Franchise Contract Regulations and Local Market Structure[*]

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March 19, 2021

Abstract

Many U.S. states have regulations in place that restrict the ability of franchisors to terminate franchise contracts. We estimate the economic effects of these regulations, with a focus on how they impact market structure. Using data from the quick-service restaurant industry, we find that implementing the franchise regulation results in 4-5% fewer establishments in the average county. Our results imply franchise regulation leads to increased concentration in a large number of markets, as the number of counties in the bottom quartile of concentration would increase by between 11% and 15% with regulation.

KEYWORDS: Franchising, Entry, Regulatory Capture, Retailing

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1 Introduction

States commonly regulate markets with the justification of protecting consumers, local business owners, or both. The industries targeted and types of regulations vary from state to state, but examples of regulations and protected industries include occupational certification or licensing (e.g. from personal hairdressers to medical professionals), and antitrust exemptions for hospital systems, the insurance industry, educational institutions, alcohol retailers, car dealerships, and gas stations. The United States Department of Justice and Federal Trade Commission have recently focused on the potential anticompetitive effects of certain state regulations and the worry that these types of regulations represent regulatory capture by businesses.[1]

In this paper, using the quick service restaurant as a case study, we examine the competitive effects of a common state regulation in franchised industries that restricts the ability of franchisors to terminate franchise agreements. These regulations, which are present in 16 US states, increase the potential costs to the franchisor of contracting with an entrepreneur by making it difficult to replace underperforming franchisees. The regulations have the support of lobbying groups representing franchisees with the stated goal of protecting local entrepreneurs against opportunistic franchisors by guaranteeing franchisees can operate long enough to recover fixed costs of relationship-specific investments. But the laws may constitute a form of regulatory capture by limiting entry by potential entrepreneurs, resulting in more concentrated markets.[2] Our contribution is to estimate the economic consequences of these franchise contract regulations, specifically focusing on how they impact local market structure.

We begin by specifying a parsimonious two-period model where a franchisor chooses how many franchised establishments to open in a market. Each establishment is run by an entrepreneur who can be either high or low quality, but the franchisor learns the entrepreneur type after some time. In unregulated markets, the franchisor can replace an entrepreneur

[1] This includes focus by the FTC on occupational licenses and attention by the DOJ on state antitrust issues. For example, in 2018, the US Department of Justice hosted a series of round-tables on the relationship between regulation and competition. See https://www.justice.gov/atr/CompReg . Additionally, Federal Trade Commissioner, Joshua Wright, discussed the importance of considering regulatory capture in high-tech

after their quality is revealed at the end of the first period. In regulated markets, the entrepreneur drawn in the first period operates the establishments for both periods. The model suggests the franchisor will open fewer franchised establishments and fewer establishments overall in regulated markets, a prediction that we bring to the data.

We collect cross-sectional establishment level data for the five largest US national quick-service restaurant chains in 2012. Using these data, we estimate the relationship between the contract termination regulations and the number of establishments at the county-chain level. Results confirm the outcome of the model, as they indicate that the average chain has 9% fewer franchises and 8% fewer establishments (franchise plus corporate-owned stores) in regulated counties. Next, in order to make predictions about the impact of the regulations, we estimate a structural model of county-level entry that is based on the seminal work of Bresnahan and Reiss (1991) in order to account for the fact that observed entry patterns are the outcome of strategic interactions among competing chains. As in their work, the model is estimated using ordered probit, where the outcome is the number of total establishments in a county across all five chains. We further follow their work by analyzing small and medium sized markets – counties with a population less than 50,000, which represents 2,150 of 3,100 counties in our full sample.

The parameter estimates indicate that the regulations lead to more concentrated markets in equilibrium, as the likelihood we observe the outcome of four or fewer total establishments in a county is about 2% higher in regulated counties than unregulated counties. We then use the estimates of the model to perform two counterfactual exercises. First, we quantify the impact of enacting termination restrictions in counties that currently don't have them (1,443) and find that the establishments per capita would fall by about 4.8% in the average county.

Our study is most closely related to the other research examining the effect of franchise

to motivate our empirical analysis. Specifically, the model provides a framework for how to think about the profitability of a franchisor and how it varies across locations with and without contract regulation, leading to the different outcomes that are observed in the data. Each period represents the term length of a franchise contract. Before the first period, the chain decides how many establishments to open in a local market, where each establishment is run by an entrepreneur (franchisee). The revenue earned by each establishment in each period is a function of the quality of its entrepreneur, which is unobserved by the chain *ex ante*. During period one, the revenue of each of the establishments is realized, of which the chain earns a (fixed) share through a royalty rate. Before the start of the second period, the chain may have the option to fire any entrepreneur and hire a new one to operate a specific establishment, where the ability to fire depends on the whether or not there are contract termination restrictions in place. Finally, during period two, revenues of each establishment are again realized.

To simplify the exposition, we assume that the quality of each entrepreneur is either high ($\tau = h$) or low ($\tau = l$) and that there is a share of φ high quality entrepreneurs in the population. The realized market structure in a given market is then a tuple indicating the number of establishments managed by each type: $M = \{N^h, N^l\}$. We denote the per period revenues from an establishment managed by type τ as R^τ_M, which is a function the market structure through the competitive effects of other establishments, and the share of revenues earned by the franchisor is given by $\gamma \in (0, 1)$. Finally, there is a fixed operating cost for each establishment given by f which is known to the franchisor at time period 0. We assume that f is drawn for each market from a common distribution given by F_f.

When there are no termination restrictions in place, the chain has the option to fire a low quality entrepreneur. The franchisor will always take this option because it is costless to hire a new entrepreneur who might be a high quality type. Therefore, the *expected* profit of choosing N establishments in this unregulated (U) environment is:

$$\begin{aligned} E[\pi^U(N)] = \gamma \sum_{n=0}^{N} \underbrace{\Phi(N,n)}_{Pr(M=\{N-n,n\})} \Bigg[& \underbrace{(N-n)R^h_{(N-n,n)} + nR^l_{(N-n,n)}}_{\text{Period 1 Revenues}} \\ & + \sum_{r=0}^{n} \Phi(n,r) \underbrace{(N-r)R^h_{(N-r,r)} + rR^l_{(N-r,r)}}_{\text{Period 2 Revenues}} \Bigg] - 2Nf \qquad (1) \end{aligned}$$

where $\Phi(N, n)$ is the probability of drawing n low quality entrepreneurs when the chosen number of establishments is N. Under the binomial distribution with parameter φ, this is given by:

$$\Phi(N,n) = \frac{N!}{n!(N-n)!}\varphi^{N-n}(1-\varphi)^n$$

The second term of Equation 1 represents the option value of the ability to fire the n entrepreneurs who are revealed to be low quality. In the regulated (R) environment, the franchisor cannot fire the low quality entrepreneur, so the expected value of choosing N establishments is:

$$E[\pi^R(N)] \quad = \quad 2\gamma \sum_{n=0}^{N} \Phi(N,n) \left[\left((N-n)R^h_{(N-n,n)} + nR^l_{(N-n,n)} \right) \right] - 2Nf. \qquad (2)$$

Our goal is to demonstrate that the franchisor is more likely to choose a larger N in an unregulated environment. For this, it is sufficient to show that:

$$E\left[\pi^U(N+1)\right] - E\left[\pi^U(N)\right] > E\left[\pi^R(N+1)\right] - E\left[\pi^R(N)\right]$$

The term on the right hand side, which is the benefit of adding an additional establishment in the regulated environment, can be expressed as:

$$E[\pi^R(N+1)] - E[\pi^R(N)] = \sum_{n=0}^{N} 2\gamma\left(\varphi H(n;N) + (1-\varphi)L(n;N)\right) \qquad (3)$$

where $H(n;N)$ is the value of adding adding an establishment run by a high quality entrepreneur when there are already n and $N-n$ low and high quality entrepreneurs in the market, respectively:

$$H(n;N) = R^h_{(N-n+1,n)} + (N-n)(R^h_{(N-n+1,n)} - R^h$$

In the unregulated environment, the benefit of adding an additional establishment is:

$$E[\pi^U(N+1)] - E[\pi^U(N)] = \sum_{n=0}^{N} \gamma \Big(\varphi 2H(n;N) + (1-\varphi)\underbrace{\big(L(n;N) + \varphi H(n;N) + (1-\varphi)L(n;N) \big)}_{\text{Benefit from the option to fire}} \Big) \quad (4)$$

The difference between this expression and the expression for the regulated environment is the second term in the parentheses, which is the expected profit if the additional establishment is run by a low quality entrepreneur in the first period. The franchisor fires this entrepreneur and hires a new one, which is high quality with probability φ. The franchisor will choose to add an additional establishment in the unregulated environment as long as:

$$E[\pi^U(N+1)] - E[\pi^U(N)] > 2f$$

meaning the probability of adding a store in the unregulated environment before the realization of f is:

$$P^U(N) = F_f\left(\frac{\pi^U(N+1) - \pi^U(N)}{2}\right)$$

Taking the difference between Equation 4 and Equation 3 results in:

$$\begin{aligned}&\left(E[\pi^U(N+1)] - E[\pi^U(N)]\right) - \left(E[\pi^R(N+1)] - E[\pi^R(N)]\right)\\ &= \gamma\varphi(1-\varphi)\sum_{n=0}^{N} \Phi(N,n)(H(n;N) - L(n;N))\end{aligned}$$

which is positive under the assumption that the value of adding a high quality establishment is always better than adding a low quality establishment.[7] Therefore, the probability of adding an additional store is higher in the unregulated environment than the regulated environment at all levels of N:

$$P^U(N) > P^R(N)$$

This suggests that we are likely to observe more franchises in unregulated markets, an implication that we take to the data in Section 4. Another outcome of interest, which is the primary focus of our structural analysis, is the total number of establishments. Although not modeled here, previous literature has shown that there is substitution to company-owned establishments in regulated markets. However, as long company-owned establishments are

[7] This might not be true if the competitive effects of adding high quality establishments are large.

not perfect substitutes for franchises, then this would only dampen the impact of the reg-

of reasons, implies that the termination laws are likely an important factor in determining the profitability of a chain.

Table 1: Establishments by Chain

	FDD	AggData	Post-Merge Sample		2012 Annual Report	
Chain	Franchised	Total	Franchised	Total	Franchised	Total
McDonald's	12,601	14,062	12,190	13,874	12,605	14,157
Burger King[a]	6,895	6,981*	6,895	6,981	7,293	7,476
Wendy's	5,564	6,200	5,224	6,116	4,528	5,817
Taco Bell	4,846	6,160	4,809	6,145	4,670	5,695
Subway	0	26,228	0	26,228	–	–

Notes: The * indicates that this information comes from Burger King's FDD rather than AggData. The Burger King report does not separate Canadian establishments from United States establishments, so this information includes 293 total stores in Canada. Subway is a privately owned company and does not publish financial information, including the total number of stores. Sources: Company FDD's, AggData, and company 10Ks.

3.1 Franchise Contract Regulations

States started to enact franchise termination regulation in the early 1970's following concerns about franchisor opportunism (Klick, Kobayashi, and Ribstein (2009)). Specifically, franchisees (and regulators) worried that, if they were able to easily terminate contracts, franchisors would use franchising as a tool to learn about and take over the most profitable locations. Nicastro (1993) discusses this specific issue in the context of *Kealey Pharmacy v. Walgreen Co*. To restrict this type of action, the most basic form of the regulation requires the franchisor to have "good cause" for terminating a contract. Often times, franchisors will claim that "good cause" comes in the form of a breach of the franchise agreement by failing to make payments, failing inspections, putting the trademark in jeopardy, etc. However, the terminology "good cause" is typically left vague without specific definition in many of the regulations and its meaning is a primary point of argument in franchise litigation.[13] Nicastro (1993) provides an excellent overview of the different views behind the "good cause" provision and lists numerous examples of how it has been litigated in wrongful termination cases.

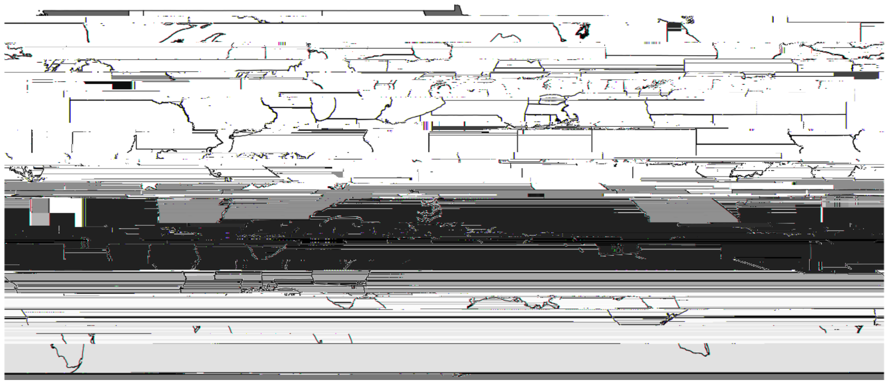
In theory, no matter which state they are located in, a franchisee can file a suit against the franchisor if they feel that their contract was wrongfully terminated. In practice, the "good cause" language makes defending the termination more difficult for the franchisor. Thus,

[13] For example, a 7-11 franchisee in New Jersey recently lost a case in which he claimed that his contract termination was without good cause. See `https://franchiselaw.foxrothschild.com/tags/new-jersey-franchise-practices-act/`

the regulation can be a valuable tool to the franchisee in presenting and winning a case for wrongful termination, and winning such a case can result in a large monetary settlement.[14] The importance of these regulations to franchisees is further evidenced by the fact that the laws are regularly backed by franchisee lobbying groups like the American Association of Franchisees and Dealers (AAFD) and the Coalition of Franchisee Associations (CFA), citing the need to protect franchises from large franchise corporations.[15]

The wrongful termination cases and the laws that impact them are also an important

Figure 1: States with “Good cause” Termination Regulation



Notes: States shaded in gray are states with ‘good cause’ regulations. Alaska and Hawaii, which are omitted in the interest of space, do not have ‘good cause’ regulations. Source: Klick, Kobayashi, and Ribstein (2009).

ulation and the median income for all of the counties in the United States in 2012 using publicly available data from the US Census Bureau. We merge this with county-level wage data for the fast-food industry, available from the Bureau of Labor Statistics. Second, similar to Brickley and Dark (1987) and Kosová and Sertsios (2018), we proxy for franchisor monitoring cost using the distance from the establishment to the chain’s headquarters. In order to determine this, we collect the location of each chain’s headquarters from the chain’s website and calculate the driving distance from this location to each establishment using the MapQuest API. Third, we collect information on whether or not the county has an interstate highway passing through it in order to control the importance of repeat customers from the County Business Patterns dataset. Finally, we collect the ranking of each state’s ‘access to capital’ published by CNBC, where 1 is the best state and 50 is the worst.[19] The idea is that the pool of local entrepreneurs, both in quantity and quality, might be impacted by how easy it is to obtain the capital requirements to open a franchise.[20]

3.3 Descriptive Statistics

Table 2 presents descriptive statistics for our full sample. The first panel presents the chain-level average establishment counts across counties, both in absolute and per-capita terms. Additionally, we break down the per-capita averages by regulation status. There is an average of 3.8 total establishments and 3.6 franchised establishments per-chain per-county,order toh3.81o controlling for population, the franchised share per-capita lowers to 90%, suggesting that franchisor-owned stores are in more populated areas. The patterns across regulated and unregulated states provides preliminary evidence that the termination laws impact market outcomes, as both the total number establishments and the number of franchises per capita are lower in regulated states.

In the second panel, we focus on the other control variables (at the county-level). Note that we omit the access to capital because it is a rank variable. About a third of the counties in the United States are subject to the termination restrictions, which suggests that the regulations are not concentrated in states with a relative large or small number of counties (i.e., 16/50 states =0.32). Many of the restaurants are far away from the franchisor's headquarters, as the average distance to HQ is almost 1,000 miles. This is about the same distance as a drive from Boston to Chicago. The median annual wage for a worker in this industry is quite low at $12,600 and less than half of the counties in the US have an interstate running through them.

4 The Impact of Franchise Contract Regulations

In what follows, we estimate the relationship between the contract regulations and local market structure. We begin with a reduced-form analysis in which we determine the impact the regulations on the number of establishments for each chain in each county, while controlling for competition and other local covariates. We then specify and estimate a structural model of chain entry in order to predict the equilibrium effects of the regulations, focusing on their role in determining county-level market structure.

4.1 County-level Regressions

To determine the impact of the termination regulation on chain-level entry decisions, we regress the count of establishments (logged) for each chain on the county regulation status, as well as county and chain characteristics.[21] The other county-level controls we include are (logged) population, land area, mean income, average wage of a quick service restaurant employee, and the distance from the county centroid to the chain headquarters. We also include a state-wide measure of entrepreneurial access to capital (ranking, 1-51), a dummy variable indicating whether or not an interstate highway passes through the county, a fixed effect for each census-region, and a fixed effect for each chain.

[21]We adjust the dependent variable by one to account for the zeros. We estimate the regressions using an arctangent approximation with similar results.

Table 2: Summary Statistics, Full Sample

Variable	Mean	Q25	Median	Q75
Outcomes				
Franchises	3.57	0	1.00	3.00
Total	3.83	0	1.00	3.00
Franchises per capita (10k)	0.40	0	0.24	0.57
Total per capita (10k)	0.42	0	0.26	0.59
Unregulated States				
Franchises per capita (10k)	0.41	0	0.23	0.55
Total per capita (10k)	0.42	0	0.25	0.57
Regulated States				
Franchises per capita (10k)	0.39	0	0.26	0.60
Total per capita (10k)	0.41	0	0.28	0.61
Controls				
Regulation	0.33	–	–	–
Dist to HQ	1,069	592	956	1,454
Population	96,773	10,765	25,644	66,294
Mean HH Income	56,195	47,514	53,751	61,625
Area, Sq. Miles	15,132	2,440	4,672	9,927
Mean Wage	13,634	11,071	12,601	14,325
Interstate Highway	0.44	–	–	–

Notes: The unit of observation for the first three rows is a chain-county. The unit of observation for the last six rows is a county. There are about 3,100 county and 15,500 chain-county observations. Source: US Census Bureau, Company 10Ks and FDDs, and AggData.

Before discussing the the county-level results, we point to the state-level results in the right side of Table 3, which provide a comparison to the analysis of Klick, Kobayashi, and Ribstein (2012).[22] Recall that Klick, Kobayashi, and Ribstein (2012) uses panel-data in order to identify the effect of within-state changes in the regulation status, while we rely on cross-sectional variation. The dependent variables in these regressions are the (logged) number of franchises (5) and total establishments (6) for a chain in a state. We find that there are 8.3% fewer franchises and 5% fewer total establishments for a chain in regulated states. These are comparable to the estimates in Table 2reThese arr2411r2466(T)2tes est egulated

Table 3: Impact of Regulations on the Number of Establishments

	County-Level				State-Level	
	Log Franchises		Log Total		Log Franchises	Log Total
	(1)	(2)	(3)	(4)	(5)	(6)
Regulation	-0.059	-0.091	-0.062	-0.081	-0.083	-0.050
	(0.013)	(0.032)	(0.014)	(0.026)	(0.057)	(0.055)
Number of Rivals		-0.885		-0.520		
		(0.551)		(0.451)		
Log Population	0.481	1.187	0.508	0.922	1.016	1.016
	(0.009)	(0.444)	(0.009)	(0.363)	(0.032)	(0.032)
Log Median Inc.	-0.279	-0.700	-0.283	-0.530	-0.322	-0.398
	(0.072)	(0.317)	(0.078)	(0.258)	(0.109)	(0.108)
Log Land Area (sq. mi.)	0.019	0.007	0.013	0.007	-0.050	-0.037
	(0.007)	(0.015)	(0.007)	(0.013)	(0.020)	(0.019)
Log Wage	0.257	0.443	0.276	0.385	-0.652	-0.555
	(0.028)	(0.132)	(0.030)	(0.107)	(0.116)	(0.115)
Access to Capital	-0.003	-0.006	-0.003	-0.004	0.002	-0.000
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Log HQ Distance	-0.073	-0.071	-0.068	-0.067	-0.249	-0.225
	(0.010)	(0.019)	(0.010)	(0.015)	(0.096)	(0.100)
Interstate Highway	0.156	0.372	0.171	0.298	0.083	0.075
	(0.014)	(0.137)	(0.015)	(0.112)	(0.057)	(0.056)
Constant	-3.396	-6.241	-3.835	-5.505	1.217	0.932
	(0.702)	(2.366)	(0.758)	(1.925)	(0.887)	(0.917)
R^2	0.778	0.487	0.801	0.665	0.637	0.651
Observations	15415	15415	15415	15415	250	250

(0q7.028(250)-48(250)6rT8325.214 Td8lk8)-14346(e250)-48(250)6rL051h0.637 0.651 .050

which we abstracted away from in Section 2.

In order to solve for the equilibrium of this model, we make the following assumptions that are common to the entry literature: (Assumption 1) is i.i.d. normally distributed; (Assumption 2) each chain knows the full payo s of all other chains; (Assumption 3) chains play a simultaneous Nash equilibrium in the choice of the number of establishments to open. In our context, we only observe a single cross-section of the equilibrium outcomes (as of 2012), meaning assumption (c) implies that these outcomes are a result of a single static equilibrium of franchisor decisions. While it is clear that not all entry happens simultaneously, there is a long literature employing this modeling strategy in order to reduce complex dynamic games to static games in order to understand the determinants of entry decisions; see, for example, Berry (1992), Seim (2006), and Ciliberto and Tamer (2009), among many others.

Under these assumptions, an equilibrium occurs when each chain maximizes their total payo in a county, $N_{j;m} \quad u_{jm}$, by best responding to their rivals' strategies, which can be summarize by the following two conditions:

$$u(N_{j;m}; N_{j;m}) \quad 0 \text{ and } u_{im}(N_{j;m} + 1; N_{j;m}) \quad 0:$$

There are two complications in solving and estimating this model. First, since BR91, it is well known that these class of simultaneous entry games have multiple equilibria. Second, our setting is more complicated than that of the classic entry literature in that we model the chain as potentially choosing multiple establishments.[26] Therefore, in order to estimate the model, we make the following two additional assumptions:

Assumption 4: $(N_m) = {}^{o}(N_{j;m} \quad 1) + {}^{r}(N_{j;m})$; $N_m = N_{j;m} \quad 1 + N_{j;m}$

Assumption 5: $X_{jm} = X_m$

Assumption 4 implies that the competition from rival chains is symmetric, both in the sense that the e ect of across-chain competition is the same as within-chain competition and that the e ect is the same for every chain (i.e. ^{w} and ^{a} are not indexed by j). This can be justi ed by the fact that franchisees/managers under the same brand name compete with each other in a single market, implying that the demand-side implications of competition are independent of the brand of the rivals. The threats to this assumption would be if demand substitution di ered based on geographic factors or brand preference, or if there were nonlinear costs in the number of establishments from the franchisors point of view. Assumption 5 implies that only variables that are common across all establishments in a county enter establishment level-payoffs. Therefore, the payoffs are symmetric across establishments in a county up to the random shock . The main cost of this is that we are not able to include any chain-level shifters of profits, or make chain-specific predictions about the effects of the regulation.

the di erence in the estimated π_1 and π_2 is about 19%, suggesting a large jump in potential profit ($18,482 \times \frac{1.393}{2.312} \approx 11,000$ in population) is needed for a monopoly market to become a duopoly. This di erence shrinks to about 5% ($18,482 \times \frac{0.512}{2.312} \approx 4,000$ in population) going from four to five establishments and is relatively level thereafter. This concavity in thresholds is qualitatively similar to BR91.

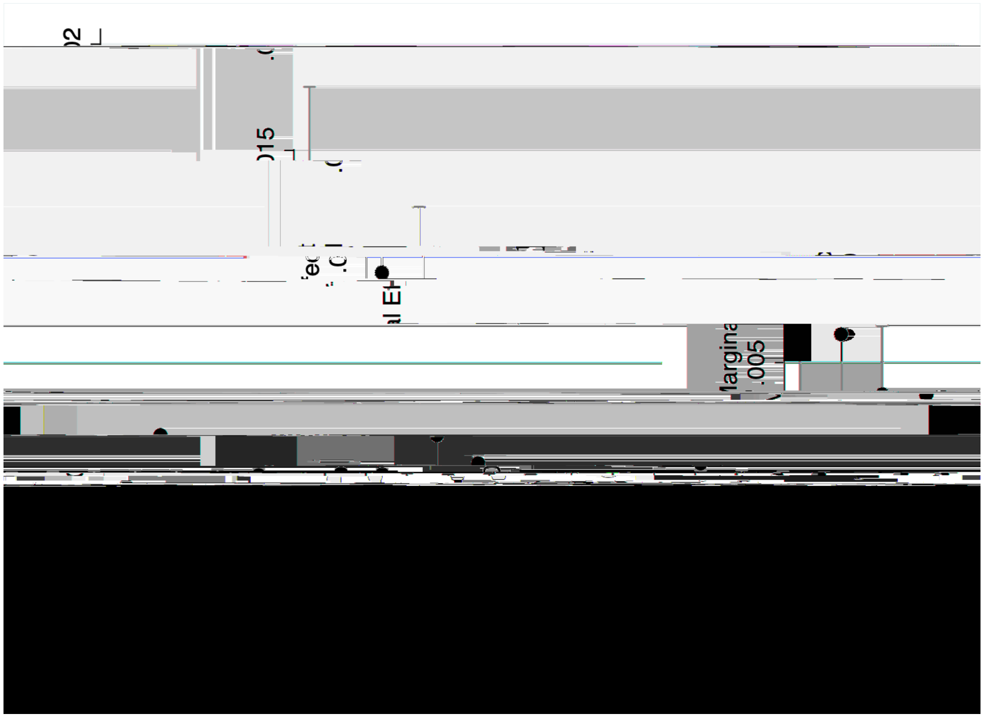
Table 5: Estimates of Ordered Probit

Variable	Estimate	Variable	Estimate	Variable	Estimate
Regulation	-0.12	1	7.415	10	12.952
	(0.058)		(1.506)		(1.517)
Log(Pop)	2.312	2	8.808	11	13.356
	(0.055)		(1.506)		(1.518)
Log(Income)	-0.868	3	9.709	12	13.657
	(0.107)		(1.508)		(1.518)
Log(Area)	-0.097	4	10.399	13	13.97
	(0.029)		(1.51)		(1.518)
Log(Wage)	0.006	5	10.911	14	14.224
	(0.083)		(1.512)		(1.519)
Access to Capital Rank	-0.01	6	11.394	15	14.469
	(0.002)		(1.513)		(1.52)
Log(HQ Dist)	-0.364	7	11.833	16	14.825
	(0.116)		(1.515)		(1.523)
Interstate	0.566	8	12.212	17	15.09
	(0.052)		(1.516)		(1.527)
		9	12.638	18	15.325
			(1.516)		(1.535)
				19	15.541
					(1.549)
Psuedo R-Sq	0.304	N	2,136		

Notes: Standard errors in parentheses. Outcome $N = 18$ is not observed in the data, meaning that π_{18} is the cuto for $N = 19$ and π_{19} is the cuto for $N = 20$

To further analyze the impact of the regulations, we present the marginal e ects the regulation dummy on the probability of each outcome in Figure 2. The figure indicates that the probability of a county having fewer than five establishments increases, while the probability of outcomes with five or more decreases. These e ects are statistically significant from zero up to $N_m = 12$. Overall, the estimated marginal e ects imply that the probability of having fewer than five establishments in a county increases by slightly more than 2% due to the regulation.

Figure 2: Marginal Effects of the Regulation



Notes: The dots are the point estimates of the marginal effects on each outcome and the confidence bands indicate the 95% confidence region.

4.3 Counterfactual: Market Structure with and without Franchise Regulation

We use the estimated ordered probit model to perform two counterfactual exercises that focus on the impact of the contract termination regulations on local market structure. First, we quantify the effect of enacting the termination regulation in counties that currently do not have such laws, a set denoted M_1. Therefore, this exercise can serve as an analysis of a federal statute, which is something that has been discussed by lobbyists and policy-makers. Second, we quantify the effect of removing regulations in counties that currently have them, a set denoted M_2, thus measuring the equilibrium impact that current regulations have.

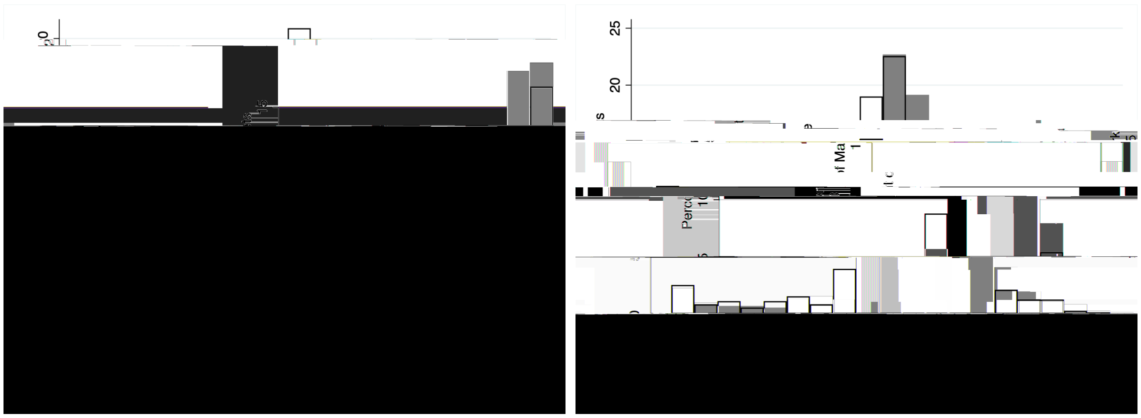
To perform these exercises, we use the model to calculate the expected number of establishments in each county under different regulation statuses (s), which we denote $\tilde{N}^s_m$. The status indicator can be either $s = 0$ (not regulated) or $s = 1$ (regulated). We do so with the following equation:

$$\tilde{N}^s_m = \sum_{n=0}^{20} \hat{P}^s_m(n) \times n \qquad (7)$$

where $\hat{P}^s_m(n)$ is the model predicted probability of outcome n in county m under regulation

Figure 3: Impact of Changing Regulation Status

(a) Counties w/out Regulation (b) Counties w/ Regulation



Notes: Histograms are based on the expected number of establishments (see equation 7) and are binned with a width of 0.2.

status s. We make these predictions by setting the regulation dummy to either 1 or 0, depending on the value of s. In order to focus on the impact on market structure, we believe it is important to control for population differences. We therefore examine all scenarios in terms of number of establishments per 10,000 residents of the county.

Figure 3 presents the distributions of the expected establishments per capita (10k) across the different scenarios. Figure 3a focuses on counties in M_1, so the gray histogram represents the distribution of outcomes under the observed regulation status (i.e., $\tilde{N}_m^0$), or the baseline, and the white histogram represents the distribution of outcomes if these same counties enacted regulations laws, (i.e., $\tilde{N}_m^1$). It is clear that the distribution shifts to left (i.e., less competition) after the regulation is introduced. Indeed, using a Kolmogorov-Smirnov test, we find that the distribution of outcomes without regulation is significantly higher than the distribution with regulation (p-val< 0.001). Figure 3b focuses on the counties in M_2, meaning the baseline distribution is in white, while the counterfactual distribution is in gray. Again, we see a shift to the left due to the regulation, which is statistically significant (KS test p-val< 0.001).

To get a better sense of how these changes impact market structure, we present different moments from these distributions in Table 6. The left panel focuses on counties in M_1. The bottom row shows that average number of establishments per 10,000 residents falls from 2.08 to 1.98 in these counties due to the regulation, a reduction of about 4.8%, an effect that is statistically significant at the 5% level (SE of 0.05).[29] We further break down these distributions into three categories based on the market structure. The low competition

[29]Standard errors for all outcomes in Table 6 are calculated based on 10,000 bootstrap samples.

markets are ones that have the number of establishments per capita (10k) below the 25th percentile of the baseline distribution (1.20 from Table 4), while the high competition markets are ones with the number of establishments per capita (10k) above the 75th percentile of the baseline (2.55 from Table 4). The medium competition markets are ones that are in-between these two thresholds. Individual cells in the table present the number of markets that fall into each category under the regulation status noted at the top. The number in parenthesis represents the standard error of the change between the baseline and the counterfactual, calculated using 10,000 bootstrap samples.

For M_1 markets, enacting the regulation results in the number of low competition markets increasing from 226 to 252 (11%), the number of medium competition markets increasing from 1,046 to 1,089 (4%), and the number of high competition markets decreasing from 171 to 102 (40%). The results are similar when focusing on M_2 in the right panel. Specifically, removing the regulation from M_2 counties results in the the average establishments per capita increasing by 0.1 (4.6%), the number of low competition markets decreasing by 15%, the number of medium competition markets decreasing by 7%, and the number of high competition markets increasing by 53%.

Table 6: Impact of the Regulation on the Distribution of N_m

Outcome	Sample: M_1		Sample: M_2	
	Baseline	CF	CF	Baseline
	Reg=0	Reg=1	Reg=0	Reg=1
# Markets w/ Low Competition	226	252		

the reduction in establishments means a reduction in product variety, in terms of geographic differentiation, which is an additional cost to consumers.

5 Conclusion

We estimate the impact of state franchise contract termination regulations on market structure in the quick-service restaurant industry. The results of the analysis suggest that the regulations lead to a 4.8% (4.6%) reduction in the number of establishments per capita in the average unregulated (regulated) county. Further, the number of markets with a low level of competition increases by between 11% and 15%, while the markets with a high level of competition decreases by between 40% and 53% due to the regulations.

The importance of our analysis lies in the fact that we estimate the extent to which the regulations impact market structure. The relevance of this is further enhanced by the fact that these types of regulations have recently been proposed by more states and at the federal level. While lobbying groups for franchisees often argue that the regulations help protect franchisees from unfair treatment by franchisors, we show that the regulations also benefit the franchisees by limiting the amount of competition each franchisee faces. Therefore, we provide evidence that the regulations may represent a form of regulatory capture, something which has been of interest to the regulatory agencies in the federal government. One shortcoming of our analysis is that we are not able to estimate other effects of these regulations. For example, the regulations that we study may encourage higher quality entrepreneurs to become franchisees of national chains. This is clear and important direction for future research in this area.

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