular importance. I find that passage of beer franchise termination laws causes a decrease in the number of breweries and total level of craft beer production relative to those without these laws. This effect is not as strong in states which have not prohibited brewers from acting as wholesalers. This result makes sense since the option of self-distribution means that these brewers have the option

---

[16]The marginal effects are calculated $\exp(1.255) - 1 = 2.51$ and $\exp(1.023) - 1 = 1.78$

of bypassing wholesalers when beginning operations. This option will potentially give the brewer more time to find a wholesaler which will align with more closely with its interests.

I also find that prohibiting integration between beer manufacturers and wholesalers had a negative and large impact on brewery entry and production compared to states without prohibitions. Most breweries start out as very small enterprises. If it is costly to find or negotiate small volume sales with a wholesaler being able to distribute one's product is important. This is of greater importance in states with beer franchise termination restrictions since it can be extremely difficult to get out of a contract once signed in those states. This study also finds some evidence that mandating exclusive territories decreases brewer entry, though this is not a robust result.

Lastly, this paper provides evidence against use of voluntary VRs as a means to dampen competition. The reasoning is that if upstream firms passed rents downstream (via exclusive territories, e.g.) and threatened to sever the contract if entry upstream was accommodated by the downstream firms, mandating the use of VRs or restricting the ability to sever contracts would remove the viability of that threat and increase entry. I find the opposite: that entry and production decreases with mandated VRs.

While this paper covered the brewing industry, and specifically craft breweries, these VR regulations are not unique to brewing. The wine and spirits industries are governed by similar laws, and this study sheds light on traditional franchise laws. Additionally, the petroleum and automotive industry, like the brewing industry is dominated by a small number of large firms, and many states regulate vertical relations through specific petroleum and automotive franchise laws.[17] The impact of these laws is very similar to beer franchise laws in that "good cause" is necessary to cancel or fail to renew a contract between a manufacturer and wholesaler, and exclusive territories are often required. Self-distribution is prohibited in many cases, as the electric car company Tesla Motors shows— many states have banned the method of direct sales Tesla employs to bypass dealerships. Lastly, the franchise business model is very common, and this study examines laws similar to laws

---

[17]Lafontaine and Morton (2010) give a description and history of franchise regulations in the automotive industry in the context of the most recent financial crisis.

many states have for traditional franchises.

This paper does not *directly* address the impact on total welfare that the mandated VRs examined here have. However, I interpret the results as being suggestive that these laws decrease welfare. Previous papers (Sass and Saurman, 1993; and Rojas, 2012) which suggested positive welfare changes from mandated exclusive territories argued that these mandates were valuable to brewers that would have not used exclusive territories without a mandate for fear of litigation. This research suggests it may be better to neither legally prevent nor mandate vertical restrictions.

Table 2.1: Variable Descriptions

Var. Name	Description	Source
Breweries	Number of active brewery records as reported by the TTB	TTB
Breweries/cap	Number of active brewery records as reported by the TTB per million people	
Entrants	Difference in number of active brewery records as reported by the TTB per million people	
Production	Total barrels of craft beer production	Elzinga, Tremblay and Trembly (2015)
TwoTier	Equals 1 if state s in has allowed breweries to distribute their own product over entire sample period, 0 otherwise	Collected by author
ExTerr	Equals 1 if state s in time t mandates exclusive wholesale territories in brewer/wholesaler contracts, 0 otherwise	Collected by author
Fran	Equals 1 if state s in time t has passed franchise termination restriction laws between brewers and wholesalers, 0 otherwise	Collected by author
TwoTier × *ExTerr*	Interaction between *TwoTier* and *ExTerr*	
TwoTier × *Fran*	Interaction between *TwoTier* and *Fran*	
Neighboring Breweries/cap	Number of active brewery records in surrounding states as reported by the TTB per million people	
Neighboring Production	Production of other states weighted by inverse distance to the centroid of states	Elzinga, Tremblay and Trembly (2015)
Real GDP/cap	Real GDP per capita in 2009 \$s	BEA
Unemployment	Unemployment rate in state s at time t	BLS
%Black Pop	Percentage of population black	Census
%20 year+ Pop	Percentage of population 20 years and older	Census
Real Tax/bbl	Real excise tax rate on beer in 2009 dollars per barrel	Beer Institute
Beer/cap	Gallons of beer consumed per capita	Beer Institute
Wine/cap	Gallons of wine consumed per capita	Beer Institute
Spirits/cap	Gallons of spirits consumed per capita	Beer Institute

Table 2.2: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Breweries	27.49	46.452	0	528	1530
Breweries/cap[a]	6.711	8.888	0	71.813	1530
$Entrants^a$	0.577	1.639	-6.694	14.615	1479
Production[b]	9.416	28.884	0	364.717	1479
$TwoTier$	0.392	0.488	0	1	1530
$ExTerr$	0.577	0.494	0	1	1530
$Fran$	0.742	0.438	0	1	1530
$TwoTier \times ExTerr$	0.167	0.373	0	1	1530
$TwoTier \times Fran$	0.256	0.437	0	1	1530
Neighboring Breweries/cap	5.690	5.672	0	45.72	1530
Neighboring Production	37.708	50.209	0	511.6989	1479
Unemployment	5.834	1.961	2.242	14.7	1530
Real GDP/cap	42.972	16.598	23.018	174.401	1530
%Black Pop	10.734	11.453	0.227	65.141	1530
%20 year+ Pop	70.118	4.584	52.78	79.535	1530
Real Tax/bbl	19.496	9.025	6.986	66.291	1530
Beer/cap (gallons)	23.050	3.908	12.2410	39.628	1530
Wine/cap (gallons)	2.051	1.100	0.489	7.027	1530
Spirits/cap (gallons)	1.560	0.619	0.686	5.939	1530

[a] breweries per million people
[b] production is expressed in 10,000 bbl units

Table 2.3: Year changes of VRs

State	Self Dist.	Ex. Terr.	Franchise
Alabama		1984	1988
Alaska	Two-tier		
Arizona	1987		1974
Arkansas	2003	1991	1991
California	Two-tier		
Colorado	Two-tier	1995	
Connecticut	Two-tier		1971
Delaware			1981
D.C.	2013		
Florida		1988	1987
Georgia		1965	1965
Hawaii	Two-tier		
Idaho	1987		1977
Illinois	2011		1982
Indiana	1993		1973
Iowa	Two-tier	1995	1995
Kansas		1979	1979
Kentucky		1982	2004
Louisiana		1993	1993
Maine	1986	1971	1979
Maryland	2013	1974	1974
Massachusetts	Two-tier		1972
Michigan	2014	1977	1984
Minnesota	Two-tier	1977	1977
Mississippi		1995	1995
Missouri		1985	1977
Montana	Two-tier	1974	1974
Nebraska		1976	1976
Nevada			1973
New Hampshire	1999	1981	1981
New Jersey	Two-tier	2006	2006
New Mexico	Two-tier		1981
New York	Two-tier		1996
North Carolina	1993	1982	1982
North Dakota	2013	1981	1981
Ohio	Two-tier	1974	1974
Oklahoma	Two-tier		
Oregon	Two-tier	1981	1989
Pennsylvania	Two-tier	1980	1980
Rhode Island	Two-tier		
South Carolina		1983	1974
South Dakota		1990	1990
Tennessee	1991	1973	1990
Texas	1993	1995	1981
Utah	1994		1998
Vermont	Two-tier	1976	1976
Virginia		1985	1978
Washington	Two-tier		
West Virginia	1993	1971	1971
Wisconsin	Two-tier	2006	2004
Wyoming	1999	1996	1996

=law change during panel observations

Notes: Self-distribution dates refer to legislation passed allowing small breweries to self-distribute. Two-tier refers to states that have not had prohibitions on brewery self-distribution; these states allowed breweries distribute their own beer or to hold wholesale licenses. CO, RI, and WA have franchise laws for some breweries, but they would not apply to most craft breweries in those states. UT exclusive territories do not apply to craft breweries. See text for more details.
Source: Collected by author.

38

Table 2.4: Impact of VR on brewery entry, panel regression 1985-2013

	(1)	(2)	(3)	(4)
ExTerr	-0.211*	-0.131	-0.124	-0.041
	(0.12)	(0.15)	(0.13)	(0.17)
Fran	-0.145	-0.317***	-0.124	-0.266
	(0.09)	(0.12)	(0.11)	(0.16)
TwoTier × *ExTerr*		-0.200		-0.206
		(0.17)		(0.20)
TwoTier × *Fran*		0.438***		0.360*
		(0.13)		(0.18)
Neighboring Breweries/cap			0.067**	0.066**
			(0.03)	(0.03)
%20 year+ Pop	0.013	0.020	-0.042	-0.036
	(0.06)	(0.06)	(0.07)	(0.07)
Real Tax/bbl	-0.004	-0.004	-0.023	-0.023
	(0.03)	(0.03)	(0.03)	(0.03)
Real GDP/cap	0.002	0.002	0.006	0.005
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	0.027	0.026	0.023	0.023
	(0.03)	(0.03)	(0.03)	(0.03)
%Black Pop	-0.038	-0.039	-0.022	-0.024
	(0.04)	(0.04)	(0.04)	(0.04)
Beer/cap	0.053	0.056	0.054	0.056
	(0.04)	(0.04)	(0.04)	(0.04)
Wine/cap	-0.165	-0.160	-0.144	-0.140
	(0.22)	(0.22)	(0.23)	(0.23)
Spirit/cap	-0.050	-0.052	-0.134	-0.133
	(0.28)	(0.28)	(0.29)	(0.28)
State & Year FE	Y	Y	Y	Y
R^2	0.372	0.372	0.378	0.378
N	1479	1479	1479	1479

Note: Table 2.4 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.5: Impact of VR imposing $\beta_{ET} = 0$, entry panel regression 1985-2013

	(1)	(2)	(3)	(4)
$Fran$	-0.260***	-0.383***	-0.190**	-0.282**
	(0.08)	(0.10)	(0.09)	(0.12)
$TwoTier \times Fran$		0.315**		0.235
		(0.13)		(0.16)
Neighboring Breweries/cap			0.067**	0.067**
			(0.03)	(0.03)
%20 year+ Pop	0.015	0.022	-0.041	-0.035
	(0.06)	(0.06)	(0.07)	(0.07)
Real Tax/bbl	-0.003	-0.004	-0.023	-0.023
	(0.03)	(0.03)	(0.03)	(0.03)
Real GDP/cap	0.002	0.002	0.006	0.006
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	0.031	0.028	0.025	0.023
	(0.03)	(0.03)	(0.03)	(0.03)
%Black Pop	-0.037	-0.037	-0.021	-0.021
	(0.04)	(0.04)	(0.04)	(0.05)
Beer/cap	0.053	0.055	0.054	0.056
	(0.04)	(0.04)	(0.04)	(0.04)
Wine/cap	-0.156	-0.155	-0.139	-0.138
	(0.22)	(0.22)	(0.22)	(0.22)
Spirit/cap	-0.062	-0.071	-0.143	-0.148
	(0.27)	(0.27)	(0.28)	(0.27)
State & Year FE	Y	Y	Y	Y
R^2	0.372	0.372	0.378	0.378
N	1479	1479	1479	1479

Note: Table 2.5 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.6: Impact of VR imposing $\beta_{fran} = 0$, entry panel regression 1985-2013

	(1)	(2)	(3)	(4)
$ExTerr$	-0.308***	-0.363***	-0.206*	-0.234*
	(0.10)	(0.13)	(0.11)	(0.14)
$TwoTier \times ExTerr$		0.131		0.065
		(0.14)		(0.16)
Neighboring Breweries/cap			0.067**	0.067**
			(0.03)	(0.03)
%20 year+ Pop	0.010	0.012	-0.044	-0.043
	(0.06)	(0.06)	(0.07)	(0.07)
Real Tax/bbl	-0.004	-0.004	-0.023	-0.024
	(0.03)	(0.03)	(0.03)	(0.03)
Real GDP/cap	0.002	0.002	0.006	0.006
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	0.026	0.024	0.022	0.021
	(0.03)	(0.03)	(0.03)	(0.03)
%Black Pop	-0.040	-0.039	-0.024	-0.023
	(0.04)	(0.04)	(0.04)	(0.04)
Beer/cap	0.051	0.051	0.053	0.053
	(0.03)	(0.03)	(0.04)	(0.04)
Wine/cap	-0.167	-0.169	-0.146	-0.147
	(0.22)	(0.22)	(0.23)	(0.23)
Spirit/cap	-0.056	-0.062	-0.139	-0.142
	(0.29)	(0.29)	(0.29)	(0.29)
State & Year FE	Y	Y	Y	Y
R^2	0.371	0.372	0.378	0.378
N	1479	1479	1479	1479

Note: Table 2.6 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.7: Impact of VR on craft production, panel regression 1984-2012

	(1)	(2)	(3)	(4)
ExTerr	0.318	0.710	0.341	0.759
	(0.36)	(0.46)	(0.36)	(0.47)
Fran	-0.679**	-0.943**	-0.690**	-0.954**
	(0.31)	(0.42)	(0.31)	(0.42)
TwoTier × ExTerr		-1.001		-1.049
		(0.65)		(0.65)
TwoTier × Fran		0.647		0.647
		(0.55)		(0.55)
ln Neighboring Breweries/cap			0.115	0.164
			(0.29)	(0.30)
ln Neighboring Prod			0.100	0.110
			(0.23)	(0.22)
ln %20 year+ Pop	-2.764	-2.552	-1.712	-1.477
	(5.48)	(5.53)	(5.67)	(5.75)
ln Pop	1.900	2.057	2.111	2.283
	(1.25)	(1.27)	(1.51)	(1.54)
ln Real Tax/bbl	-1.307**	-1.252**	-1.265*	-1.212*
	(0.62)	(0.61)	(0.64)	(0.64)
ln Real GDP/cap	-1.238*	-1.248*	-1.349	-1.361
	(0.70)	(0.69)	(0.82)	(0.82)
ln Unemployment	-0.272	-0.248	-0.277	-0.251
	(0.28)	(0.27)	(0.28)	(0.27)
ln %Black Pop	-0.200	-0.207	-0.258	-0.278
	(0.37)	(0.36)	(0.37)	(0.37)
ln Beer/cap	-3.373**	-3.338**	-3.412**	-3.376**
	(1.38)	(1.38)	(1.34)	(1.34)
ln Wine/cap	0.643	0.755	0.664	0.781
	(0.66)	(0.66)	(0.66)	(0.65)
ln Spirit/cap	0.639	0.757	0.641	0.746
	(1.01)	(1.01)	(1.06)	(1.06)
State & Year FE	Y	Y	Y	Y
R^2	0.872	0.873	0.872	0.873
N	1479	1479	1479	1479

Note: Table 2.7 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.8: Impact of VR imposing $\beta_{ET} = 0$, production panel regression 1984-2012

	(1)	(2)	(3)	(4)
Fran	-0.513**	-0.526**	-0.517**	-0.527**
	(0.23)	(0.25)	(0.24)	(0.26)
TwoTier × Fran		0.033		0.026
		(0.42)		(0.42)
ln Neighboring Breweries/cap			0.068	0.065
			(0.29)	(0.29)
ln Neighboring Prod			0.095	0.096
			(0.23)	(0.23)
ln %20 year+ Pop	-3.003	-2.959	-1.954	-1.910
	(5.47)	(5.54)	(5.69)	(5.77)
ln Pop	1.957	1.969	2.166	2.176
	(1.24)	(1.27)	(1.50)	(1.53)
ln Real Tax/bbl	-1.345**	-1.344**	-1.298**	-1.296**
	(0.61)	(0.61)	(0.63)	(0.64)
ln Real GDP/cap	-1.255*	-1.258*	-1.370*	-1.373
	(0.69)	(0.69)	(0.82)	(0.82)
ln Unemployment	-0.282	-0.284	-0.286	-0.287
	(0.28)	(0.27)	(0.28)	(0.27)
ln %Black Pop	-0.227	-0.230	-0.273	-0.274
	(0.37)	(0.36)	(0.38)	(0.37)
ln Beer/cap	-3.356**	-3.341**	-3.411**	-3.401**
	(1.38)	(1.40)	(1.36)	(1.37)
ln Wine/cap	0.573	0.580	0.583	0.588
	(0.69)	(0.68)	(0.69)	(0.68)
ln Spirit/cap	0.766	0.762	0.798	0.797
	(1.01)	(1.00)	(1.06)	(1.05)
State & Year FE	Y	Y	Y	Y
R^2	0.872	0.872	0.872	0.872
N	1479	1479	1479	1479

Note: Table 2.8 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.9: Impact of VR imposing $\beta_{fran} = 0$, production panel regression 1984-2012

	(1)	(2)	(3)	(4)
$ExTerr$	-0.122	0.076	-0.102	0.130
	(0.32)	(0.38)	(0.33)	(0.39)
$TwoTier \times ExTerr$		-0.532		-0.590
		(0.58)		(0.57)
ln Neighboring Breweries/cap			0.138	0.206
			(0.29)	(0.30)
ln Neighboring Prod			0.060	0.058
			(0.23)	(0.22)
ln %20 year+ Pop	-3.700	-4.051	-3.171	-3.671
	(5.49)	(5.46)	(5.63)	(5.55)
ln Pop	2.022	1.985	2.143	2.091
	(1.24)	(1.24)	(1.53)	(1.52)
ln Real Tax/bbl	-1.288**	-1.277**	-1.276**	-1.278**
	(0.61)	(0.61)	(0.63)	(0.63)
ln Real GDP/cap	-1.296*	-1.273*	-1.349	-1.308
	(0.68)	(0.69)	(0.82)	(0.82)
ln Unemployment	-0.294	-0.266	-0.298	-0.268
	(0.28)	(0.28)	(0.28)	(0.28)
ln %Black Pop	-0.172	-0.151	-0.224	-0.218
	(0.38)	(0.38)	(0.39)	(0.39)
ln Beer/cap	-3.522**	-3.664**	-3.515**	-3.638**
	(1.42)	(1.45)	(1.38)	(1.41)
ln Wine/cap	0.483	0.463	0.504	0.492
	(0.70)	(0.69)	(0.69)	(0.68)
ln Spirit/cap	0.653	0.756	0.615	0.689
	(1.05)	(1.05)	(1.11)	(1.11)
State & Year FE	Y	Y	Y	Y
R^2	0.870	0.871	0.870	0.871
N	1479	1479	1479	1479

Note: Table 2.9 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.10: "Placebo" Lead Dummy Variables, impact on entry

	(1)	(2)	(3)	(4)
ExTerr	-0.338	-0.155	-0.254	-0.082
	(0.21)	(0.20)	(0.20)	(0.21)
Fran	-0.183	-0.359***	-0.155	-0.282**
	(0.15)	(0.10)	(0.15)	(0.12)
TwoTier × ExTerr		-0.390		-0.385
		(0.36)		(0.35)
TwoTier × Fran		0.400		0.271
		(0.27)		(0.28)
ExTerr (5 year lead)	0.299	0.113	0.306	0.147
	(0.38)	(0.40)	(0.40)	(0.42)
Fran (5 year lead)	0.092	0.134	0.077	0.071
	(0.31)	(0.23)	(0.36)	(0.37)
TwoTier × ExTerr (5 year lead)		0.283		0.246
		(0.84)		(0.86)
TwoTier × Fran (5 year lead)		-0.062		0.056
		(0.70)		(0.77)
Neighboring Breweries/cap			0.066**	0.066**
			(0.03)	(0.03)
%20 year+ Pop	0.012	0.018	-0.043	-0.036
	(0.06)	(0.06)	(0.07)	(0.07)
Real Tax/bbl	-0.005	-0.004	-0.024	-0.024
	(0.03)	(0.03)	(0.03)	(0.03)
Real GDP/cap	0.003	0.002	0.006	0.005
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	0.032	0.031	0.028	0.028
	(0.03)	(0.03)	(0.03)	(0.03)
%Black Pop	-0.040	-0.040	-0.024	-0.025
	(0.04)	(0.04)	(0.04)	(0.04)
Beer/cap	0.056	0.059*	0.057	0.060*
	(0.03)	(0.04)	(0.03)	(0.04)
Wine/cap	-0.170	-0.162	-0.150	-0.143
	(0.22)	(0.22)	(0.23)	(0.23)
Spirit/cap	-0.070	-0.071	-0.153	-0.152
	(0.28)	(0.27)	(0.28)	(0.28)
State & Year FE	Y	Y	Y	Y
R^2	0.373	0.373	0.379	0.379
N	1479	1479	1479	1479

Note: Table 2.10 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.11: "Placebo" Lead Dummy Variables, Franchise and Ex. Terr Separate Regressions

Panel (a)	(1)	(2)	(3)	(4)
Fran	-0.368**	-0.447***	-0.293**	-0.327**
	(0.14)	(0.15)	(0.14)	(0.15)
$TwoTier \times Fran$		0.228		0.095
		(0.27)		(0.27)
Fran (5 year lead)	0.266	0.198	0.254	0.142
	(0.21)	(0.31)	(0.22)	(0.33)
$TwoTier \times Fran$ (5 year lead)		0.089		0.208
		(0.40)		(0.41)
Neighboring Breweries/cap			0.067**	0.067**
			(0.03)	(0.03)

Panel (b)	(1)	(2)	(3)	(4)
ExTerr	-0.466**	-0.434**	-0.362*	-0.298
	(0.18)	(0.21)	(0.18)	(0.22)
$TwoTier \times ExTerr$		-0.080		-0.172
		(0.30)		(0.30)
ExTerr (5 year lead)	0.368	0.253	0.364	0.233
	(0.25)	(0.43)	(0.24)	(0.35)
$TwoTier \times ExTerr$ (5 year lead)		0.212		0.264
		(0.53)		(0.47)
Neighboring Breweries/cap			0.066**	0.067**
			(0.03)	(0.03)
State & Year FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

Note: Table 2.11 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

46

Table 2.12: Lagged VR Treatment Variables, impact on entry

	(1)	(2)	(3)	(4)
ExTerr	-0.386**	-0.514**	-0.335**	-0.444**
	(0.15)	(0.20)	(0.14)	(0.19)
Fran	-0.053	-0.043	-0.068	-0.082
	(0.08)	(0.13)	(0.10)	(0.17)
TwoTier × ExTerr		0.234		0.218
		(0.24)		(0.23)
TwoTier × Fran		0.005		0.063
		(0.19)		(0.22)
ExTerr (5 year lag)	0.260	0.539***	0.322	0.567***
	(0.20)	(0.17)	(0.20)	(0.18)
Fran (5 year lag)	-0.126	-0.393***	-0.057	-0.250
	(0.16)	(0.14)	(0.14)	(0.15)
TwoTier × ExTerr (5 year lag)		-0.619*		-0.588
		(0.37)		(0.36)
TwoTier × Fran (5 year lag)		0.648***		0.446*
		(0.24)		(0.24)
Neighboring Breweries/cap			0.069**	0.067**
			(0.03)	(0.03)
%20 year+ Pop	0.011	0.017	-0.048	-0.043
	(0.06)	(0.06)	(0.07)	(0.07)
Real Tax/bbl	-0.003	-0.003	-0.022	-0.021
	(0.03)	(0.03)	(0.03)	(0.03)
Real GDP/cap	0.002	0.001	0.005	0.004
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	0.028	0.028	0.024	0.025
	(0.03)	(0.03)	(0.03)	(0.03)
%Black Pop	-0.038	-0.041	-0.023	-0.026
	(0.04)	(0.04)	(0.04)	(0.05)
Beer/cap	0.054	0.059	0.055	0.059
	(0.04)	(0.04)	(0.04)	(0.04)
Wine/cap	-0.152	-0.153	-0.121	-0.122
	(0.23)	(0.23)	(0.23)	(0.23)
Spirit/cap	-0.052	-0.052	-0.141	-0.136
	(0.28)	(0.27)	(0.28)	(0.28)
State & Year FE	Y	Y	Y	Y
R^2	0.373	0.374	0.380	0.381
N	1479	1479	1479	1479

Note: Table 2.12 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.13: Lagged VR Treatment Variables, Franchise and Ex. Terr Separate Regressions

Panel (a)	(1)	(2)	(3)	(4)
$Fran$	-0.269**	-0.331**	-0.256**	-0.333**
	(0.10)	(0.14)	(0.10)	(0.14)
$TwoTier \times Fran$		0.126		0.179
		(0.21)		(0.20)
$Fran$ (5 year lag)	0.015	-0.071	0.115	0.088
	(0.17)	(0.18)	(0.17)	(0.19)
$TwoTier \times Fran$ (5 year lag)		0.296		0.099
		(0.36)		(0.34)
Neighboring Breweries/cap			0.069**	0.067**
			(0.03)	(0.03)
Panel (b)	(1)	(2)	(3)	(4)
$ExTerr$	-0.422***	-0.535***	-0.382***	-0.497***
	(0.13)	(0.16)	(0.11)	(0.13)
$TwoTier \times ExTerr$		0.272		0.293
		(0.22)		(0.18)
$ExTerr$ (5 year lag)	0.184	0.249	0.292	0.389**
	(0.20)	(0.18)	(0.20)	(0.19)
$TwoTier \times ExTerr$ (5 year lag)		-0.178		-0.295
		(0.49)		(0.45)
Neighboring Breweries/cap			0.070**	0.070**
			(0.03)	(0.03)
State & Year FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

Note: Table 2.13 presents the results of a linear model with the number of entering breweries per million people as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.14: "Placebo" Lead Dummy Variables, impact on production

	(1)	(2)	(3)	(4)
ExTerr	0.245	0.632	0.280	0.676
	(0.43)	(0.56)	(0.43)	(0.57)
Fran	-0.445	-0.712	-0.441	-0.692
	(0.38)	(0.54)	(0.38)	(0.54)
TwoTier × ExTerr		-1.013		-1.031
		(0.82)		(0.81)
TwoTier × Fran		0.607		0.569
		(0.66)		(0.66)
ExTerr (5 year lead)	0.172	0.115	0.163	0.141
	(0.49)	(0.73)	(0.49)	(0.71)
Fran (5 year lead)	-0.559	-0.555	-0.608	-0.656
	(0.54)	(0.80)	(0.53)	(0.79)
TwoTier × ExTerr (5 year lead)		0.159		0.078
		(0.90)		(0.88)
TwoTier × Fran (5 year lead)		0.068		0.189
		(0.89)		(0.90)
ln Neighboring Breweries/cap			0.144	0.190
			(0.30)	(0.31)
ln Neighboring Prod			0.150	0.159
			(0.22)	(0.22)
ln %20 year+ Pop	-2.360	-1.944	-0.694	-0.132
	(5.45)	(5.67)	(5.57)	(5.98)
ln Pop	1.821	2.008	2.132	2.346
	(1.27)	(1.29)	(1.51)	(1.56)
ln Real Tax/bbl	-1.287**	-1.240**	-1.218*	-1.180*
	(0.61)	(0.60)	(0.64)	(0.63)
ln Real GDP/cap	-1.273*	-1.291*	-1.452*	-1.468*
	(0.70)	(0.69)	(0.83)	(0.83)
ln Unemployment	-0.283	-0.261	-0.291	-0.268
	(0.28)	(0.28)	(0.28)	(0.28)
ln %Black Pop	-0.200	-0.217	-0.279	-0.313
	(0.36)	(0.35)	(0.37)	(0.37)
ln Beer/cap	-3.509**	-3.409**	-3.598**	-3.490**
	(1.41)	(1.40)	(1.37)	(1.36)
ln Wine/cap	0.633	0.758	0.657	0.794
	(0.65)	(0.65)	(0.64)	(0.64)
ln Spirit/cap	0.679	0.768	0.706	0.791
	(1.01)	(1.01)	(1.05)	(1.06)
State & Year FE	Y	Y	Y	Y
R^2	0.873	0.874	0.873	0.874
N	1479	1479	1479	1479

Note: Table 2.14 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.15: "Placebo" Lead Dummy Variables, Franchise and Ex. Terr Separate Regressions

Panel (a)	(1)	(2)	(3)	(4)
Fran	-0.319	-0.331	-0.304	-0.307
	(0.26)	(0.29)	(0.27)	(0.30)
TwoTier × *Fran*		0.026		-0.000
		(0.54)		(0.55)
Fran (5 year lead)	-0.459	-0.541	-0.508	-0.614
	(0.38)	(0.60)	(0.38)	(0.61)
TwoTier × *Fran* (5 year lead)		0.177		0.229
		(0.71)		(0.73)
ln Neighboring Breweries/cap			0.097	0.096
			(0.30)	(0.31)
ln Neighboring Prod			0.145	0.152
			(0.22)	(0.22)
Panel (b)	(1)	(2)	(3)	(4)
ExTerr	-0.012	0.156	0.023	0.218
	(0.33)	(0.35)	(0.34)	(0.37)
TwoTier × *ExTerr*		-0.540		-0.594
		(0.69)		(0.68)
ExTerr (5 year lead)	-0.254	-0.237	-0.283	-0.262
	(0.32)	(0.50)	(0.32)	(0.50)
TwoTier × *ExTerr* (5 year lead)		0.120		0.124
		(0.64)		(0.64)
ln Neighboring Breweries/cap			0.151	0.209
			(0.29)	(0.30)
ln Neighboring Prod			0.077	0.071
			(0.23)	(0.22)
State & Year FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

Note: Table 2.15 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.16: Lagged VR Treatment Variables, impact on production

	(1)	(2)	(3)	(4)
$ExTerr$	0.446	0.811	0.453	0.840*
	(0.36)	(0.49)	(0.36)	(0.49)
$Fran$	-0.656**	-0.887***	-0.670**	-0.908***
	(0.26)	(0.32)	(0.26)	(0.32)
$TwoTier \times ExTerr$		-0.844		-0.884
		(0.62)		(0.62)
$TwoTier \times Fran$		0.558		0.573
		(0.50)		(0.50)
$ExTerr$ (5 year lag)	-0.196	-0.134	-0.180	-0.119
	(0.33)	(0.50)	(0.33)	(0.50)
$Fran$ (5 year lag)	-0.066	-0.114	-0.059	-0.096
	(0.29)	(0.43)	(0.28)	(0.43)
$TwoTier \times ExTerr$ (5 year lag)		-0.347		-0.341
		(0.55)		(0.54)
$TwoTier \times Fran$ (5 year lag)		0.103		0.082
		(0.42)		(0.42)
ln Neighboring Breweries/cap			0.082	0.135
			(0.29)	(0.30)
ln Neighboring Prod			0.093	0.098
			(0.23)	(0.23)
ln %20 year+ Pop	-2.506	-2.391	-1.519	-1.434
	(5.49)	(5.54)	(5.67)	(5.76)
ln Pop	1.867	2.043	2.069	2.250
	(1.26)	(1.28)	(1.52)	(1.55)
ln Real Tax/bbl	-1.338**	-1.281**	-1.291**	-1.240*
	(0.62)	(0.61)	(0.64)	(0.64)
ln Real GDP/cap	-1.170	-1.184	-1.284	-1.294
	(0.71)	(0.71)	(0.84)	(0.84)
ln Unemployment	-0.271	-0.232	-0.275	-0.235
	(0.28)	(0.28)	(0.28)	(0.28)
ln %Black Pop	-0.217	-0.221	-0.262	-0.280
	(0.36)	(0.35)	(0.37)	(0.36)
ln Beer/cap	-3.326**	-3.279**	-3.378**	-3.323**
	(1.38)	(1.37)	(1.34)	(1.34)
ln Wine/cap	0.655	0.750	0.670	0.770
	(0.67)	(0.66)	(0.66)	(0.66)
ln Spirit/cap	0.642	0.804	0.658	0.802
	(1.00)	(1.01)	(1.06)	(1.06)
State & Year FE	Y	Y	Y	Y
R^2	0.872	0.873	0.873	0.874
N	1479	1479	1479	1479

Note: Table 2.16 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.17: Lagged VR Treatment Variables, Franchise and Ex. Terr Separate Regressions

Panel (a)	(1)	(2)	(3)	(4)
$Fran$	-0.413*	-0.426	-0.424*	-0.438
	(0.24)	(0.31)	(0.24)	(0.31)
$TwoTier \times Fran$		0.034		0.036
		(0.42)		(0.41)
$Fran$ (5 year lag)	-0.175	-0.167	-0.163	-0.154
	(0.28)	(0.37)	(0.28)	(0.38)
$TwoTier \times Fran$ (5 year lag)		-0.022		-0.029
		(0.40)		(0.41)
ln Neighboring Breweries/cap			0.046	0.046
			(0.29)	(0.30)
ln Neighboring Prod			0.091	0.091
			(0.23)	(0.23)

Panel (b)	(1)	(2)	(3)	(4)
$ExTerr$	-0.016	0.178	-0.012	0.204
	(0.34)	(0.48)	(0.35)	(0.48)
$TwoTier \times ExTerr$		-0.429		-0.465
		(0.58)		(0.57)
$ExTerr$ (5 year lag)	-0.175	-0.153	-0.152	-0.119
	(0.31)	(0.44)	(0.32)	(0.44)
$TwoTier \times ExTerr$ (5 year lag)		-0.267		-0.287
		(0.49)		(0.49)
ln Neighboring Breweries/cap			0.117	0.191
			(0.29)	(0.30)
ln Neighboring Prod			0.054	0.049
			(0.23)	(0.23)
State & Year FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y

Note: Table 2.17 presents the results of a linear model with the log of craft beer production (in hundreds of barrels) plus one as the dependent variable in columns (1)-(4). Robust standard errors, clustered at the state level are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.18: Impact of *TwoTier* on Entry, Cross Sectional Regression, 1984

	(1)	(2)	(3)	(4)
TwoTier	0.182*	0.246	0.168	0.266*
	(0.11)	(0.15)	(0.11)	(0.15)
ExTerr	0.129	0.100	0.138	0.093
	(0.09)	(0.12)	(0.09)	(0.11)
Fran	-0.093	-0.034	-0.074	0.027
	(0.09)	(0.12)	(0.09)	(0.12)
TwoTier × *ExTerr*		0.099		0.164
		(0.20)		(0.20)
TwoTier × *Fran*		-0.160		-0.258
		(0.19)		(0.20)
Neighboring Breweries/cap			-0.295	-0.383*
			(0.21)	(0.23)
%20 year+ Pop	-0.020	-0.020	-0.021	-0.021
	(0.02)	(0.02)	(0.02)	(0.02)
Real Tax/bbl	-0.004	-0.004	-0.003	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Real GDP/cap	-0.009**	-0.009**	-0.006	-0.006
	(0.00)	(0.00)	(0.00)	(0.00)
Unemployment	0.015	0.014	0.021	0.023
	(0.02)	(0.02)	(0.02)	(0.02)
%Black Pop	0.001	0.002	-0.002	-0.002
	(0.00)	(0.01)	(0.01)	(0.01)
Beer/cap	0.031**	0.029**	0.028**	0.024*
	(0.01)	(0.01)	(0.01)	(0.01)
Wine/cap	-0.002	-0.019	0.005	-0.020
	(0.07)	(0.07)	(0.07)	(0.07)
Spirits/cap	0.066	0.088	0.070	0.108
	(0.11)	(0.11)	(0.11)	(0.11)
Constant	0.752	0.748	0.770	0.766
	(1.27)	(1.30)	(1.25)	(1.27)
R^2	0.382	0.394	0.412	0.439
N	51	51	51	51

Note: Table 2.18 presents the results of a linear model with the number of breweries per million people as the dependent variable in columns (1)-(4). Standard errors are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.19: Impact of *TwoTier* on Entry, Cross Sectional Regression, 2013-1984

	(1)	(2)	(3)	(4)
TwoTier	8.818**	6.802	8.698**	7.011*
	(3.62)	(4.34)	(3.44)	(4.14)
Δ *ExTerr*	3.665	3.675	4.694	4.244
	(4.41)	(5.38)	(4.22)	(5.15)
Δ *Fran*	-3.095	-5.936	-1.354	-3.412
	(4.43)	(5.59)	(4.28)	(5.46)
Δ *TwoTier* $\times$ *ExTerr*		-0.187		1.243
		(9.74)		(9.32)
Δ *TwoTier* $\times$ *Fran*		7.555		5.168
		(9.39)		(9.03)
ΔNeighboring Breweries/cap			0.559**	0.542**
			(0.25)	(0.25)
Δ%20 year+ Pop	5.596***	5.680***	4.793***	4.884***
	(1.18)	(1.20)	(1.18)	(1.20)
ΔReal Tax/bbl	0.437*	0.438*	0.160	0.169
	(0.23)	(0.23)	(0.25)	(0.25)
ΔReal GDP/cap	0.028	-0.003	0.111	0.085
	(0.20)	(0.21)	(0.20)	(0.20)
ΔUnemployment	1.921*	1.919*	1.709	1.701
	(1.07)	(1.09)	(1.02)	(1.04)
Δ%Black Pop	-1.001	-1.049	-0.679	-0.717
	(0.80)	(0.81)	(0.77)	(0.79)
ΔBeer/cap	0.604	0.646	0.566	0.599
	(0.56)	(0.57)	(0.54)	(0.55)
ΔWine/cap	2.601	2.643	2.973	3.010
	(3.78)	(3.83)	(3.59)	(3.66)
ΔSpirits/cap	-0.345	-0.122	-1.549	-1.388
	(2.07)	(2.14)	(2.03)	(2.12)
Constant	-44.360***	-43.760**	-49.454***	-48.854***
	(16.33)	(16.58)	(15.69)	(16.00)
R^2	0.544	0.554	0.598	0.605
N	51	51	51	51

Note: Table 2.19 presents the results of a linear model with the change in breweries per million people as the dependent variable in columns (1)-(4). Standard errors are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.20: Impact of *TwoTier* on Production, Cross Sectional Regression, 1984

	(1)	(2)	(3)	(4)
TwoTier	-0.058	0.586	-0.036	0.589
	(0.45)	(0.64)	(0.46)	(0.65)
ExTerr	0.423	0.184	0.409	0.183
	(0.40)	(0.48)	(0.41)	(0.49)
Fran	-0.464	0.102	-0.494	0.110
	(0.39)	(0.49)	(0.40)	(0.52)
TwoTier × *ExTerr*		0.833		0.842
		(0.82)		(0.85)
TwoTier × *Fran*		-1.502*		-1.516*
		(0.80)		(0.85)
Neighboring Breweries/cap			0.469	-0.053
			(0.93)	(0.97)
%20 year+ Pop	-0.170**	-0.168**	-0.168**	-0.168**
	(0.08)	(0.08)	(0.08)	(0.08)
Pop	0.079**	0.074**	0.080**	0.073*
	(0.04)	(0.04)	(0.04)	(0.04)
Real Tax/bbl	-0.005	-0.006	-0.007	-0.006
	(0.02)	(0.02)	(0.02)	(0.02)
Real GDP/cap	0.005	0.005	0.001	0.005
	(0.02)	(0.02)	(0.02)	(0.02)
Unemployment	0.009	0.008	-0.002	0.009
	(0.09)	(0.09)	(0.09)	(0.09)
%Black Pop	-0.024	-0.017	-0.018	-0.018
	(0.02)	(0.02)	(0.02)	(0.02)
Beer/cap	-0.022	-0.040	-0.018	-0.041
	(0.05)	(0.05)	(0.05)	(0.06)
Wine/cap	1.123***	0.979***	1.109***	0.979***
	(0.30)	(0.31)	(0.31)	(0.31)
Spirits/cap	-0.961*	-0.780	-0.962*	-0.778
	(0.50)	(0.50)	(0.50)	(0.51)
Constant	11.043**	11.020**	11.033*	11.020*
	(5.43)	(5.36)	(5.49)	(5.43)
R^2	0.540	0.582	0.544	0.582
N	51	51	51	51

Note: Table 2.20 presents the results of a linear model with the log of craft beer production in hundreds of barrels plus one as the dependent variable in columns (1)-(4). Standard errors are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.

Table 2.21: Impact of *TwoTier* on Production, Cross Sectional Regression, 2012-1984

	(1)	(2)	(3)	(4)
TwoTier	1.246**	1.042*	1.255**	1.023*
	(0.51)	(0.61)	(0.51)	(0.60)
Δ *ExTerr*	-0.079	0.198	-0.158	0.142
	(0.63)	(0.78)	(0.63)	(0.77)
Δ *Fran*	-0.208	-0.737	-0.335	-0.954
	(0.63)	(0.78)	(0.63)	(0.80)
Δ *TwoTier* $\times$ *ExTerr*		-0.911		-1.025
		(1.40)		(1.39)
Δ *TwoTier* $\times$ *Fran*		1.508		1.713
		(1.32)		(1.32)
ΔNeighboring Breweries/cap			-0.041	-0.047
			(0.04)	(0.04)
Δ%20 year+ Pop	0.178	0.187	0.238	0.257
	(0.17)	(0.18)	(0.18)	(0.18)
ΔPop	0.248**	0.243**	0.252**	0.247**
	(0.11)	(0.12)	(0.11)	(0.12)
ΔReal Tax/bbl	0.018	0.018	0.038	0.042
	(0.03)	(0.03)	(0.04)	(0.04)
ΔReal GDP/cap	-0.007	-0.012	-0.013	-0.020
	(0.03)	(0.03)	(0.03)	(0.03)
ΔUnemployment	0.091	0.100	0.107	0.119
	(0.15)	(0.15)	(0.15)	(0.15)
Δ%Black Pop	0.094	0.081	0.071	0.053
	(0.11)	(0.11)	(0.11)	(0.12)
ΔBeer/cap	-0.164*	-0.158*	-0.160*	-0.153*
	(0.08)	(0.08)	(0.08)	(0.08)
ΔWine/cap	0.159	0.150	0.137	0.123
	(0.55)	(0.56)	(0.55)	(0.55)
ΔSpirits/cap	0.257	0.319	0.346	0.429
	(0.29)	(0.30)	(0.30)	(0.31)
Constant	-1.112	-0.984	-0.761	-0.566
	(2.40)	(2.43)	(2.41)	(2.43)
R^2	0.477	0.496	0.495	0.518
N	51	51	51	51

Note: Table 2.21 presents the results of a linear model with the log of the change in craft beer production as the dependent variable in columns (1)-(4). Standard errors are in parenthesis where *, **, *** denote significant at 10%, 5%, and 1% levels, respectively.
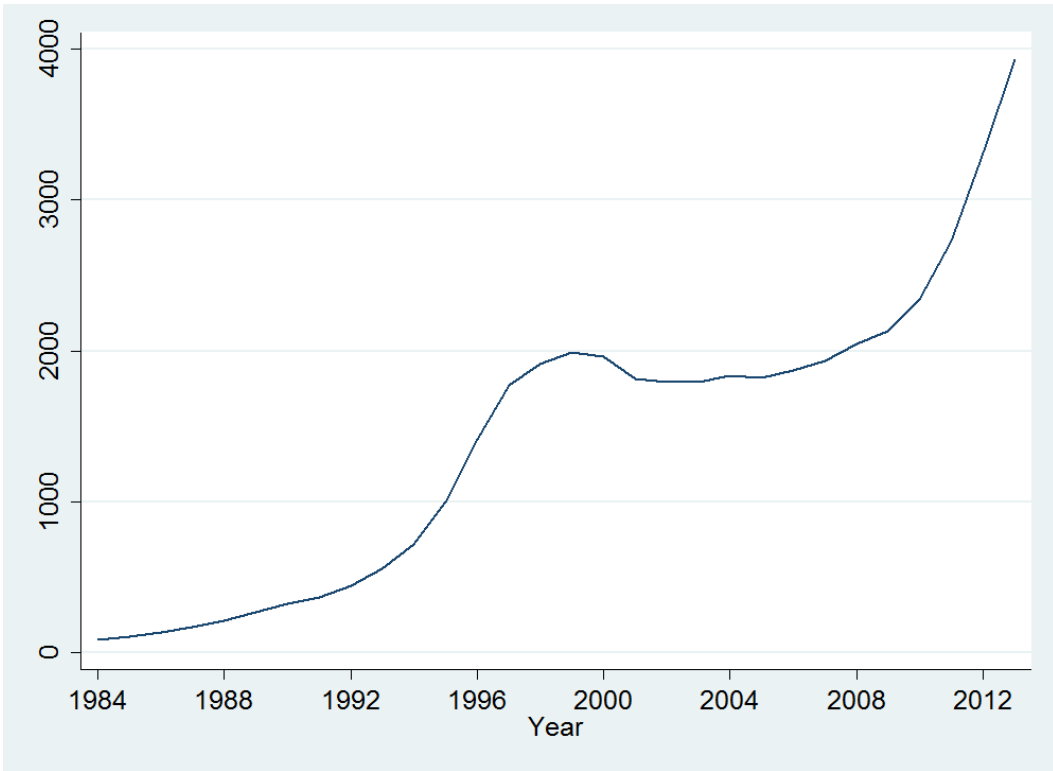
Figure 2.1: Number of Permitted Breweries in US (1984-2013)
Source: TTB
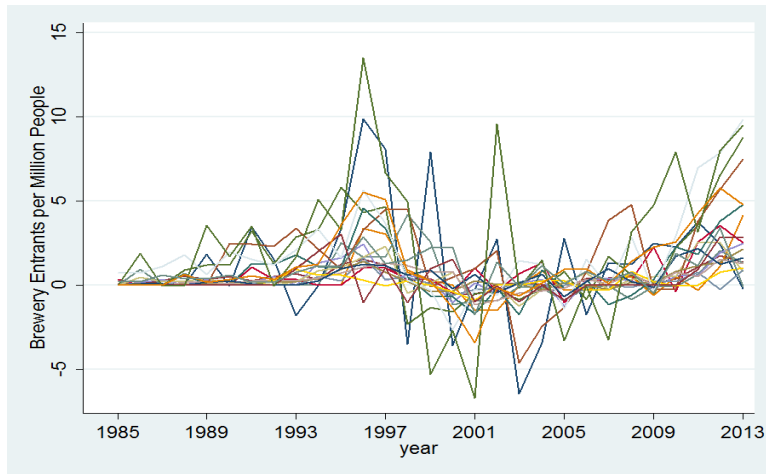
(a) Entry per capita in $Twotier = 1$ states
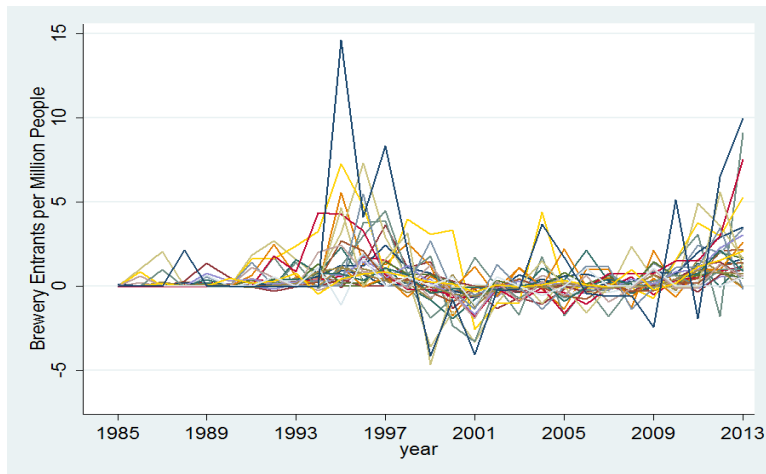
(b) Entry per capita in $Twotier = 0$ states

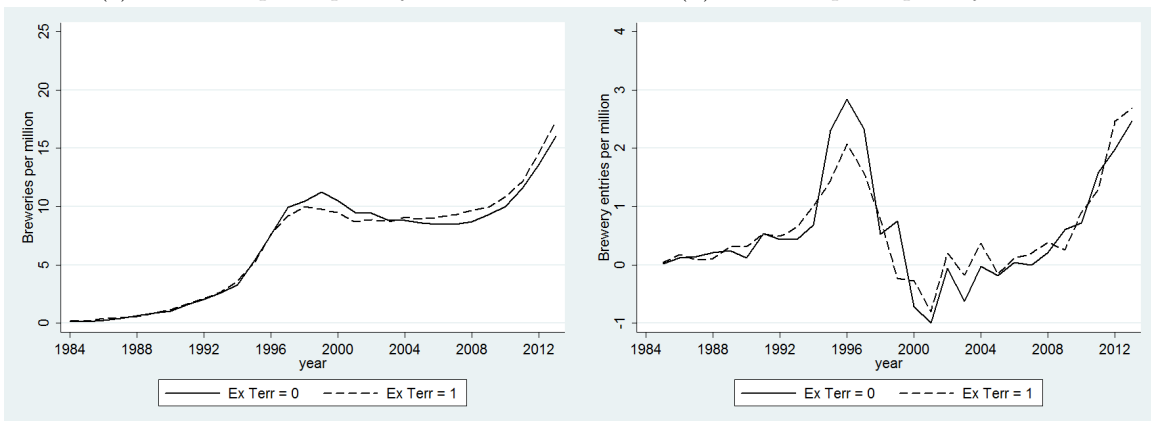Figure 2.2: Net brewery entry per million people by year
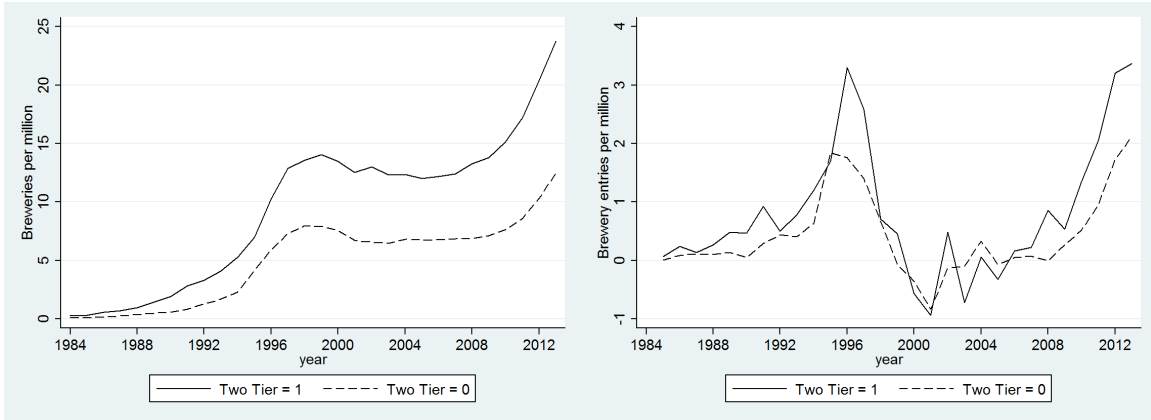
(a) Breweries per capita by $TwoTier$

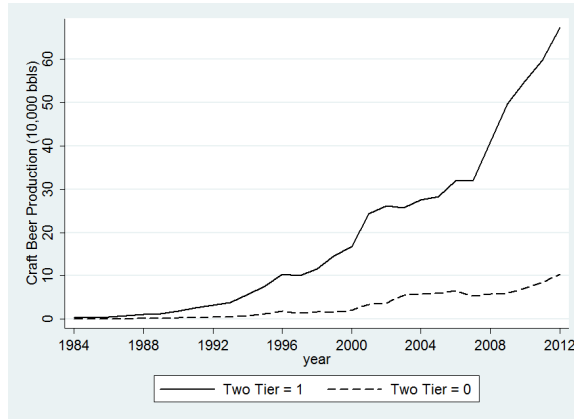(b) Entrants per capita by $TwoTier$
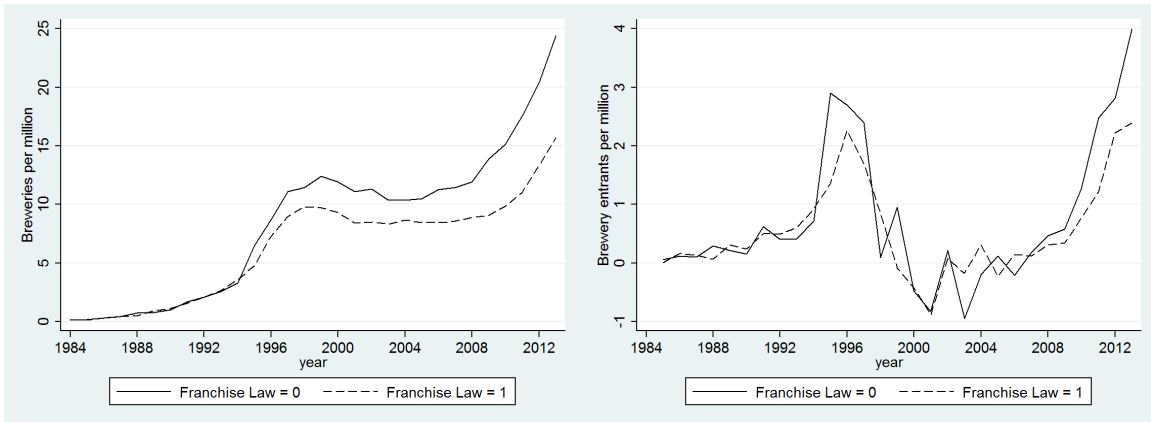
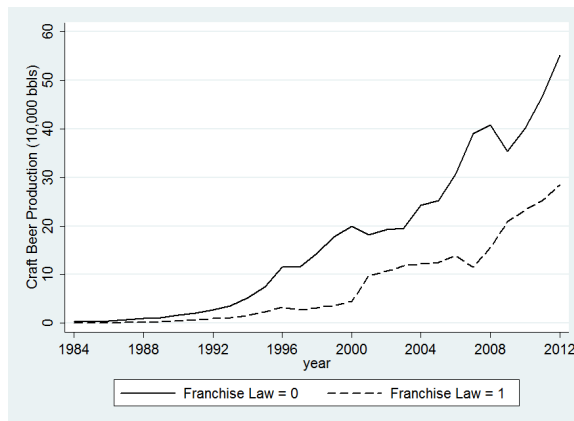(c) Breweries per capita by $Fran$

(d) Entrants per capita by $Fran$

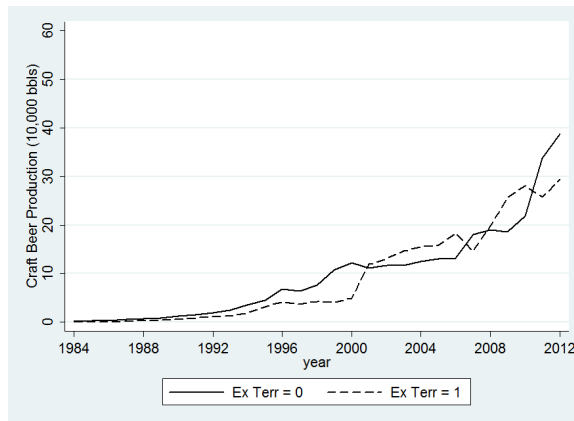(e) Breweries per capita by $ExTerr$

(f) Entrants per capita by $ExTerr$

Figure 2.3: Number of Breweries and Entrants per Capita by Policy

(a) Craft beer production by $TwoTier$

(b) Craft beer production by $Fran$

(c) Craft beer production by $ExTerr$

Figure 2.4: Craft Beer Production by Policy
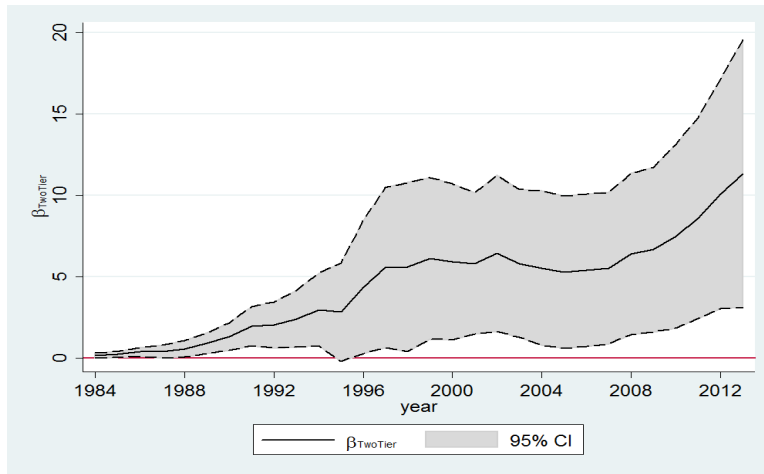
(a) *TwoTier* on breweries per capita
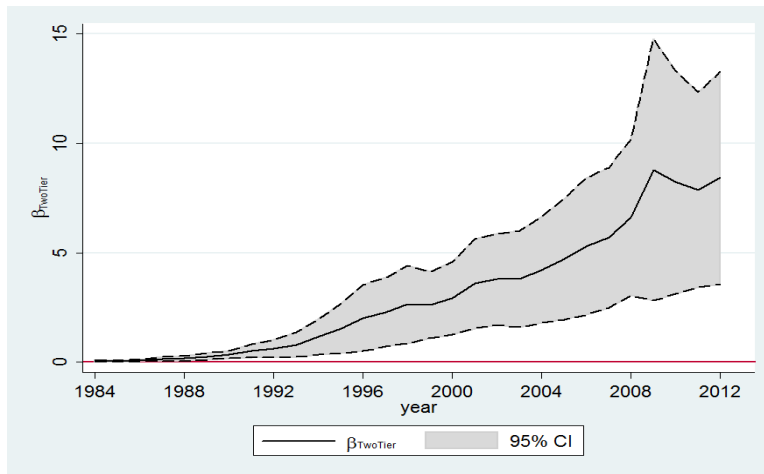
(b) *TwoTier* on craft beer production per capita

Figure 2.5: Impact of self distribution over time

Chapter 3

Mandated Exclusive Territories and Beer Franchise Laws: Evidence from scanner level data

3.1 Introduction

There are conflicting theories on the impact of vertical restraints as to whether they act as efficiency enhancing or anti-competitive. Theoretical literature on the subject is mixed,[1] so empirical work is key. This paper exploits the implementation of two laws by the state of Wisconsin that mandated vertical restraints in the brewing industry, and examines the impact these two policies had on prices and quantities. In May of 2004, Wisconsin enacted beer franchise laws which legally restricts when a brewer can cancel, terminate, or fail to renew a wholesale contract with a beer distributor. Subsequently in January of 2006, Wisconsin enacted mandated exclusive territories which required all brewers to designate an exclusive wholesale territory for their distributors. Since the impact of these policies may be different in different niches of the market (large, domestic breweries compared to import or craft breweries, for example), I allow the impact to differ across categories of breweries.

---

[1]See Rey and Verge (2008) for a summary of theoretical work on vertical restraints.

I find that prices increase significantly for smaller craft brewers and lend support to anti-competitive effects of the laws.

Franchise laws place restrictions on when a franchisor can terminate a contract with a franchisee. Although the relationship between brewers and wholesalers is not treated as a traditional franchise in most states, beginning in the 1970s, states began to pass franchise laws specifically in the beer industry. Similar to traditional franchise laws these laws restrict when brewers can terminate, cancel, or fail to renew a contract with a wholesaler. The impact of these laws is analogous to traditional franchise laws. The theoretical effects of franchise laws are ambiguous (see Brickley, Dark, Weisbach, (1991), and Klein (1995), e.g.). These laws have been justified for giving beer wholesalers the security to be willing to invest effort into selling a brand without fear of the future benefit of that effort going to another wholesaler. On the other hand, franchise laws also have the potential to serve as a mechanism for agency problems and for rents to be accrued to the wholesalers, as once a contract is signed, it can be very costly to terminate a contract even if the wholesaler is not acting in line with the brewer's interest. This could decrease competition among wholesalers, raise the cost of distribution and ultimately raise the final price of beer. Further, if this effect is asymmetric across market segments, it could reduce the incentive to compete on prices for the less affected segment and weaken competition between brewers.

The voluntary use of and mandates to use exclusive territories also have seen mixed theoretical and empirical studies. Theoretically, the voluntary use of exclusive territories may have anticompetitive effects, such as reducing competition (Stiglitz and Rey, 1995) or preventing entry (Asker and Bar-Isaac, 2014). On the other hand, alternative lines of thought argue that they may be used to alleviate agency problems (Klein and Murphy, 1988). Many brewers use exclusive territories voluntarily, even where not mandated. However, the benefit of granting exclusive territories may be diminished if the threat of finding an alternative wholesaler is not present, as it is absent or at least diminished when beer franchise laws are also enforced.

This study seeks to extend investigation of these restrictions by exploiting the quasi-

experiment caused by the franchise and exclusive territory legislation from Wisconsin. Existing studies have examined some of the effects of these laws in the brewing industry. Burgdorf (2016) finds beer franchise laws and mandated exclusive territories reduced brewery entry and production. Sass and Saurman (1993, 1996) and Rojas (2013) argue that the ability to use exclusive territories are welfare improving and mandates allowed brewers to do so without fear of litigation. However, these studies span time periods when anti-trust treatment of vertical restraints was more restrictive. The effects of mandates may be different in more recent times since the use of exclusive territories seems unlikely to attract attention from antitrust authorities (see Federal Trade Commission, 2005). Secondly, the brewing industry has changed drastically since the time period of these studies. According to the Brewer's Association, the brewing industry in 2014 had a 19.3% craft brewery share of revenue and 11% share of volume, whereas in 2005 craft beer made up 4.7% of revenue and 3.1% of volume. Earlier years saw an even smaller craft share. This study will be able to take into account this segment of the market and will allow estimated effects to differ by types of beer brands.

Using a difference in differences design I find that franchise laws increased prices of craft beer by 2.4-3.5% and the subsequent passage of mandated exclusive territories increased prices by a further 3.4-4.0%. These findings are robust across several control groups[2] and a data driven synthetic control method. Impacts on quantities sold are not found to be robust and consistent across all control groups, as with price effects on other brand categories. One issue is the measure of quantity, average store level sales, does not represent total sales in states, and may not account for unobserved heterogeneity well using this methodology. Arguably, surrounding states would account for local geographical demand and supply shocks better than other, wider control groups, and these controls find overall beer quantity sold decreased. The increase in prices for smaller, craft brewers indicates an increase in the cost of distribution. A small empirical literature across several industries tends to find beneficial welfare impacts of the voluntary use of vertical restraints

---

[2]The control groups used are states in close geographic proximity to Wisconsin, states that do not mandate exclusive territories, and all states in the dataset. See section 4 for more details.

and negative impacts when they are mandated (see Slade and Lafontaine, 2008, and Cooper, et al., 2005 for two relatively recent surveys of the literature). These findings add to this empirical literature.

The rest of the paper proceeds as follows. The next section will discuss the beer industry and specific legislation at hand, and explore some more of the theoretical and empirical findings associated with these policies. Section 3 presents the data used in this study. Section 4 details the main empirical research design and section 5 discusses the results and robustness checks. Finally, section 6 concludes and discusses the contributions of this paper.

3.2   Background and law changes

The brewing industry is highly regulated, and much regulation is directed towards the vertical supply chain of the industry. The supply chain in the brewing industry is colloquially called the "three-tier system" consisting of brewers, wholesalers, and retailers. Under the strictest enforcement of this system, each tier must be independently owned and operated, and integration between tiers is not allowed. While no states allow brewers to integrate with retailers (with the exception of brew pubs in all states and on-brewery-premise sales or direct shipments in some states) some states allow integration between brewers and wholesalers.[3] Over the time period of this study, Wisconsin allowed all brewers to distribute their beer to retailers.[4] This option is not available in all states. One would expect to find larger effects in states where a brewer is prohibited from distributing its own beer to retailers.

The brewing industry is also characterized by high levels of concentration (see Tremblay, Iwasaki, and Tremblay, 2005; and Tremblay and Tremblay, 2005). The first states to mandate exclusive territories and pass beer franchise laws did so as concentration was in-

---

[3]Many states have also passed small brewery exceptions to their prohibitions of integration, allowing breweries under certain production levels to sell directly to retailers.

[4]This was amended in 2011 Wisconsin Act 32, which removed the ability of brewers to hold wholesale licenses. Small brewers were still allowed to sell and distribute beer to retailers.

creasing in response to wholesaler concerns that large brewers would act anti-competitively and harm wholesaler interests. Since then the craft brewing industry has emerged and although these brewers are far smaller in scale than large, national brewers, exclusive territory laws and beer franchise laws apply to them equally.

3.2.1 Franchise Laws

Beer franchise laws, which are currently present in almost all states (see Burgdorf, 2016), restrict when a brewer can cancel, terminate, or fail to renew a contract with a wholesaler. This restriction is similar to traditional franchise laws.[5] Beer franchise laws were passed in Wisconsin with the 2003 Wisconsin Act 303, effective May 5, 2004.[6] Under this law if a contract with a wholesaler is "terminated, cancelled, or failed to renew" the law requires the terminated wholesaler to be compensated by the amount of the "fair market value" of the distribution rights of beer brand. There are a few provisions under which a wholesaler would not be required to be compensated for a termination or failure to renew a contract. They are not very broad provisions, as the wholesaler is not due compensation only if the wholesaler committed fraud, sold beer outside a designated territory, went bankrupt, or was convicted of a felony.

Unlike many states' beer franchise laws, Wisconsin's laws do not completely prohibit termination of contracts without cause, but requires compensation to the wholesaler if the contract is terminated for reasons other than the four listed above. This provision makes Wisconsin's beer franchise laws more lenient than other states. Most states do not allow for any termination outside of legal "good cause," which is usually defined similarly to the four provisions above. In fact, North Carolina and New York have recently passed exceptions to their beer franchise laws which allow small brewers to compensate wholesalers when terminating a contract; thus these exceptions which relaxed the law still only put them on par with Wisconsin's legislation.

---

[5]For a useful summary of beer franchise laws compared to traditional franchise laws see Kurtz and Clements (2014).

[6]https://docs.legis.wisconsin.gov/2003/related/acts/303

Prior to the 2003 Act, Wisconsin beer wholesalers were protected in some cases under the Wisconsin Fair Dealership Law (FDL). This act requires good cause to cancel any franchise in which there is a "community of interest" defined as "a continuing financial interest between the grantor and grantee in either the operation of the dealership business or the marketing of such goods or services.[7]" This law applied to franchises as well as other industries, but in the beer industry only applied to brands that made up a substantial portion of a wholesaler's business. Aside from a few brands and brewers, the FDL would not cover most brands.[8]

As discussed above, the theoretical impact of franchise termination laws are ambiguous. Brickley et al. (1991) formally models the ambiguous effects of franchise termination laws and empirically finds franchise laws reduced stock returns of franchise companies.[9] Broadly speaking, this stems from potentially misaligned incentives between brewers and wholesalers. Franchise laws would increase a wholesaler's incentive to shirk on investment into quality control of storage or promotional activities since the law makes it more costly to terminate a shirking wholesaler. In this case, franchise laws would increase shirking and raise the effective cost of distribution and prices. Alternatively, the brewer may have incentives threaten termination for anti-competitive reasons (for distributing another brewer's product for example), in which case franchise laws may increase competition.

3.2.2 Mandated Exclusive Territories

Exclusive territories for beer wholesalers were mandated by law in Wisconsin with the passage of 2005 Wisconsin Act 103 (Assembly Bill 787). This legislation requires brewers to give wholesalers an exclusive wholesale territory in which no other wholesaler can legally sell the contracted brands to retailers.

---

[7] Wisconsin Statutes 135.025: http://docs.legis.wisconsin.gov/1995/statutes/statutes/135.pdf

[8] According to a statement filed in support of the legislation by the Wisconsin Beer Wholesaler's Association, the brand would need to comprise at least approximately 15% of distributor's business before the FDL would apply. This, from the same statement, would only cover a few very large brands, and not even brands like Corona, the largest volume imported brand in the U.S. Available here: https://docs.legis.wisconsin.gov/2003/proposals/sb489

[9] Other studies examine franchise laws: Klick et al. (2012) finds a reduction in franchising activities from franchise laws, and Smith II (1982) finds an increase in automobile dealerships.

The legislation was passed partly in response to the US Supreme Court ruling of Granholm v. Heald, 544 U.S. 460 (2005), in anticipation of potential Constitutional conflicts with how beer wholesaling laws stood at the time of the ruling.[10] The law became effective January 21, 2006 for new contracts, and August 1, 2006 for existing wholesalers, [11] and the effects of the law appear in the data in January 2006.

There have been a handful of studies examining the impact of mandated exclusive territories in the brewing industry. Sass and Saurman (1993) use price proxies and quantity data and find these mandates increased demand and decreased supply resulting in no quantity impact and increase in price. Sass and Saurman (1996) examine the exclusive territory *ban* in Indiana (which lasted from 1979-2002) and find the ban reduced sales. Similarly Rojas (2012) found that when Arkansas implemented mandated exclusive territories in 1991, quantities rose dramatically, and no significant impact on price was found.[12] Both Sass and Saurman (1993) and Rojas (2012) argue that these laws allowed breweries to use exclusive territories when they otherwise would not have for fear of legislation. This study can extend upon and address some considerations that the previous studies were not able to address. First, the previous studies cover time periods when the voluntary use of exclusive territories was viewed more suspiciously than the time period of this study, and although breweries often use exclusive territories voluntarily (see Klein and Murphy, 1988), they risked being sued.[13] During the timeframe of this study, voluntary use of exclusive

---

[10]Before this law was passed Wisconsin had different standards for breweries located instate and those located out of state. This may have been unconstitutional under the Commerce Clause given the ruling in Granholm v. Heald, which found that allowing instate wineries to ship directly to residents, but not out of state wineries was unconstitutional. Additionally, there was concern over "big-box" stores becoming more active in distribution and shipping. As stated in material submitted in support of the legislation, "'Designated territories' are designed to prevent big-box mega retailers from becoming the *de facto* middle-tier of the three-tier system, destroying our independent beer distributors, hurting Wisconsin's craft brewers and increasing costs for taverns, convenience stores and the thousands of other small retailers in Wisconsin." (Accessible here: https://docs.legis.wisconsin.gov/2005/proposals/ab787).

[11]Section 10 of the act reads: "This act first applies on the first day of the 7th month beginning after the effective date of this subsection with respect to any person holding a wholesaler's license issued under section 125.28 of the statutes immediately prior to the effective date of this subsection."

[12]Unfortunately, the same legislation that mandated exclusive territories in Arkansas also included beer franchise laws. It is unclear the full effect of his findings can be ascribed to exclusive territories therefore. This study has the advantage of franchise laws being passed separately from mandated exclusive territories.

[13]See for example, Adolph Coors Co. v. FTC, 497 F.2d 1178 (10th Cir. 1974), cert. denied, 419 U.S. 1105 (1975)

territories was less likely to result in antitrust litigation,[14] so mandates may have different effects in this different legal environment. Secondly, the previous studies covered time periods where craft brewing was an extraordinarily small part of the market. This study will contribute differential effects depending on the types of brewers.

3.3 Data

The data used in this paper consist of scanner data provided by IRI from a large number of chain grocery stores.[15] IRI collects data on sales volume and quantities from bar code scanners from a large number of stores in nearly every state. The data span from 2001 to 2011 and provide detailed store-sales level data on a large number of product categories. The unit of observation in the original data is at the store-weekly-UPC sales level. The stores are categorized as belonging to one of 50 distinct geographical markets defined by IRI, which corresponds to a geographic region. Store location is important for this study. Usually, a market is within a single state, but for cases when it is not (the market of St. Louis contains stores in both Missouri and Illinois, for example), I have store location up to zip code. The data also include an estimate of annualized sales across all products sold in millions for the store. For more details about the IRI dataset, see Bronnenberg, et al. (2008).

For the purposes of this study, the data were aggregated monthly and across all UPCs of beer sales within a store so the unit of observation is a store-month. Total quantity of beer sold is calculated along with the average price paid, separated by "types" of beer. These "types" consist of five categories: all beer products in total, domestic non-craft brands (simply referred to as domestic in the following discussions—this captures any brand that was not imported but was not classified as "craft"), imported beer brands, craft beer brands,[16] and in-state craft brewers (brands by breweries located within the state the in

---

[14]See for example, Federal Trade Commission. (2005). Comment on (California's) Proposed Beer Franchise Act, August 24, available at www.ftc.gov

[15]All estimates and analyses in this paper based on Information Resources Inc. data are by the author and not by IRI.

[16]The main source used to distinguish craft breweries from non-craft breweries was the Brewer's Associa-

which the store is located).

Table 3.1 provides summary statistics on the quantities and prices of beer sold in stores broken down into five categories: all sales, domestic (non-craft) sales, import sales, craft sales, and in-state craft brewery sales. The unit of sales is a volume of 72 oz (i.e. one six pack). Estimated total yearly sales of the store in millions of dollars are reported. The statistics cover only the time period of the study, May 2003 to January 2007, spanning one year before beer franchise laws were implemented and one year after exclusive territories were mandated (which is a shorter time period than the full IRI data). The summary statistics are broken down by Wisconsin stores in panel (a) and the three control groups that will be used: all other states in the IRI data in panel (b), states that do not mandate exclusive territories in panel (c), and states in close proximity to Wisconsin—Illinois, Indiana, Iowa, and Michigan[17]—in panel (d). The samples have distinct differences. Wisconsin stores uniformly sell more beer overall and domestic brands than all the control groups, even though average sales of the stores is not always correspondingly higher. Wisconsin stores sell fewer imported and craft brands in relation to all other states controls and states that do not mandate exclusive territories, but more than its neighboring states. Wisconsin also tends to sell more in-state craft brands than the control groups. Lastly, beer is cheaper in Wisconsin than any of the other controls across all categories.

Figures 1-5 show average store level prices and quantities in Wisconsin grocery stores and the other control groups that are used in this study showing one year before and one year after the effective date of beer franchise laws. Figures 6-10 similarly show one year before and after the mandate of exclusive territories. Prices and quantities are presented side-by-side, separated by type of beer. The vertical dashed lines represent impositions of the policies studied in this paper. The vertical line in Figures 1-5 indicates the effective date of franchise laws, in May of 2004. Mandated exclusive territories are represented by the next two lines: January 2006 and August 2006. The line corresponding to January

tion (a trade group for craft brewers) membership list: https://www.brewersassociation.org/membership/member-directories/. Previous published lists were also used via the Internet Archive "Wayback Machine:" https://archive.org/web/

[17]Minnesota is not included due to regulations on beer sales in grocery stores.

2006 applied to new contracts with wholesalers and in August 2006, all wholesalers must be assigned an exclusive territory.[18]

Inspection of Figures 1-10 reveal some interesting findings. First, Wisconsin stores sell beer on average for a lower price than all other states, with the exception of imported brands. This is in part driven by the composition of brands consumed in Wisconsin compared to the control groups. However, prices for identical brands tend to be lower generally as well. For example, over the time period of the study, the average price of a 72oz unit of Bud Light was $3.85 in Wisconsin stores, whereas the average in all stores excluding Wisconsin was $4.15. Second, quantity sold have a high degree of correlation across all control groups, indicating the need to control for monthly demand shocks. Also, average quantity sold is higher in Wisconsin stores for total beer sales, domestic brands, and craft breweries located in-state, but Wisconsin stores sell less imported brands, and similar levels of craft beer.

There are interesting pricing dynamics as well. Two things stand out, both occurring directly after exclusive territory legislation was enacted: first, there is a temporary price spike in beer price, driven by large domestic brands. This increase in price is short-lived and prices return to similar levels of pre-mandated exclusive territories after the legislation is effective for all contracts. Second, there appears to be permanent price shocks to both craft brands and craft brands located within Wisconsin. This is most readily apparent on Figure 9(a). Immediately after exclusive territory legislation is first effective, prices show a discrete increase in Wisconsin for craft brands. When the legislation takes full effect for all contracts, another discrete jump in price appears, and unlike the large brewery domestic brands, this is not temporary. Prices seem to converge to the control group prices, and in these products, Wisconsin no longer faces lower prices. A similar pattern is seen for the craft brewers located in Wisconsin in Figure 10(a).

---

[18]Section 10 of 2005 Wisconsin Act 103 reads, "This act first applies on the first day of the 7th month beginning after the effective date of this subsection with respect to any person holding a wholesaler's license issued under section 125.28 of the statutes immediately prior to the effective date of this subsection."

3.4 Empirical Research Design

To investigate the impacts beer franchise laws and mandated exclusive territories had a difference in differences approach is used. Regressions are estimated using multiple control groups as a check on robustness. Specifically, the regressions take the form of

$$Y_{jt} = \beta Fran_{jt} + \delta ln(Sales_{jt}) + \sigma_j + \sigma_t + \varepsilon_{jt} \tag{3.1}$$

$$Y_{jt} = \beta ExTerr_{jt} + \delta ln(Sales_{jt}) + \sigma_j + \sigma_t + \varepsilon_{jt} \tag{3.2}$$

where $Fran_{jt}$ is a dummy variable equal to 1 if store j is located in Wisconsin post enactment of beer franchise laws (effective May 5, 2004) at time t and zero otherwise, and $ExTerr_{jt}$ is a dummy variable equal to 1 if store j is located in Wisconsin post enactment of mandated exclusive territories (effective January 1, 2006) at time t and zero otherwise. $Sales_{jt}$ is the estimated annual sales of the store j in millions, and covers all products sold in the store; σ_i and σ_t are store and month fixed effects respectively. ε_{jt} is an unobserved error term. All standard errors in this section's analysis are clustered at the IRI market level to allow for serial correlation in the error term within the defined markets. Y_{jt} will be the log price of beer and the inverse hyperbolic sine[19] of quantity of beer sold (this transformation allows for zero quantity values of beer sales, which occur most frequently with craft or in-state brands). Formally, the values of Y_{jt} are defined as

$$\mathbf{P_{jt}} = \ln\left(\frac{\sum_{b=1}^{B_j}(P_{bjt}Q_{bjt})}{\sum_{b=1}^{B_j}Q_{bjt}}\right)$$

$$\mathbf{Q_{jt}} = \sinh^{-1}\left(\frac{1}{B_j}\sum_{b=1}^{B_j}Q_{bjt}\right)$$

where P_{bjt} and Q_{bjt} are the price and quantity sold, respectively, in 72oz units of

---

[19]The inverse hyperbolic sine function is defined as $\sinh^{-1}(x) = \ln(x + \sqrt{1+x^2})$. For values not close to 0, this function is approximately equal to $\ln(2x) = \ln(2) + \ln(x)$, so the interpretation of coefficients in a regression on $\sinh^{-1}(x)$ and marginal effects are approximately the same as a natural log, but the hyperbolic inverse sine is defined at zero. This is necessary as many stores have zero sales of certain types of brands. See Burbidge, et. al (1988) for more details on this transformation.

brand b at store j in month t. B_j is the total number of brands in store j. This average is calculated separately for different categories of "types" of beer: all beer products, domestic (non-craft) brands, imported brands, craft brands, and craft brands that are located within the same state as the store it is sold.

The further from the policy enactment dates the more difficult it is to control for other factors that may determine the dependent variables of interest. For this reason the bandwidth around the time policy is limited, and the entire sample is not used. A bandwidth of one year before and after the month of franchise termination laws and then exclusive territories were implemented is used and the regressions omit the month the law went into effect.

There are three markets as defined by IRI in Wisconsin: Eau Claire, Green Bay, and Milwaukee. Identifying which set of other stores are best to use as control groups for these is not immediately obvious. The preferred control group in this paper will be one that limits the sample of stores included to only those in markets in close proximity to Wisconsin. This group will control for local, geographic supply and demand shocks that do not occur at a national level better than a wider, less restrictive sample. The first control group thus will consist only of stores located in states in close proximity to Wisconsin (Illinois, Michigan, Indiana and Iowa). This consists of 10 IRI defined markets.[20]

An alternative argument could be to use as broad of a sample as possible or states that have similar regulations. To approach this problem, I will use two alternative control groups. The findings should be considered more robust if they do not vary much across control groups. The second control group will be constructed using all stores from 47 IRI markets in the sample.[21] Certain states are excluded due to beer sales laws.[22] As another robustness check, only stores located in states in which exclusive territories are not mandated (22 IRI markets) will be used.[23]

---

[20]The markets are Chicago, Detroit, Grand Rapids, Indianapolis, Peoria/Springfield, Spokane and St. Louis (only stores that are in Illinois).

[21]See Appendix A for a listing of all included IRI markets

[22]Markets in Minnesota, Pennsylvania, and New Jersey were not included due to state sales laws, or restrictions on retail store ownership.

[23]The markets are: Boston, Buffalo/Rochester, Chicago, Hartford, Indianapolis, Los Angeles, New York,

3.5 Results

3.5.1 Franchise Laws

Results of estimating equation (1), the impact of franchise laws, are presented first. Table 3.2 presents results on prices and Table 3.3 presents results on quantities. For both tables Panel (a) uses stores from states in close geographical proximity to Wisconsin as a control group, Panel (b) uses stores from all IRI markets in the sample as a control group, and Panel (c) uses only stores in states that do not mandate exclusive territories as a control group.

When using only the surrounding state control in Table 3.2 Panel (a), the estimated effect on price for all brands, domestic brands, and imported brands is small and all are statistically insignificant. Craft beer and in-state craft brands are estimated to have a sizeable price increase of 3.40% and 3.34% respectively.[24] The in-state price increase is not statistically significant, but craft brands are significant at the 5% level.

When using all markets as a control in Table 3.2 Panel (b), we find inconsistent results for columns (1)-(3) as the average price of all beer, domestic brands, and imported brands are estimated to fall by approximately 2.01%, 2.43% and 0.999%, respectively. In fact, the sign of the price effect flips on imported brands in column (3), Despite these inconsistent results in columns (1)-(3), craft beer prices in column (4) are estimated to increase by 2.34% and in-state brands increase by 2.96%, the former is significant at the 10% level and the latter is not statistically significant. Using states that did not mandate exclusive territories as a control group in Panel (c), results are similar.

It could be argued that surrounding states is the most appropriate control group, as this may more readily account for any exogenous geographical demand or supply shocks that

Philadelphia, Phoenix, Pittsfield, Portland, OR, Sacramento, Salt Lake City, San Diego, San Francisco, Seattle/Tacoma, Spokane, Syracuse, Washington DC, and West Texas/New Mexico. This is a natural seeming benchmark for the study on exclusive territories. Using states that did not have beer franchise laws would be ideal for the franchise law study, but unfortunately, this leaves too few markets since nearly every state has beer franchise laws.

[24]Precisely, the marginal effect of the coefficient β, is calculated $\exp(\beta) - 1$, which is approximately equal to β for small values. Since all coefficient estimates are small, the results presented here will treat the coefficients as the marginal effects.

may have occurred as franchise laws were implemented, so this casts doubt on any causal effects that can be attributed to the price decreases found for non-craft brands. Secondly, it would be surprising to find an effect on the large domestic brands which may have fallen under the Wisconsin FDL already, as mentioned above, as they would face no change in the law's effects. Craft brands however, are consistently estimated to have increased prices across all control groups. If regional demand or supply shocks drove the results in Panel (b) and (c), these effects should be not be present in Panel (a) where only proximate states are included as the control. The price increase is estimated to be largest in Panel (a), so I find the opposite. Here we find craft prices increase and no significant effect (statistically or economically) on other brands.

Quantity effects are examined using surrounding states as a control in Panel (a) of Table 3.3. Overall, domestic, and imported quantities are estimated to fall by 4.43%, 4.63% and 3.60%, respectively. The coefficient on craft is positive but imprecise (the standard error is over twice the size of the coefficient). The estimated coefficient on in-state brands is negative but also statistically insignificant. Using all markets as a control group in Panel (b) finds significant and relatively large effects on the average quantity of craft beer and in-state brands. The coefficients are 0.0960, significant at the 5% level, and 0.0643 significant at the 1% level respectively. Positive, but insignificant, effects are found for other categorizations. When using markets that do not mandate exclusive territories in Panel (c), the quantity increase on craft brands is no longer significant and is less than half the size as Panel (b). Instate brands are estimated to increase quantity by 6.67%, significant at th 5% level. Other categories are similar and none are estimated to be significant. Hence, quantity results are not robust across control groups. As above, this casts doubt on findings of an increase in sales for craft and in-state brands due to franchise laws. An alternative explanation is that a regional increase in craft an in-state brand sales coincided around the time-frame considered.

The only results from the franchise law study that are robust across all control group specifications is that of craft beer prices. These prices are estimated to have increased by

approximately 2.34-3.40%, and while the results for in-state brands were not statistically significant, the estimates were of similar magnitude.

3.5.2   Exclusive Territories

Results from equation (2) estimate the impact of mandated exclusive territories. Table 3.4 presents results on prices and Table 3.5 presents results on quantities. As above, Panel (a) uses all IRI markets in the sample as a control group, Panel (b) uses only states that do not mandate exclusive territories as a control group, and Panel (c) uses states in close geographical proximity to Wisconsin as a control group.

Table 3.4 present price effect estimates of mandated exclusive territories. In Panel (a) using surrounding states as a control, mandated exclusive territories are estiamted to increase overall and domestic brand prices by 1.51% and 1.43%, respectively. Craft and in-state brand prices are estimated increase by 3.92% and 5.58%, respectively. This can be readily seen in Figure 3.9(b) and 3.10(b), where immediately after exclusive territories are mandated a discrete jump occurs in prices.

In Panel (b) and (c), only craft and in-state brands are estimated to have significant price effects. Craft brands are estimated to increase by approximately 3.31% in Panel (b) and 3.80% in Panel (c). In-state brands are estimated to increase by 5.56% in Panel (b) and 5.58% in Panel (c), all significant at the 1% level. Average beer prices over all brands, domestic and imported brands are all estimated to have statistically and economically insignificant price effects ($< 1\%$ in absolute value) in Panel (b) and (c). Again, it can be argued that the surrounding states may in fact be the appropriate control group as it would better control for geographical shocks than a larger or more dispersed group, and is the preferred control group. However, the price effects are only robust across all groups for craft and in-state brands.

The finding that mandated exclusive territories when beer franchise laws are present further increases prices suggests that this mandate raises the costs of distribution. Further, the finding that this price increase was larger for craft brewers and larger still for craft

brewers located in Wisconsin[25] suggests that the effects are asymmetric across firms. Thus, these laws not only weaken competition among wholesalers but may be weakening competition among brewers, as it would reduce incentives for large brewers to reduce their prices to compete with the expanding craft brewing market.

Table 3.5 presents the impact of mandated exclusive territories on average store level quantities sold. In Panel (a) using surrounding states as the control group, the impact of mandated exclusive territories is estimated to be negative (ranging from -1.8% to -2.7%) for all categories except in-state brands, although this is not statistically significant. In panels (b) and (c), most of the estimated coefficients across the groups are negative (with in-state brands being an exception, which had economically small, positive coefficients), however none are statistically significant in these specifications. Further, the standard errors are relatively large across all control groups, usually being close to the same magnitude of the coefficient. This specification therefore is not able to detect any significant changes in average store level sales.

3.5.3 Synthetic control units

As another control group the synthetic control method of Abadie and Gardeazabal (2003) and Abadie, Diamond, Hainmueller (2010) is used to further test the robustness of the findings. The synthetic control method proceeds by creating a set of weights on observations that minimize the distance between pre-treatment observations of characteristics of the treated state and the potential control states. For this analysis, the observations were aggregated to the state/month level, so that there is only one treated unit (Wisconsin). This will also alleviate any concerns of serial correlations between stores or markets that was may not have been addressed by clustering the standard errors by markets, as the observation level is now at the state, which is the same level as the policy. Since not all states had the same number of stores, the observations at which the procedure is performed

---

[25]These brewers are more likely to have most, if not all of their sales entirely within Wisconsin than craft brewers located outside of but shipping in to Wisconsin.

upon is given by

$$\tilde{\mathbf{P}}_{\mathbf{st}} = \hat{\mathbf{P}}_{\mathbf{st}} - \bar{\mathbf{P}}_{\mathbf{st}}$$

$$\tilde{\mathbf{Q}}_{\mathbf{st}} = \hat{\mathbf{Q}}_{\mathbf{st}} - \bar{\mathbf{P}}_{\mathbf{st}}$$

where

$$\hat{\mathbf{P}}_{\mathbf{st}} = \ln\left(\frac{1}{J_s}\sum_{j=1}^{J_s}\frac{\sum_{b=1}^{B_j}(P_{bjt}Q_{bjt})}{\sum_{b=1}^{B_j}Q_{bjt}}\right)$$

$$\hat{\mathbf{Q}}_{\mathbf{st}} = \sinh^{-1}\left(\frac{1}{J_s}\frac{1}{B_j}\sum_{j=1}^{J_s}\sum_{b=1}^{B_j}Q_{bjt}\right)$$

and $\bar{\mathbf{P}}_{\mathbf{st}}$ and $\bar{\mathbf{Q}}_{\mathbf{st}}$ are the average values of $\tilde{\mathbf{P}}_{\mathbf{st}}$ and $\tilde{\mathbf{Q}}_{\mathbf{st}}$, respectively, for the twelve months preceding the implementation of franchise laws or exclusive territories. P_{bjt} and Q_{bjt} are the price and quantity sold, respectively, in 72oz units of brand b at store j in state s at month t. J_s is the total number of stores in state s, and B_j is the total number of brands in store j. In words, $\tilde{\mathbf{P}}_{\mathbf{st}}$ and $\tilde{\mathbf{Q}}_{\mathbf{st}}$ are the demeaned average store level price and quantity of beer at the state level. So for example, a value of $\tilde{\mathbf{P}}_{\mathbf{st}} = 0$ would indicate that the average store level price of beer in state s at time t was equal to the average store level price over the year preceding the policy change.

The synthetic control method was implemented using the *synth* package in Stata, minimizing the distance between demeaned pre-treatment log prices, $\tilde{\mathbf{P}}_{\mathbf{st}}$, for the price analysis and minimizing the distance between demeaned pre-treatment $\sinh^{-1}$ quantities, $\tilde{\mathbf{Q}}_{\mathbf{st}}$, for the quantity analysis, for each group. These weighted units were then applied to the post treatment periods and regressions were ran using 12 months before the treatment month and 12 months after the treatment month. The regression analysis is again a

difference-in-differences model

$$Y_{st} = \beta Fran_{st} + \sigma_s + \sigma_t + \varepsilon_{st} \tag{3.3}$$

$$Y_{st} = \beta ExTerr_{st} + \sigma_s + \sigma_t + \varepsilon_{st} \tag{3.4}$$

where the notation is similar to equation (1) and (2). Y_{st} will take the value of either $\tilde{\mathbf{P}}_{\mathbf{st}}$ or $\tilde{\mathbf{Q}}_{\mathbf{st}}$.

Results are presented in Tables 3.6 and 3.7.[26] The price results are qualitatively similar to the previous control groups for the effect of mandated exclusive territories and franchise laws: craft beer prices increased, and the craft brewers located within Wisconsin increased prices by more. Similar to the surrounding state control group from Panel (a) in Table 3.4, prices overall and domestic prices are estimated to have increased as a result of exclusive territories, but this was likely a temporary increase, as the graphs in Figures 3.6 and 3.7 show. Quantities are also estimated to have decreased or have economically and statistically insignificant effects. The results from the synthetic control methods support the findings from section 5 with regards to the effects of mandating exclusive territories.

For franchise laws, the results are not as intuitive. Quantity results do not accord with what was found in section 5.1, as across all groups significant quantity increases are estimated. Inspection of the data from Wisconsin and the constructed synthetic control units as shown in Appendix B, figures B1-B5, reveal the match is not always a good one, unlike those of exclusive territories in figures B6-B10. Further, even though quantities appeared to have increased across all types of beer products, this is in contrast with the surrounding state control group presented in Table 3.3 which found *negative* quantity effects. The synthetic control thus may not be controlling adequately for regional demand and/or supply shocks, and results should be interpreted with caution.

---

[26]Figures B1-B10 show the data for $\tilde{\mathbf{P}}_{\mathbf{st}}$ and $\tilde{\mathbf{Q}}_{\mathbf{st}}$ for Wisconsin and the synthetic control unit.

3.6   Conclusion

This paper presents evidence on the effects of beer franchise laws and mandated exclusive territories. Prices of craft beer brands are found to have increased significantly due to franchise laws and increased even further when exclusive wholesale territories were mandated. The latter effect was larger for craft breweries located within Wisconsin. These results are robust across several control groups. This suggests that these laws increased the costs of distribution, and the asymmetric effects of larger effects on smaller breweries raises concern that these laws decrease not only wholesaler competition, but competition between brewers as well. Raising the costs of small brewers reduces the incentives the larger national brewers have to decrease prices to compete with craft brewers.

Results on quantity of beer sales are not robust and consistent across control groups. A potential reason for this is that average grocery store level sales does not represent the main avenue of the quantity effect, or the methodology does not adequately account for unobserved heterogeneity across stores. To that end, the local control group may do a better job accounting for geographic demand and supply shocks. This control group found a decrease in average sales.

The findings of this paper contribute further evidence to a small empirical literature on mandated vertical restraints. In contrast to previous studies that examined mandated exclusive territories in the brewing industry (Sass and Saurman, 1993; Rojas, 2012), I find that the effect is likely anti-competitive and welfare decreasing. A potential reason for this difference is the time frames of the studies. Previous studies used data from times when the use of exclusive territories was more likely to attract antitrust litigation, and hence mandates served as a protection against legal fees, and allowed beneficial *voluntary* use. This study used data from a time period when the use of exclusive territories was not likely to attract litigation, so brewers who found it useful to employ exclusive territories were likely doing so already. The findings here suggest neither litigation nor mandates improve welfare.
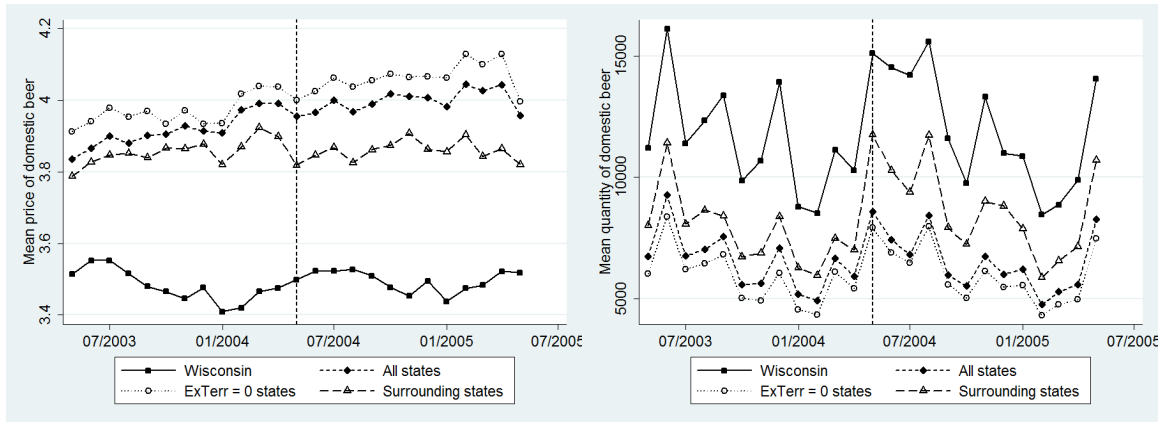
Figures

Beer Franchise Laws
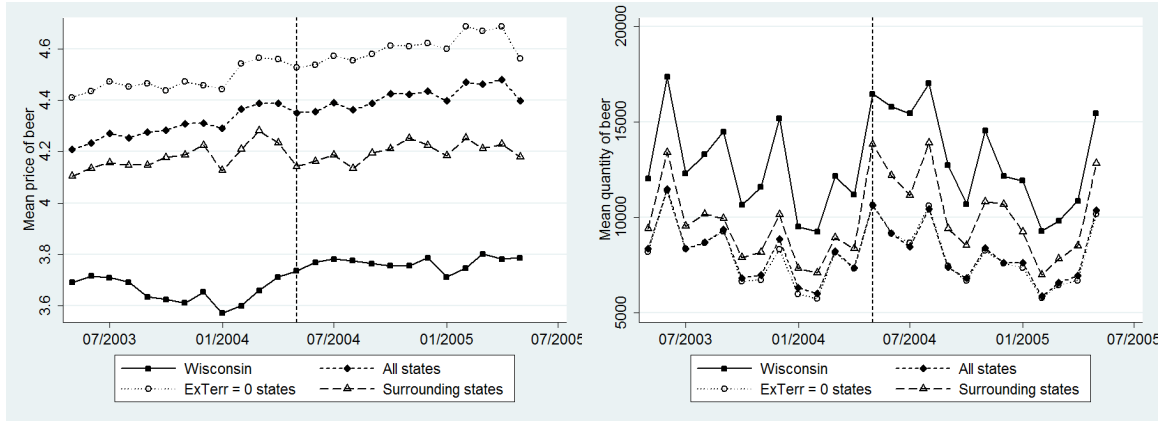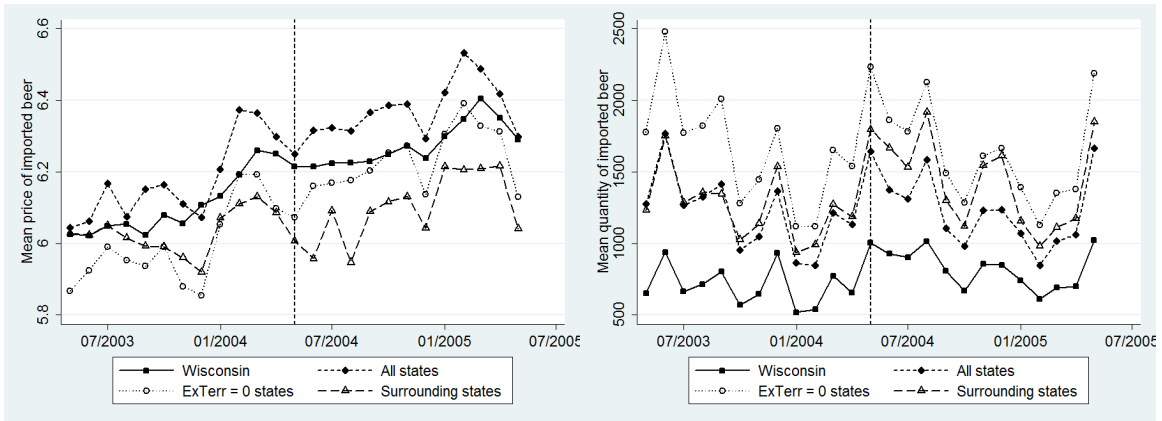

(a) Mean Price

(b) Mean Quantity

Figure 3.1: Store Level Price and Quantity: all beer
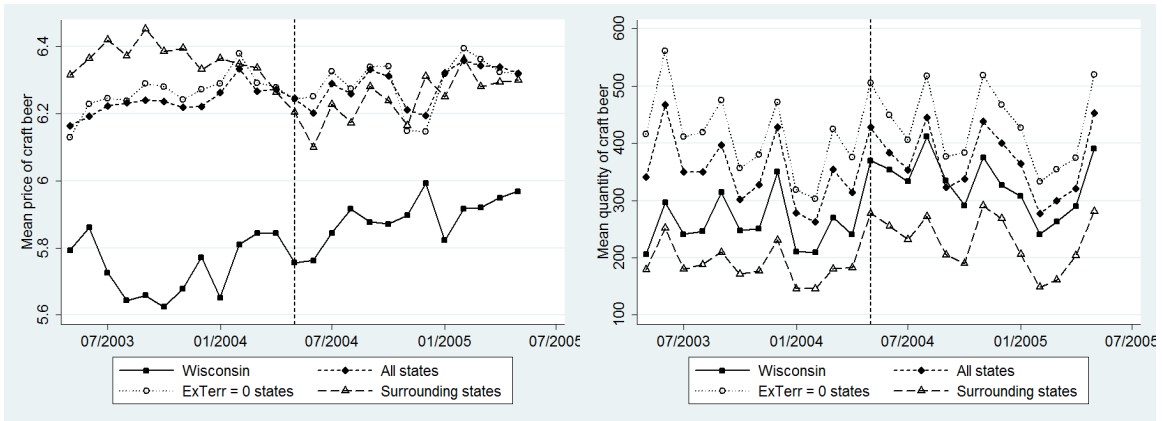

(a) Mean Price

(b) Mean Quantity

Figure 3.2: Store Level Price and Quantity: domestic brands
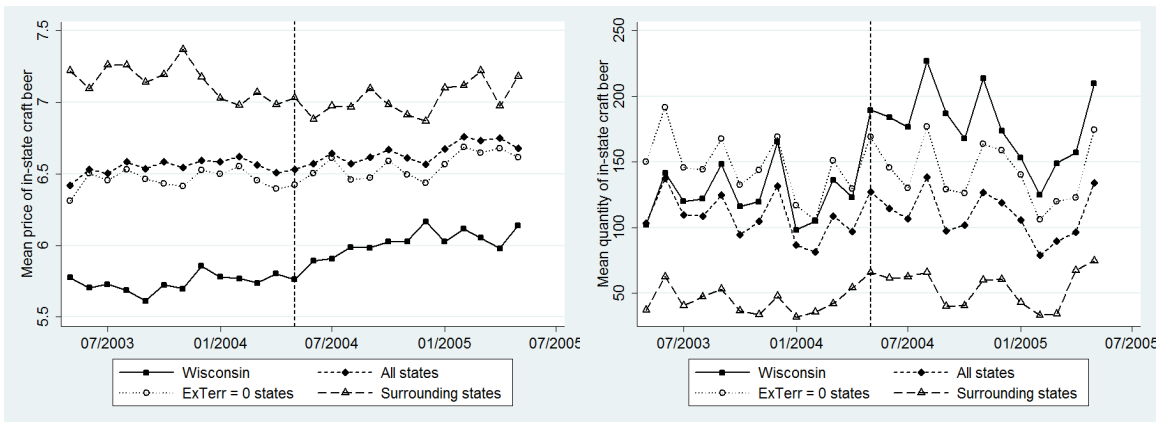
(a) Mean Price

(b) Mean Quantity

Figure 3.3: Store Level Price and Quantity: import brands

(a) Mean Price

(b) Mean Quantity

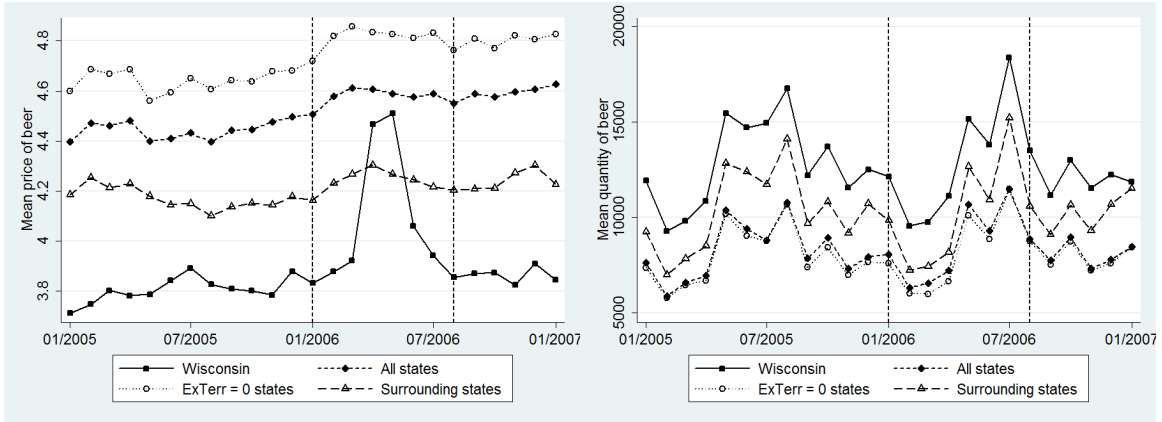Figure 3.4: Store Level Price and Quantity: craft brands

(a) Mean Price

(b) Mean Quantity

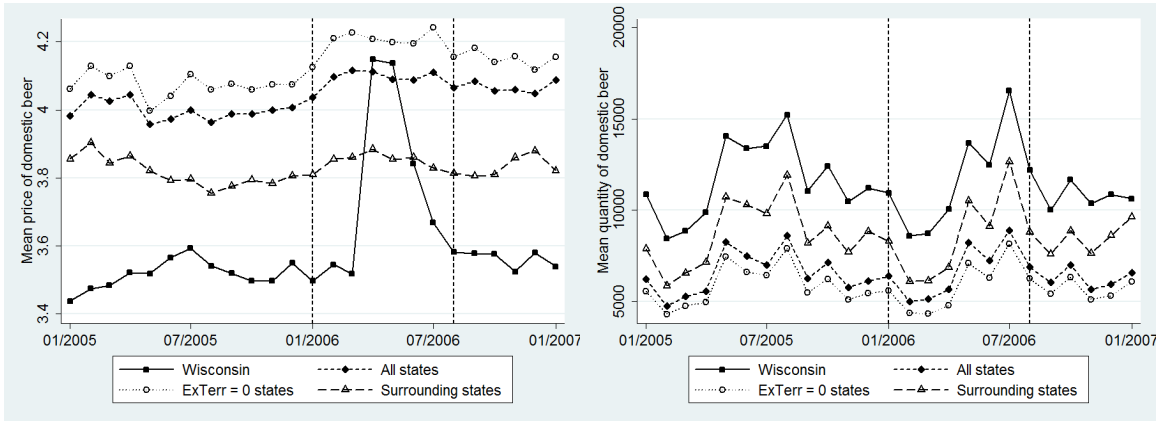Figure 3.5: Store Level Price and Quantity: in-state beer

Mandated Exclusive Territories

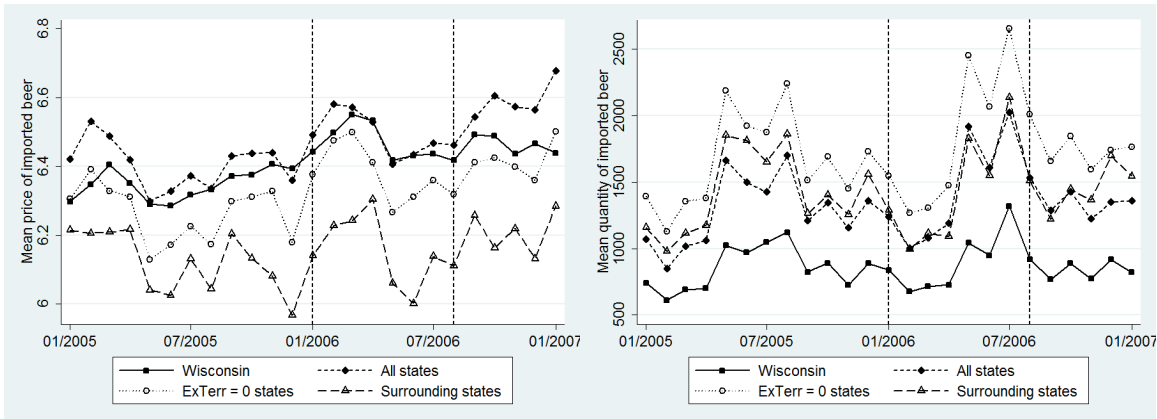

(a) Mean Price

(b) Mean Quantity

Figure 3.6: Store Level Price and Quantity: all beer
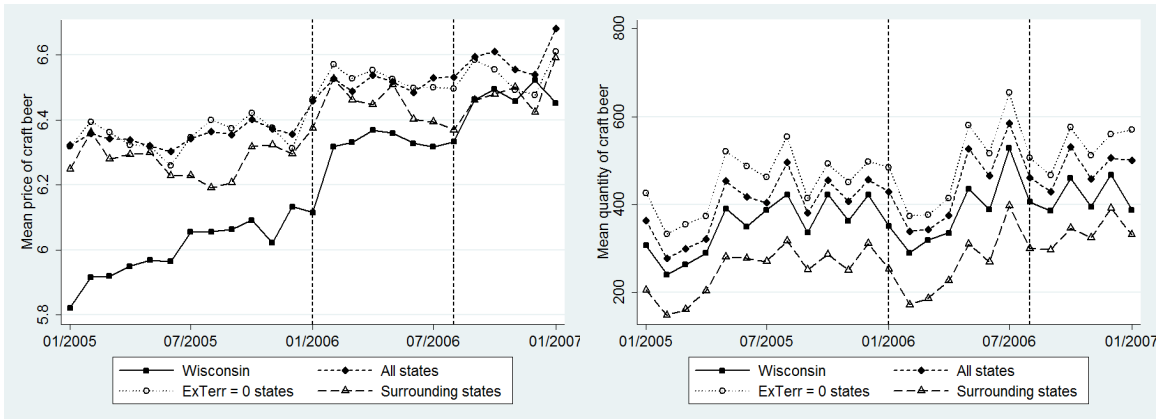

(a) Mean Price

(b) Mean Quantity

Figure 3.7: Store Level Price and Quantity: domestic brands
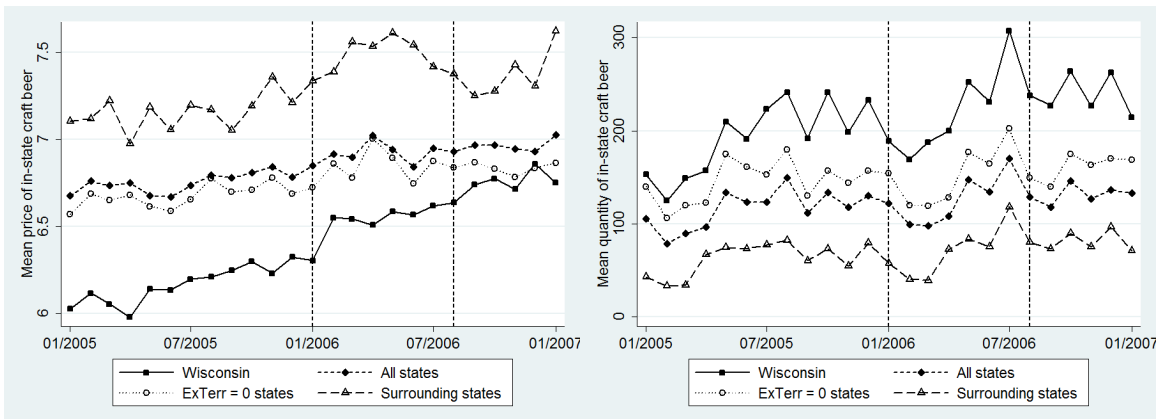
(a) Mean Price

(b) Mean Quantity

Figure 3.8: Store Level Price and Quantity: import brands

(a) Mean Price

(b) Mean Quantity

Figure 3.9: Store Level Price and Quantity: craft brands

(a) Mean Price

(b) Mean Quantity

Figure 3.10: Store Level Price and Quantity: in-state beer

Tables

Summary Statistics

Table 3.1: Summary Statistics

Variable	Mean	Std. Dev.	N	Mean	Std. Dev.	N
	Panel (a): Wisconsin			Panel (b): Surrounding States		
Quantity (all brands)	12928.27	8314.38	1420	10214.08	6733.74	5161
Quantity (domestic brands)	11768.46	7698.47	1420	8555.63	5911.77	5161
Quantity (imported brands)	822.12	655.37	1420	1412.27	1207.97	5161
Quantity (craft brands)	337.23	320.71	1420	245.77	286.48	5161
Quantity (in-state brands)	183.55	192.10	1420	60.48	125.27	5161
Price (all brands)	3.81	0.70	1420	4.20	0.45	5160
Price (domestic brands)	3.55	0.64	1417	3.84	0.35	5157
Price (imported brands)	6.29	0.37	1402	6.10	0.60	5157
Price (craft brands)	6.02	0.57	1327	6.34	0.74	5066
Price (in-state brands)	6.16	0.62	1307	7.20	1.15	3292
Annual store sales	26.61	13.66	1420	30.32	17.20	5158
	Panel (c): All Other States			Panel (d): $ExTerr = 0$ States		
Quantity (all brands)	8003.07	6213.19	53654	7646.37	5722.31	24890
Quantity (domestic brands)	6361.80	5145.61	53654	5597.39	4502.28	24890
Quantity (imported brands)	1256.69	1405.34	53654	1618.99	1632.41	24890
Quantity (craft brands)	384.18	559.33	53654	429.60	508.43	24890
Quantity (in-state brands)	112.80	249.98	53654	140.35	219.04	24890
Price (all brands)	4.43	0.57	53653	4.61	0.61	24889
Price (domestic brands)	4.00	0.38	53440	4.08	0.39	24758
Price (imported brands)	6.36	0.70	50521	6.21	0.79	23321
Price (craft brands)	6.36	0.78	47584	6.36	0.88	21484
Price (in-state brands)	6.73	0.87	30781	6.64	0.80	18021
Annual store sales	23.20	13.12	53650	26.18	13.75	24887

Note: All quantities and prices are for 72oz units of volume. Annual store sales is expressed in millions of dollars.

Beer Franchise Laws

Table 3.2: Beer Franchise Laws: Price regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Surrounding states control					
$Fran$	-0.00867	-0.0125	0.00673	0.0340**	0.0334
	(0.0106)	(0.0102)	(0.00602)	(0.0135)	(0.0248)
$\ln(Sales)$	-0.0371**	-0.0488**	-0.0235	-0.0187	-0.140**
	(0.0157)	(0.0211)	(0.0309)	(0.0441)	(0.0526)
Observations	3484	3484	3470	3360	2364
R^2	0.947	0.925	0.890	0.766	0.917
Panel (b): All states control					
$Fran$	-0.0201***	-0.0243***	-0.00999**	0.0234*	0.0296
	(0.00655)	(0.00522)	(0.00464)	(0.0126)	(0.0221)
$\ln(Sales)$	-0.00154	-0.00189	0.00128	0.00157	0.00500
	(0.00284)	(0.00280)	(0.00248)	(0.00397)	(0.00482)
Observations	28645	28562	27851	26308	16719
R^2	0.935	0.910	0.912	0.891	0.833
Panel (c): $ExTerr = 0$ states control					
$Fran$	-0.0257***	-0.0284***	-0.0161**	0.0262*	0.0265
	(0.00660)	(0.00538)	(0.00617)	(0.0128)	(0.0225)
$\ln(Sales)$	-0.00214	-0.00385	0.00245	0.00389	0.00984
	(0.00299)	(0.00333)	(0.00323)	(0.00549)	(0.00750)
Observations	11879	11845	11697	10743	9079
R^2	0.947	0.908	0.927	0.918	0.812

Note: Table 3.2 shows the results of least squares estimation of equation 3.1, with the log price as the dependent variable. Standard errors are in parentheses and clustered by IRI market. Store and month fixed effects are included in each regression.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.3: Beer Franchise Laws: Quantity regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Surrounding states control					
$Fran$	-0.0443**	-0.0463**	-0.0360*	0.0308	-0.0152
	(0.0138)	(0.0147)	(0.0188)	(0.0629)	(0.0172)
$\ln(Sales)$	0.157**	0.140**	0.0947	-0.0463	0.103
	(0.0677)	(0.0605)	(0.167)	(0.231)	(0.161)
Observations	3485	3485	3485	3485	3485
R^2	0.963	0.961	0.965	0.961	0.966
Panel (b): All states control					
$Fran$	0.0142	0.00815	0.0407	0.0960**	0.0643***
	(0.0233)	(0.0242)	(0.0247)	(0.0454)	(0.0229)
$\ln(Sales)$	0.0184	0.0324	-0.0964	0.0673	-0.0709
	(0.0158)	(0.0219)	(0.0818)	(0.0629)	(0.0633)
Observations	28646	28646	28646	28646	28646
R^2	0.967	0.966	0.966	0.964	0.969
Panel (c): $ExTerr = 0$ states control					
$Fran$	0.0117	0.00893	0.0420	0.0407	0.0667**
	(0.0306)	(0.0332)	(0.0246)	(0.0477)	(0.0240)
$\ln(Sales)$	0.0421	0.0630	-0.178	0.00584	-0.133
	(0.0251)	(0.0378)	(0.144)	(0.0153)	(0.109)
Observations	11879	11879	11879	11879	11879
R^2	0.980	0.979	0.972	0.974	0.975

Note: Table 3.3 shows the results of least squares estimation of equation 3.1, with the inverse hyperbolic sine of quantity as the dependent variable. Standard errors are in parentheses and clustered by IRI market. Store and month fixed effects are included in each regression.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Mandated Exclusive Territories

Table 3.4: Mandated Exclusive Territories: Price regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Surrounding states control					
$ExTerr$	0.0151**	0.0143**	0.00942	0.0392***	0.0506**
	(0.00615)	(0.00529)	(0.00780)	(0.0116)	(0.0163)
$\ln(Sales)$	-0.0169	-0.0132	-0.00873	-0.0455*	-0.0479
	(0.0154)	(0.0138)	(0.0132)	(0.0236)	(0.0421)
Observations	3560	3554	3554	3476	2556
R^2	0.914	0.876	0.899	0.780	0.873
Panel (b): All states control					
$ExTerr$	0.00165	-0.000613	-0.00114	0.0331***	0.0556***
	(0.00526)	(0.00473)	(0.00385)	(0.00409)	(0.00927)
$\ln(Sales)$	-0.0235	-0.0363*	-0.00708	-0.0104	0.00826
	(0.0213)	(0.0193)	(0.0126)	(0.0141)	(0.0265)
Observations	27861	27753	27047	25585	17383
R^2	0.932	0.909	0.918	0.897	0.828
Panel (c): $ExTerr = 0$ states control					
$ExTerr$	-0.00362	-0.00459	-0.00181	0.0380***	0.0558***
	(0.00627)	(0.00596)	(0.00450)	(0.00488)	(0.0108)
$\ln(Sales)$	-0.00847	-0.0231	-0.00729	-0.0180	-0.000181
	(0.0242)	(0.0215)	(0.0160)	(0.0123)	(0.0242)
Observations	12031	11962	11800	10905	9439
R^2	0.930	0.900	0.930	0.926	0.787

Note: Table 3.4 shows the results of least squares estimation of equation 3.2, with the log price as the dependent variable. Standard errors are in parentheses and clustered by IRI market. Store and month fixed effects are included in each regression.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.5: Mandated Exclusive Territories: Quantity regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Surrounding states control					
$ExTerr$	-0.0180	-0.0270	-0.0188	-0.0240	0.0155
	(0.0181)	(0.0202)	(0.0327)	(0.0430)	(0.0354)
$\ln(Sales)$	0.0865	0.121	0.112*	0.413**	0.159**
	(0.0639)	(0.0758)	(0.0554)	(0.133)	(0.0556)
Observations	3560	3560	3560	3560	3560
R^2	0.970	0.972	0.972	0.960	0.972
Panel (b): All states control					
$ExTerr$	-0.00588	-0.0171	-0.0279	0.0479	0.00865
	(0.0142)	(0.0196)	(0.0182)	(0.0443)	(0.0234)
$\ln(Sales)$	0.0370	-0.0115	0.00651	0.348*	0.0292
	(0.118)	(0.165)	(0.153)	(0.187)	(0.138)
Observations	27861	27861	27861	27861	27861
R^2	0.973	0.971	0.969	0.973	0.972
Panel (c): $ExTerr = 0$ states control					
$ExTerr$	-0.0232	-0.0271	-0.0287	0.0297	0.00877
	(0.0178)	(0.0275)	(0.0200)	(0.0546)	(0.0261)
$\ln(Sales)$	-0.0568	-0.153	-0.121	0.195	-0.0750
	(0.137)	(0.248)	(0.234)	(0.114)	(0.195)
Observations	12031	12031	12031	12031	12031
R^2	0.980	0.977	0.970	0.979	0.975

Note: Table 3.5 shows the results of least squares estimation of equation 3.2, with the inverse hyperbolic sine of quantity as the dependent variable. Standard errors are in parentheses and clustered by IRI market. Store and month fixed effects are included in each regression.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Synthetic Control

Franchise Laws

Table 3.6: Beer Franchise Laws: Synthetic control regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Prices					
$Fran$	0.00771	-0.0170**	-0.00193	0.0124*	0.0304***
	(0.00710)	(0.00776)	(0.00281)	(0.00639)	(0.00568)
Observations	48	48	48	48	48
R^2	0.787	0.562	0.971	0.774	0.914
Panel (b): Quantities					
$Fran$	0.0452*	0.0282***	0.0495***	0.0824***	0.0330**
	(0.0231)	(0.00462)	(0.00650)	(0.0168)	(0.0119)
Observations	48	48	48	48	48
R^2	0.977	0.938	0.963	0.903	0.919

Note: Table 3.7 shows the results of least squares estimation of equation 3.3, with $\tilde{\mathbf{P}}_{\mathbf{st}}$ and $\tilde{\mathbf{Q}}_{\mathbf{st}}$ as the dependent variables.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Exclusive Territories

Table 3.7: Mandated Exclusive Territories: Synthetic control regressions

	(1) All	(2) Domestic	(3) Import	(4) Craft	(5) In-state
Panel (a): Prices					
$ExTerr$	0.0194	0.0315*	-0.00564	0.0296***	0.0390***
	(0.0177)	(0.0177)	(0.00380)	(0.00359)	(0.00557)
Observations	48	48	48	48	48
R^2	0.644	0.648	0.896	0.979	0.964
Panel (b): Quantities					
$ExTerr$	-0.0292*	0.00355	-0.0265***	0.00574	-0.0207**
	(0.0149)	(0.0101)	(0.00727)	(0.0119)	(0.00775)
Observations	48	48	48	48	48
R^2	0.990	0.786	0.947	0.907	0.948

Note: Table 3.7 shows the results of least squares estimation of equation 3.4, with $\tilde{\mathbf{P}}_{\mathbf{st}}$ and $\tilde{\mathbf{Q}}_{\mathbf{st}}$ as the dependent variables.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendices

Appendix A   IRI Markets

Atlanta, GA
Birmingham/Montgomery, AL
Boston, MA
Buffalo/Rochester, NY
Charlotte, NC
Chicago, IL
Cleveland, OH
Dallas, TX
Des Moines, IA
Detroit, MI
Eau Claire, WI
Grand Rapids, MI
Green Bay, WI
Hartford, CT
Houston, TX
Indianapolis, IN
Kansas City, MO
Knoxville, TN
Los Angeles, CA
Milwaukee, WI
Mississippi
New England
New Orleans, LA
New York, NY
Oklahoma City, OK
Omaha, NE
Peoria/Springfield, IL
Phoenix, AZ
Pittsfield, MA
Portland, OR
Raleigh/Durham, NC
Richmond/Norfolk, VA
Roanoke, VA
Sacramento, CA
Salt Lake City, UT
San Diego, CA
San Francisco, CA
Seattle/Tacoma, WA
South Carolina
Spokane, WA
St. Louis, MO
Syracuse, NY

Toledo, OH
Tulsa, OK
Washington, DC
West Texas/New Mexico

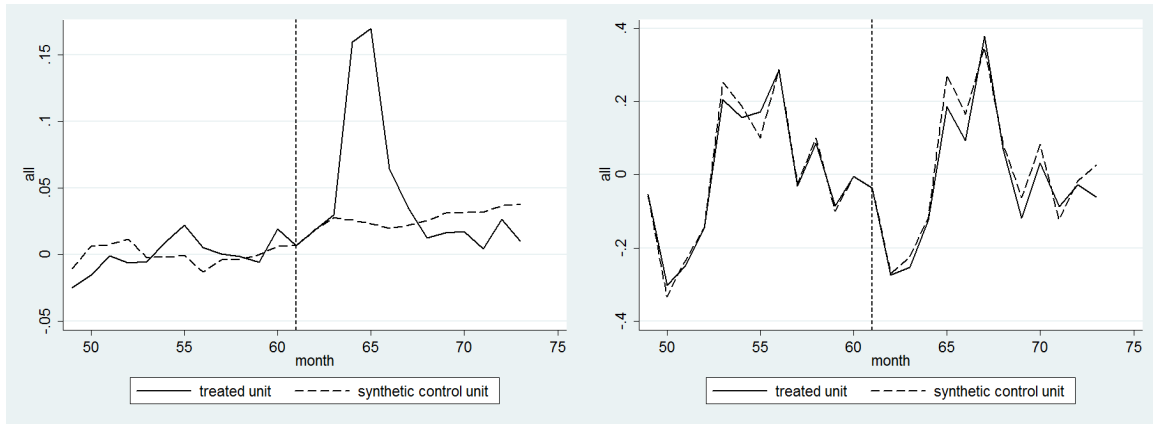# Appendix B   Synthetic control method graphs

B.1   Franchise Laws
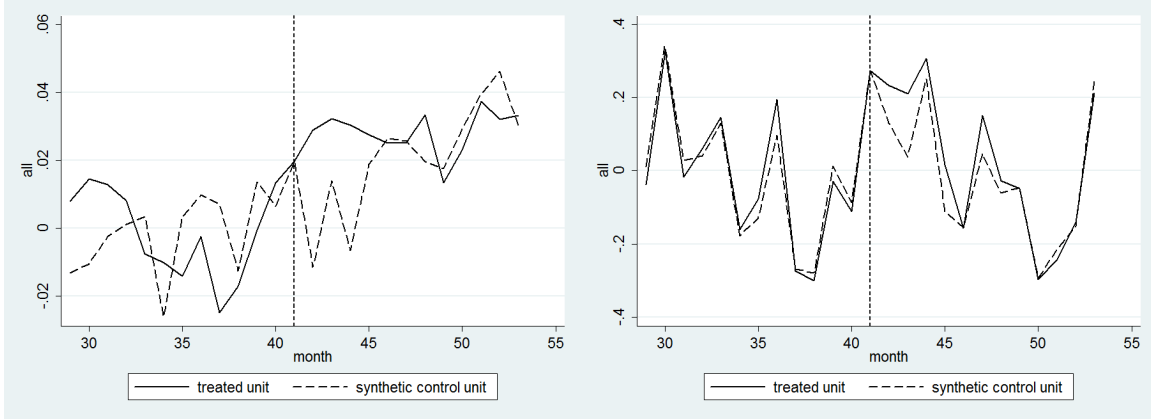
(a) Price

(b) Quantity

Figure B1: Mean Wisconsin and synthetic control: all beer
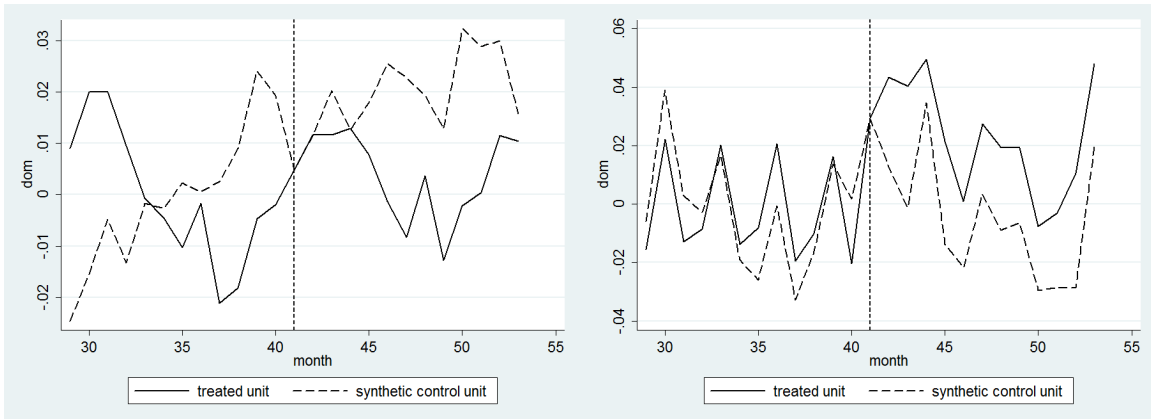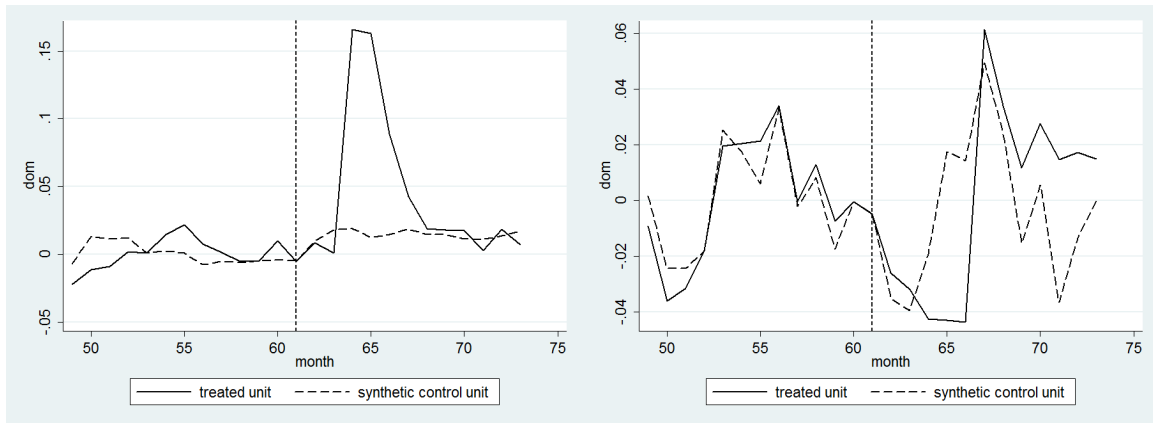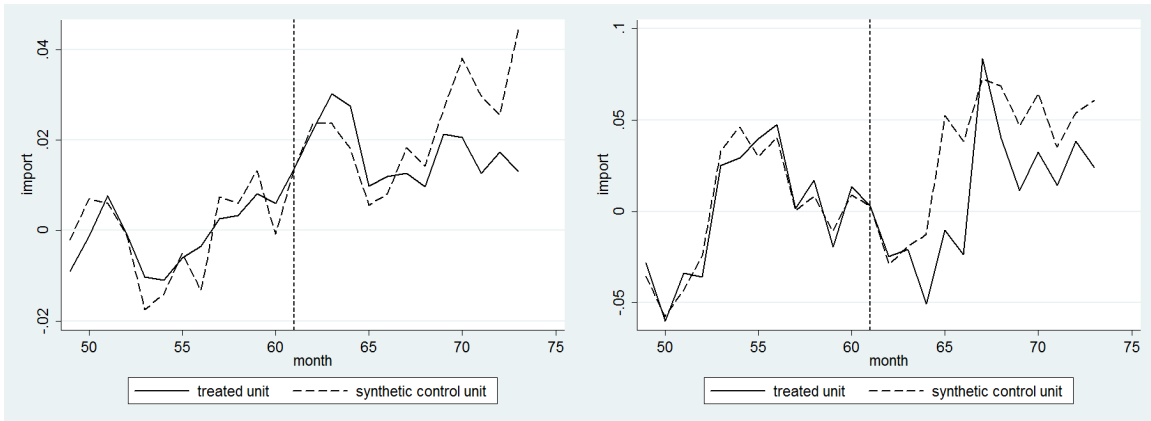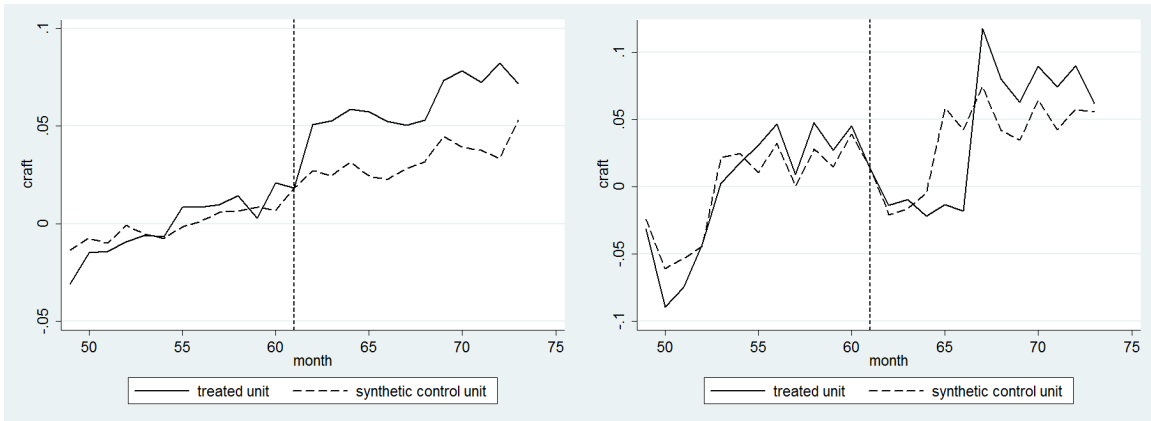

(a) Price

(b) Quantity

Figure B2: Mean Wisconsin and synthetic control: domestic beer
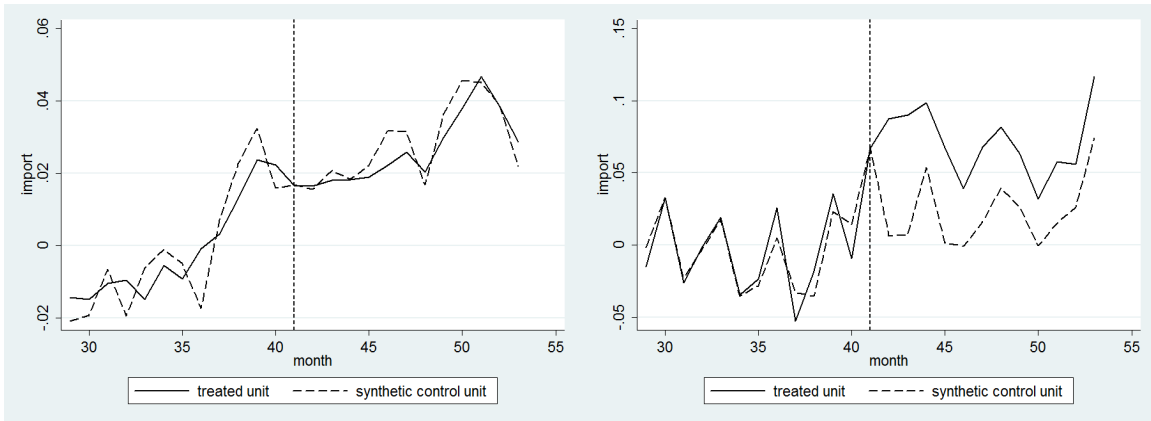
(a) Price (b) Quantity

Figure B3: Mean Wisconsin and synthetic control: imported beer
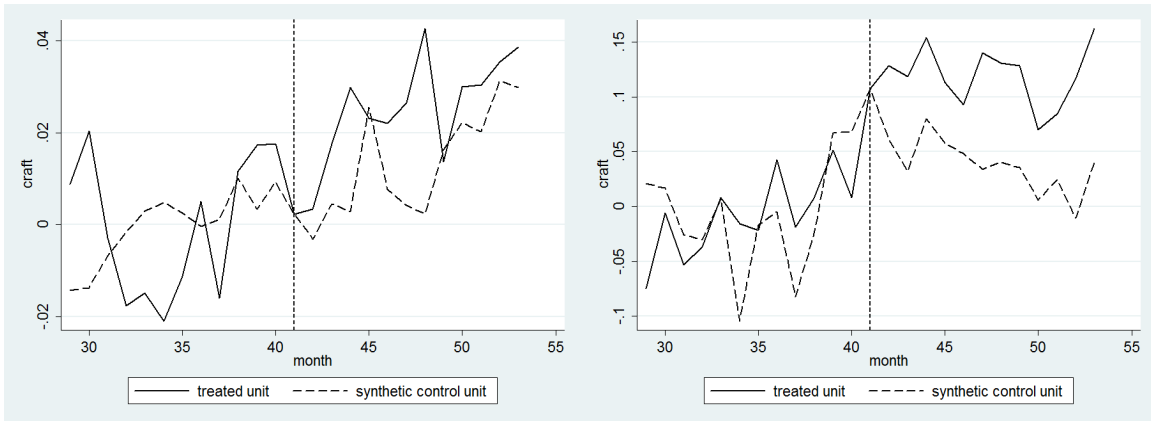
(a) Price (b) Quantity

Figure B4: Mean Wisconsin and synthetic control: craft beer
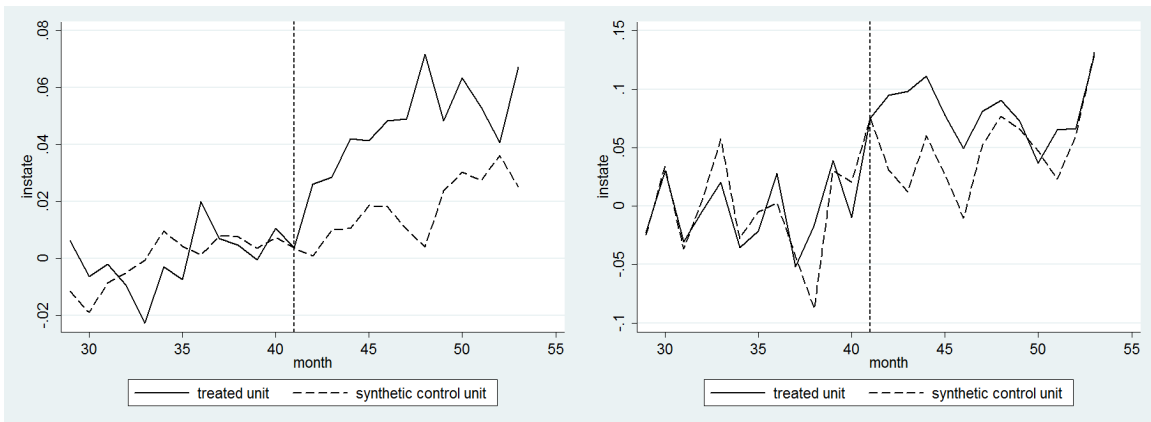
(a) Price (b) Quantity

Figure B5: Mean Wisconsin and synthetic control: instate beer

B.2 Exclusive Territories

(a) Price   (b) Quantity

Figure B6: Mean Wisconsin and synthetic control: all beer

(a) Price   (b) Quantity

Figure B7: Mean Wisconsin and synthetic control: domestic beer

(a) Price   (b) Quantity
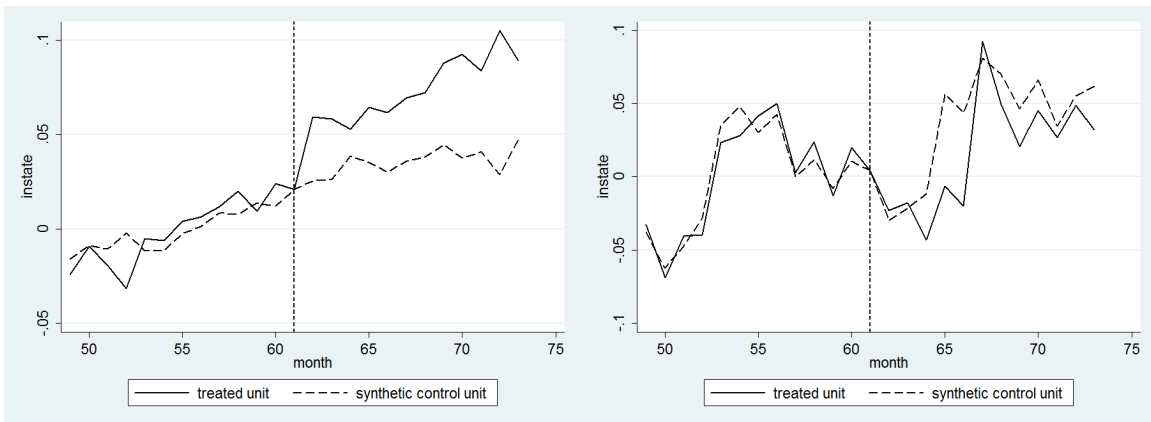
Figure B8: Mean Wisconsin and synthetic control: imported beer

(a) Price   (b) Quantity

Figure B9: Mean Wisconsin and synthetic control: craft beer

(a) Price   (b) Quantity

Figure B10: Mean Wisconsin and synthetic control: instate beer

References

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. "Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program." *Journal of the American Statistical Association* 105, no. 490 (2010): 493-505.

Abadie, Alberto, and Javier Gardeazabal. "The economic costs of conflict: A case study of the Basque Country." *The American Economic Review* 93, no. 1 (2003): 113-132.

Angrist, Joshua D., and Jörn-Steffen Pischke. *Mostly harmless econometrics: An empiricist's companion.* Princeton university press, 2008.

Asker, John, and Heski Bar-Isaac. "Raising retailers' profits: on vertical practices and the exclusion of rivals." *The American Economic Review* 104, no. 2 (2014): 672-686.

Azoulay, Pierre, and Scott Shane. "Entrepreneurs, contracts, and the failure of young firms." *Management Science* 47, no. 3 (2001): 337-358.

Barron, John M., and John R. Umbeck. "The effects of different contractual arrangements: The case of retail gasoline markets." *The Journal of Law and Economics* 27, no. 2 (1984): 313-328.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics* 119, no. 1 (2004): 249-275.

Blass, Asher A. and Dennis W. Carlton. "The Choice of Organizational Form in Gasoline Retailing and the Cost of Laws That Limit That Choice." *The Journal of Law and Economics* 44, no. 2 (2001): 511-524

Beer Institute. *Brewers Almanac.* Washington, DC, *various years.*

Brickley, James A., Frederick H. Dark, and Michael S. Weisbach. "The economic effects of franchise termination laws." *The Journal of Law and Economics* 34, no. 1 (1991): 101-132.

Bronnenberg, Bart J., Michael W. Kruger, and Carl F. Mela. "Database paper-The IRI marketing data set." *Marketing Science* 27, no. 4 (2008): 745-748.

Burbidge, John B., Lonnie Magee, and A. Leslie Robb. "Alternative transformations to handle extreme values of the dependent variable." *Journal of the American Statistical Association* 83, no. 401 (1988): 123-127.

Burgdorf, Jacob. "Trouble Brewing? Impact of Mandated Vertical Restraints on Craft Brewery Entry and Production." Working paper, Clemson University, 2016

Carroll, Glenn R., and Anand Swaminathan. "Why the Microbrewery Movement? Organizational Dynamics of Resource Partitioning in the US Brewing Industry." *American Journal of Sociology* 106, no. 3 (2000): 715-762.

Calif. Beer Wholesalers Assn. v. Alco. Bev. etc. App., 487 P.2d 745, 5 Cal. 3d 402, 96 Cal. Rptr. 297 (1971).

Chen, Chia-Wen. "Estimating the foreclosure effect of exclusive dealing: Evidence from the entry of specialty beer producers." *International Journal of Industrial Organization* 37 (2014): 47-64.

Cooper, James C., Luke M. Froeb, Dan O'Brien, and Michael G. Vita. "Vertical antitrust policy as a problem of inference." *International Journal of Industrial Organization* 23, no. 7 (2005): 639-664.

Culbertson, Patton W., and David Bradford. "The price of beer: Some evidence from interstate comparisons." *International Journal of Industrial Organization* 9, no. 2 (1991): 275-289.

Elzinga, Kenneth G., Carol Horton Tremblay, and Victor J. Tremblay. "Craft beer in the United States: History, numbers, and geography." *Journal of Wine Economics* 10, no. 03 (2015): 242-274.

Federal Trade Commission. (2005). Comment on (California's) Proposed Beer Franchise Act, August 24

Gohmann, Stephan F. "Why Are There so Few Breweries in the South?" *Entrepreneurship Theory and Practice* (2015)

Hindy, Steve. *The Craft Beer Revolution: How a Band of Microbrewers Is Transforming the World's Favorite Drink.* Macmillan, 2014.

Jordan, W. John, and Bruce L. Jaffee. "Use of Exclusive Territories in the Distribution of Beer: Theoretical and Empirical Observations." *Antitrust Bulletin* 32, no. 1 (1987):

137-164.

Katz, Barbara G. "Territorial exclusivity in the soft drink industry." *The Journal of Industrial Economics* 27, no. 1 (1978): 85-96.

Klein, Benjamin. "The economics of franchise contracts." *Journal of Corporate Finance* 2, no. 1 (1995): 9-37.

Klein, Benjamin, and Kevin M. Murphy. "Vertical restraints as contract enforcement mechanisms." *The Journal of Law and Economics* 31, no. 2 (1988): 265-297.

Klick, Jonathan, Bruce H. Kobayashi, and Larry E. Ribstein. "The Effect of Contract Regulation on Franchising." *Journal of Institutional and Theoretical Economics* 168, no. 1 (2012): 38-53.

Kurtz, Barry and Bryan H. Clements "Beer Distribution Law as Compared to Traditional Franchise Law" *Franchise Law Journal* 33, no. 3 (2014): 397-409.

Lafontaine, Francine, and Fiona Scott Morton. "Markets: state franchise laws, dealer terminations, and the auto crisis." *The Journal of Economic Perspectives* 24, no. 3 (2010): 233-250.

Lafontaine, Francine, and Margaret Slade. "Exclusive contracts and vertical restraints: Empirical evidence and public policy." *Handbook of Antitrust Economics* 1 (2008): 391-414.

Rey, Patrick, and Joseph Stiglitz. "The role of exclusive territories in producers' competition." *RAND Journal of Economics* 26, no. 3 (1995): 431-451.

Rey, Patrick and Thibaud Verge (2008), "The Economics of Vertical Restraints," *Handbook of Antitrust Economics* 1 (2008): 353-390.

Rojas, Christian. "The Effect of Mandated Exclusive Territories in the US Brewing Industry." *The BE Journal of Economic Analysis and Policy* 12, no. 1 (2012).

Sass, Tim R., and David S. Saurman. "Mandated exclusive territories and economic efficiency: An empirical analysis of the malt-beverage industry." *The Journal of Law and Economics* 36, no. 1 (1993): 153-177.

Sass, Tim R., and David S. Saurman. "Efficiency effects of exclusive territories: Evidence from the Indiana beer market." *Economic Inquiry* 34, no. 3 (1996): 597-615.

Sass, Tim R., and David S. Saurman. "Mandated exclusive territories: Efficiency effects and regulatory selection bias." *Advances in Applied Microeconomics* 10 (2001): 55-72.

Slade, Margaret E. "Beer and the Tie: Did Divestiture of Brewer-owned Public Houses Lead to Higher Beer Prices?" *The Economic Journal* 108, no. 448 (1998): 565-602.

Smith, Richard L. "Franchise regulation: An economic analysis of state restrictions on automobile distribution." *The Journal of Law and Economics* 25, no. 1 (1982): 125-157.

Tremblay, Victor J., Natsuko Iwasaki, and Carol Horton Tremblay. "The dynamics of industry concentration for US micro and macro brewers." *Review of Industrial Organization* 26, no. 3 (2005): 307-324.

Tremblay, Victor J., and Carol Horton Tremblay. *The US brewing industry: Data and economic analysis.* MIT Press, 2005.

Whitman, Douglas Glen. *Strange Brew: Alcohol and Government Monopoly.* Independent Institute, 2003.