No-Poaching Clauses, Job Concentration and Wages: A Natural Experiment Generated by a State Attorney General

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January 23, 2020

Abstract

We use a natural experiment to perform the first empirical analysis of the widely-claimed effect of no-poaching clauses on job-market concentration and wages. In 2018, the Washington State Attorney General obtained agreements from dozens of quick-service restaurant brands, encompassing thousands of restaurants across the United States, to stop enforcing no-poaching clauses. We use the unexpected, nation-wide enforcement action to identify the effect of no-poaching clauses on job-concentration and wages in job markets covering 3,035 franchised quick-service restaurants in Rhode Island and Florida. We find the elimination of no-poaching clauses causes minimal reductions in job concentration and no increase in wages.

Introduction

How do employee wages respond to employer concentration and market power created by no-poaching clauses? The prediction made by many, including some prominent economists and legal scholars (Krueger and Ashenfelter, 2017; Krueger and Posner, 2018, Thomas Philippon, 2019), and relied upon by the popular press (e.g., Abrams/New York Times ("NYT") September 27, 2017),[2] legislators

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[2] Rachel Abrams, "Why Aren't Paychecks Growing? A Burger-Joint Clause Offers a Clue." *The New York Times* (New York), September 27, 2017, available at https://www.nytimes.com/2017/09/27/business/pay-growth-fast-food-hiring.html; PBS News Hour, interview with Joe Biden, November 1, 2019.

(e.g., Senators Booker and Warren),[3] and State Attorneys General,[4] is that wages will fall.[5] However, labor mobility restrictions of the type created by no-poaching clauses may also create increased incentive for employers to bear more human capital enhancing costs, such as learning-by-doing and training costs that could enhance labor efficiency (Becker, 1964; Kennan, 1979; Acemoglu and Pischke, 1999). This increased labor efficiency could either increase or decrease wages, for reasons other than employer market power.[6] Regardless of the economic mechanism, it is important to measure the effect of no-poaching clauses on concentration and wages empirically, rather than assume the direction of the effect based on theoretical models that themselves yield ambiguous effects. A net effect of lower wages due to no-poaching clauses is consistent with either enhanced market power or potentially increased labor efficiency. Increased wages are consistent with a net effect dominated by increased labor efficiency/human capital. The actual effect of no-poaching clauses on wages cannot be resolved in the absence of empirical evidence.

Krueger and Ashenfelter's (2017) recent paper addressing no-poaching clauses, cited in the press, regulatory and private legal actions and legislative efforts, presented an "Empirical Example" often cited as evidence that no-poaching clauses significantly increase concentration in labor markets, moving them from "Unconcentrated" to "Highly Concentrated."[7] Their suggested increase in labor-market concentration results not from a change in number or location of restaurants,[8] but rather from the limits no-poaching clauses put on workers' ability to move between employers in the existing configuration of brands and restaurant locations within each workers relevant geographic job market. Work by Levy and Tardiff (2018) showed that the calculations in the Krueger and Ashenfelter (2017) example did not reflect the way no-poaching clauses function, and for that reason, among others, grossly overestimated the concentrative effects of no-poaching clauses. Furthermore, to date there has been no empirical analysis of the effect of no-poaching clauses on wages of workers (Starr, 2018).

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[3] Senator Cory Booker, February 28, 2018, *Booker, Warren Introduce Bill to Crack Down on Collusive "No Poach" Agreements*, available at https://www.booker.senate.gov/?p=press_release&id=760.

[4] Washington State Attorney General ("WSAG"), July 12, 2018 *AG Ferguson Announces Fast-Food Chains Will End Restrictions On Low-Wage Workers Nationwide*, at https://www.atg.wa.gov/news/news-releases/ag-ferguson-announces-fast-food-chains-will-end-restrictions-low-wage-workers.

[5] Forgas, et al. (2019) also describe the legal, legislative, and popular press accounts inspired by Krueger and Ashenfelter (2017), including a description of that paper and Levy and Tardiff's economic evaluation of that paper.

[6] For example, the reduction in wages due to human capital investment could result from increase in labor efficiency and low elasticity of labor supply and low elasticity of end-product demand.

[7] Krueger and Ashenfelter, 2017, P. 12.

[8] This potential longer-run effect on the competitive impact of no-poaching clauses on franchises compared to non-franchised or company-owned brands may also be relevant, but in longer-run than we are addressing in this paper.

This paper presents the first empirical evidence about the effect of no-poaching clauses in franchise agreements on the wages of workers in the quick service restaurant ("QSR") industry, which commonly used them until 2018.[9]

We analyze the experience of more than 3,000 franchised QSRs (F-QSRs) locations, in more than 120 branded franchises in Rhode Island and southwest Florida, following the elimination of no-poaching clauses at nearly 80 percent of F-QSRs locations that previously had them, as negotiated by the Washington State Attorney General ("WSAG") in 2018. Many F-QSRs had no-poaching clauses. However, at least 44 percent and 30 percent of F-QSR locations in Rhode Island and Florida, respectively, did not have no-poaching clauses, even prior to the WSAG actions.

No-poaching clauses generally block employees from obtaining employment at F-QSR locations within their current brand of employment. Comparison of wages and the concentration of employment opportunities in the F-QSR industry before and after the elimination of no-poaching clauses offers an excellent opportunity to evaluate the effect of no-poaching clauses on labor market concentration, and changes in labor market concentration on wages, offering at least three measurement advantages. First, the exogenous, unanticipated elimination of no-poaching clauses, due to regulatory actions, provides a clean change in concentration that is exogenous to any "reverse" effect that wages may have on concentration. This is a significant empirical advantage over other empirical studies which may be able to precisely measure the correlation between wages and job market concentration, but not the causation (e.g. Benmelech, Bergman, Kim; 2018). Section I, below, describes the exogenous impetus and timing of the elimination of no-poaching clauses from the F-QSR industry.

Second, the elimination of no-poaching clauses from F-QSRs occurred simultaneously across the United States for the same F-QSRS, sequentially eliminating no-poaching clauses from the vast majority of F-QSRs over the course of a few months.[10]

Third, in addition to the variation over time in job concentration, due to the elimination of enforcement of no-poaching clauses, the impact of no-poaching clauses on concentration differed across

[9] QSRs are defined similarly to Limited Service Restaurants (NAICS 722513). See https://www.naics.com/naics-code-description/?code=722513.

[10] Some in the legal community have questioned whether the Washington State Attorney General had the authority to negotiate the elimination of no-poaching clauses for restaurant locations outside Washington State, particularly in states where the Attorney General had not stated an interest in eliminating no-poaching clauses form franchise agreements. However, with or without such legal authority the WSAG did negotiate the elimination of enforcement of no-poaching clause detailed here. See Michael L. Sturm, "The State of Washington's Attempt to Ban Franchise Anti-Poaching Provisions Nationwide Violates Constitutional Limitations on State Power to Regulate National Commerce. Fall 2019, *Franchise Law Journal*, Vol.39, No.2. Pp 169-184.

geographic areas. No-poaching clauses restricted franchisees within a single brand from hiring employees from other locations within that brand. They placed no restrictions on hiring across brands. Therefore, both the brand mix and geographic density of F-QSRs within a given labor market alter the effect of no-poaching clauses on the jobs available to F-QSR employees within that market. For example, if a geographic labor market contained four restaurants, one from each of four brands, no-poaching clauses would have no effect on job concentration in that market. Alternatively, if a geographic market had four restaurants of a single franchised brand, the enforcement of no-poaching clauses would eliminate some employment options, creating greater job concentration. These variations in brand mix and geographic density of locations provide temporal and geographic variation in both employment concentration and the *change* in employment concentration when the enforcement of no-poaching clauses ended abruptly, during 2018.

We analyze counties in Rhode Island and southwest Florida. Krueger and Ashenfelter's (2017) "Empirical Example" is based on Rhode Island, making that state of interest for analysis of their methods, as performed in Levy and Tardiff (2018), and here for analysis of whether wages will increase with the elimination of no-poaching clauses. We chose counties of southwestern Florida due to the relatively clear geographic boundaries of those markets established by the Gulf of Mexico to the west and the many miles of everglades and low population to the east. These features allow us efficiently to collect data for larger geographic markets than in Rhode Island. Other markets may produce qualitatively different results.

Krueger and Ashenfelter (2017), Krueger and Posner (2018), and numerous litigations and legislative efforts use quick service restaurant jobs as a relevant job market. Levy and Tardiff (2018) use the same convention to simplify the analysis of the methods in Krueger and Ashenfelter (2017), at the same time noting that it may be an overly narrow job market definition, which could have a significant impact on measured concentration. Below and in Appendix C, we discuss the effect of using this narrow definition of the job market on market concentration and the change in market concentration caused by the elimination of no-poaching clauses.

In this paper we consider multiple distance measures from each F-QSR to define the labor market opportunities employees at each F-QSR are likely to access, and to test the sensitivity of our results. Some analyses have resorted to using "Commuter Zones" defined by the Bureau of Labor Statistics as the relevant geography of a labor market (Azar *et al* (2018); Azar, Berry, and Marinescu, (2019)). However, the distances across these zones can be more than 100 miles.[11]

[11] For example, the Boston commuting zone includes both Worcester and Barnstable Counties, MA, which contain locations more than 120 miles apart, ignoring road distances, and require more than 4.33 hours of travel during commute times. At the same time, locations that cross commuter zones can be quite proximate. For

Seasonal patterns of employment in Rhode Island and Florida differ. The labor markets in these states may differ for other regional economic and demographic reasons. We analyze the data from these two states separately but within a single empirical framework.

Our estimates are precise enough to detect changes in wages, driven by no-poaching clauses, of as little as $3 to $8 per week in the quick service restaurant industry, where the average weekly wage is approximately $300 per week (see Table 3). Even so, we find no evidence that the concentration caused by no-poaching clauses reduced wages of employees of franchised quick service restaurants in Rhode Island or southwest Florida.

This paper proceeds as follows: Section I discusses the impetus and timing of the elimination of no-poaching clauses. Section II discusses the unique dataset we have collected about the locations and franchise status of over 3,000 restaurants, and how the elimination of no-poaching clauses creates a rare opportunity to measure the effect of an exogenous change to no-poaching clauses and related labor market concentration on wages. Section III details the effect of no-poaching clauses on concentration of job market opportunities within the F-QSR industry for workers already in the industry. Section IV presents regression results of the effect on wages of changes in concentration driven by no-poaching clauses. Section V describes the precision or our estimates and the magnitude of wage changes due to change in concentration that our analysis can detect. Section VI provides some concluding thoughts.

I. No-Poaching Clauses and Their Elimination through State Enforcement Actions

Prior to 2018, no-poaching clauses were widely used in franchise contracts of many brands, including the 20 brands of the F-QSR that eliminated no-poaching clauses in Rhode Island and southwest Florida locations.[12] These no-poaching clauses prohibit franchisees (restaurant owners) from hiring employees of the franchisor (brand owner) or of another location of the same branded franchise owned by another franchisee. Typically, the hiring restriction applies while the employee works at a job in the same brand, or, in some cases, for some limited time after leaving the employ of the same brand. The

example, it is only 2.3 miles from the Burger King in the Boston Commuter Zone at Route 24 Northbound, Bridgewater, MA 02324 to the McDonalds at in the Providence Commuter Zone at 947 Broadway, Raynham, MA 02767. Clearly this Burger King and McDonalds are more likely to compete for employees, despite being in different commuter zones, than two restaurants of the same brands in the Boston commuter zone located more than 4 hours of commuting time apart.

[12] See WSAG press releases at https://www.atg.wa.gov/news/news-releases/. The WASG press release listed dozens of franchise brands, but 20 were in Rhode Island or southwest Florida from July 2018 to May 2019 and identified as QSRs according to FRANdata 2018, "Franchise Registry", retrieved October 8, 2019, https://franchiseregistry.com/. The franchise brands that eliminated no-poaching clauses included 118 of the 305 F-QSR locations in Rhode Island and 1,139 of the 2,569 F-QSR locations in southwest Florida.

restrictions are in the contract between the franchisee and the franchisor. These no-poach clauses do not restrict hiring across franchise brands.[13] Franchisees are independent restaurant owners and therefore, like other separate businesses, have independent business incentives. At the same time, franchisees must run their F-QSRs within the limits set by their franchise agreement. There is no indication that the independent franchisees coordinate their human resource activities outside of their "vertical" agreement with the franchisors.[14] This is distinct from other branded restaurants that are owned by one company or owned by the branded company, such as a Starbucks, where human resource operations fall within a single company's control, making coordination across locations permissible, and perhaps functionally required, to comply with labor laws.[15]

On September 27, 2017, the NYT published an article (byline Rachel Abrams) about low wages in the F-QSR industry, citing Krueger and Ashenfelter (2017), dated September 29, 2017,[16] which noted the widespread use of no-poaching clauses and provided an empirical example that suggested QSR labor markets could change from "a very high degree of competition" without no-poaching clauses, to "a high degree of employer concentration" with no-poaching clauses. Citing Krueger and Ashenfelter (2017) about the widespread use of no-poaching clauses among franchise brands, Senators E. Warren and C. Booker sent a letter to the Department of Justice in late November or early December, 2017 asking the Department of Justice to review no-poaching clauses, including their wage-suppressing effect.[17] A February 28, 2018 press release by Senator Booker announced that Senators Booker and Warren

[13] However, franchisors can own multiple franchise brands. For example, Yum! Brands, Inc. owns and operates Taco Bell, KFC and Pizza Hut in US. This means that, regardless of no-poaching, clauses the single multibrand owner may also not recruit employees across his own multibrand locations See https://www.yum.com/wps/portal/yumbrands/Yumbrands/company .

[14] The U.S. Department of Justice recently observed that although an agreement among a brand's franchisees not to compete for workers would be a *per se* antitrust violation, no-poaching agreements are vertical agreements and "[h]ere, there is no indication that the plaintiffs have successfully pleaded the existence of a [horizontal coordination] "rim" on which to base the "hub-and-spoke conspiracy." It was not aware of evidence of such horizontal agreements. United States' Corrected Statement of Interest, Joseph Stigar v. Dough Dough, Inc., United States District Court, Eastern District of Washington, March 8, 2019, P. 21.

[15] For example, antidiscrimination laws in some states prohibit pay differentials across a company's establishments within certain geographical areas, such as states or counties, if caused/associated with variations in the gender composition of the work force. This likely requires exchange of information about wages across establishments within a company. See California's Fair Pay Act (SB 358; Labor Code § 1197.5) and Equal Pay Provision of the New York State Labor Law Article 6, §194.

[16] The New York Times on September 27, 1917 provided a weblink that eventually linked to a working paper dated September 29, 2019.

[17] Letter from Senators Warren and Booker to Jeff Sessions, November 21, 2017, https://www.warren.senate.gov/files/documents/2017_11_21_No_Poach.pdf.

introduced legislation to ban no-poaching clauses in franchise agreements.[18] In March 2018, a franchise industry publication noted that no-poaching clauses were being investigated.[19] The WSAG announced in July 2018 that it had started investigating no-poaching clauses at F-QSRs "earlier in the year," and by then had already obtained agreements from five F-QSRs to stop enforcing no-poaching clauses.[20] With similar announcements in September and October 2018, two and a half months after the WSAG announced it was investigating no-poaching clauses in F-QSRs, the WSAG had obtained agreements from franchisors of 18 F-QSR brands, in Rhode Island or Florida, encompassing thousands of individual restaurants, to stop enforcing no-poaching clauses, not only in Washington State, but in Florida, Rhode Island and across the entire United States.[21,22] The series of announcements, between July and October 2018, removed no-poaching clauses from 1,330 F-QSR locations, in the geographies we study here, Rhode Island (and adjacent Massachusetts and Connecticut towns) and southwest Florida. The WSAG announced in November 2018 that one F-QSR brand with 2 locations had agreed to stop enforcement, and in May 2019 another brand with 5 locations had agreed to stop enforcement or no-poaching clauses. The vast majority of F-QSR locations that had no-poaching clauses in June 2018 agreed to stop enforcing them by October 2018.

This elimination of the no-poaching clauses was widespread, unexpected prior to 2018, or even the second quarter of 2018, and virtually completed for the F-QSR industry by October 2018, leaving approximately 74 percent of F-QSR locations and 86 percent of QSR locations in the regions in our analysis, and possibly across the United States, without no-poaching clauses.

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[18] Senator Cory Booker, February 28, 2018, *Booker, Warren Introduce Bill to Crack Down on Collusive "No Poach" Agreements* at https://www.booker.senate.gov/?p=press_release&id=760. Senators Booker and Warren re-introduced their bill (S. 2215) in the new session of Congress on July 23, 2019. https://www.congress.gov/bill/116th-congress/senate-bill/2215/text.

[19] Janet Sparks, March 19, 2018, *Anti-Poaching Clause in Franchise Agreements Is a Big Risk for Franchisors*, https://www.bluemaumau.org/story/2018/03/19/anti-poaching-clause-franchise-agreements-big-risk-franchisors.

[20] WSAG, July 12, 2018 *AG Ferguson Announces Fast-Food Chains Will End Restrictions On Low-Wage Workers Nationwide*, at https://www.atg.wa.gov/news/news-releases/ag-ferguson-announces-fast-food-chains-will-end-restrictions-low-wage-workers.

[21] On March 12, 2019 the Pennsylvania State Attorney General announced the elimination of no-poaching at Dunkin', Arby's, Five Guys and Little Caesars, https://www.attorneygeneral.gov/taking-action/press-releases/ag-shapiro-secures-win-for-workers-as-four-fast-food-chains-agree-to-end-use-of-no-poach-agreements/. Dunkin' is not listed as a QSR according to FranData; the other 3 chains were in earlier announcements of WSAG, and hence already incorporated in to our model.

[22] WSAG also negotiated the end of no-poaching clauses for other types of franchised businesses, see for example, https://www.atg.wa.gov/news/news-releases/ag-ferguson-announces-major-milestones-initiative-eliminate-no-poach-clauses, where the WSAG had been "Extending anti-no-poach campaign beyond fast-food".

II. Empirical Design and Evaluation

Our choice of the F-QSR industry is based on several factors. First, the F-QSR industry is used in previous research about wages and no-poaching clauses (Card and Krueger, 1994; Krueger and Ashenfelter, 2017; Levy and Tardiff, 2018), as well as discussed in the popular press (Abrams, NYT, (September 27, 2017); Lerner, Hollywood, Gore, Bloomberg Law (August 29, 2018); Stein, Washington Post (2018)), by regulators (WSAG, Press Release July 17, 2018), and private litigators (Deslandes v. McDonald (2017)). Second, many of the public and private legal actions about no-poaching clauses are about the F-QSR industry, claiming that the F-QSR industry is a distinct labor market, and that any training obtained in that market is only valuable within F-QSR labor market, or even only within a particular franchise brand.[23] Krueger and Ashenfelter (2017) uses F-QSRs in their "Empirical Example" and is widely cited for the claim that no-poaching clauses increase concentration within the F-QSR industry, reduce job opportunities, and result in lower wages.[24] Third, quick service restaurant workers make up over 35 percent of the restaurant workers in the US.[25] Fourth, for some states, including Rhode Island and Florida, public records provide the name and location of restaurants, including F-QSRs, in publicly available, centralized, electronic, governmental databases.[26] Fifth, the street addresses of QSRs (including both F-QSRs and independent QSRs) are available through online map searches and restaurant webpages. Sixth, wages for QSRs by county are available quarterly form the Bureau of Labor Statistics in the Quarterly Census of Employment and Wages ("QCEW") database, formerly called the ES-202 files. The QCEW data reflect the experience of workers covered by unemployment-insurance and are from payroll tax records. They include all covered employees within in a county. This data has been used widely in the analysis of employee wages in the fast food industry (see, for example, Card and Krueger (2000); Dube, Lester, Reich (2010); Webber (2015)). We use quarterly QCEW data for employees at QSRs.[27]

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[23] See, for example, Deslandes v. McDonalds, Memorandum Opinion and Order, U.S. District Court for the Northern District of Illinois, Eastern Division, Case No. C 4875, June 25, 2018; The State of Washington v. Jersey Mike's Franchise Systems, Inc, *et al*, October 15, 2018, Section D, Pp. 11-13, stating that "Employment with Non-Jersey Mike's Brands is Not a Reasonable Substitute for Jersey Mike's Workers."

[24] See, for example, Rachel Abrams, September 27, 2017, "Why Aren't Paychecks Growing? A Burger-Joint Clause Offers a Clue," *The New York Times*. Retrieved from https://www.nytimes.com/2017/09/27/business/pay-growth-fast-food-hiring.html. The BLS refers to this industry as limited service restaurants.

[25] Based on Quarterly Census of Employment and Wages (QCEW) data obtained from the Bureau of Labor Statistics, AACG calculates that limited service restaurant workers make up over 35 percent of the restaurant workers in the U.S.

[26] For Rhode Island, see http://www.health.ri.gov/lists/licensees/; for Florida, see http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92.

[27] The BLS refers to this industry as limited service restaurants.

Yearly turnover of workers in 2018 for the QSR industry is estimated by industry sources to be 150% per year,[28] and to be 74.9% per year for the broader "Accommodation and food services" category reported by the Bureau of Labor Statistics.[29]Our measure of concentration is the Labor-Group-Specific Index (LI) defined in Levy and Tardiff (2018).[30]

$$LI_i^j = \left(100\frac{n_i^j}{N_i^j}\right)^2 + (N_i^j - n_i^j)\left(100\frac{1}{N_i^j}\right)^2,$$

where LI_i^j is the LI measurement of a reference location i for j radial miles;

n_i^j is the number of employer locations within j radial miles of center location i (including self), that are in the same chain as i and have a no-poaching clause;

and N_i^j is the number of F-QSR locations (of any brand) within j radial miles of reference location i (including self).

The LI job concentration is a squared measure of concentration, like a Herfindahl-Hirschman Index ("HHI"), but measured individually for the labor market j miles around each of i restaurant locations based on job opportunities within that distance from the specific restaurant. For example, if a F-QSR has two other F-QSRs located within j radial miles of it, one of its own brand and one of another brand, that F-QSR location has an LI of 5,556 within that geographic area.[31] The LI ranges from near-zero (very many competing employers) to 10,000 (only a single employer or employer group). If there are 50 F-QSRs in a county, we calculate 50 individual LIs for the F-QSRs in that county. The relevant alternative job opportunities for each of the 50 F-QSRs within that county will likely exclude some of the restaurants within that county and include some F-QSRs outside of the county less than j radial miles from one or more of the F-QSRs in the county. This new concentration measure provides a robust and improve statistic for the relevant job opportunities faced by employees at each F-QSR.

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[28] https://www.cnbc.com/2019/08/29/fast-food-restaurants-in-america-are-losing-100percent-of-workers-every-year.html downloaded 2020 01 18

[29] Bureau of Labor Statistics 2018, https://www.bls.gov/news.release/jolts.t16.htm.

[30] When no-poaching clauses are prohibited and/or a chain does not have a no-poaching clause, $LI_i^j = \frac{10{,}000}{N_i^j}$.

[31] Labor Group-Specific Index = the sum of the squares of the market share (based on locations) of each competing entity. With a no-poaching clause in effect, a franchised QSR that competes with two others within j mile(s), one of its own-brand, and one of another, will result in a LI of 10,000 x $[(2/3)^2 + (1/3)^2] = 5{,}556$ for that individual restaurant. Once the no-poaching clause is eliminated the employees at that same restaurant function in a labor market with an LI of 10,000 x $[(1/3)^2 + (1/3)^2 + (1/3)^2] = 3{,}333 = 10{,}000/3$.

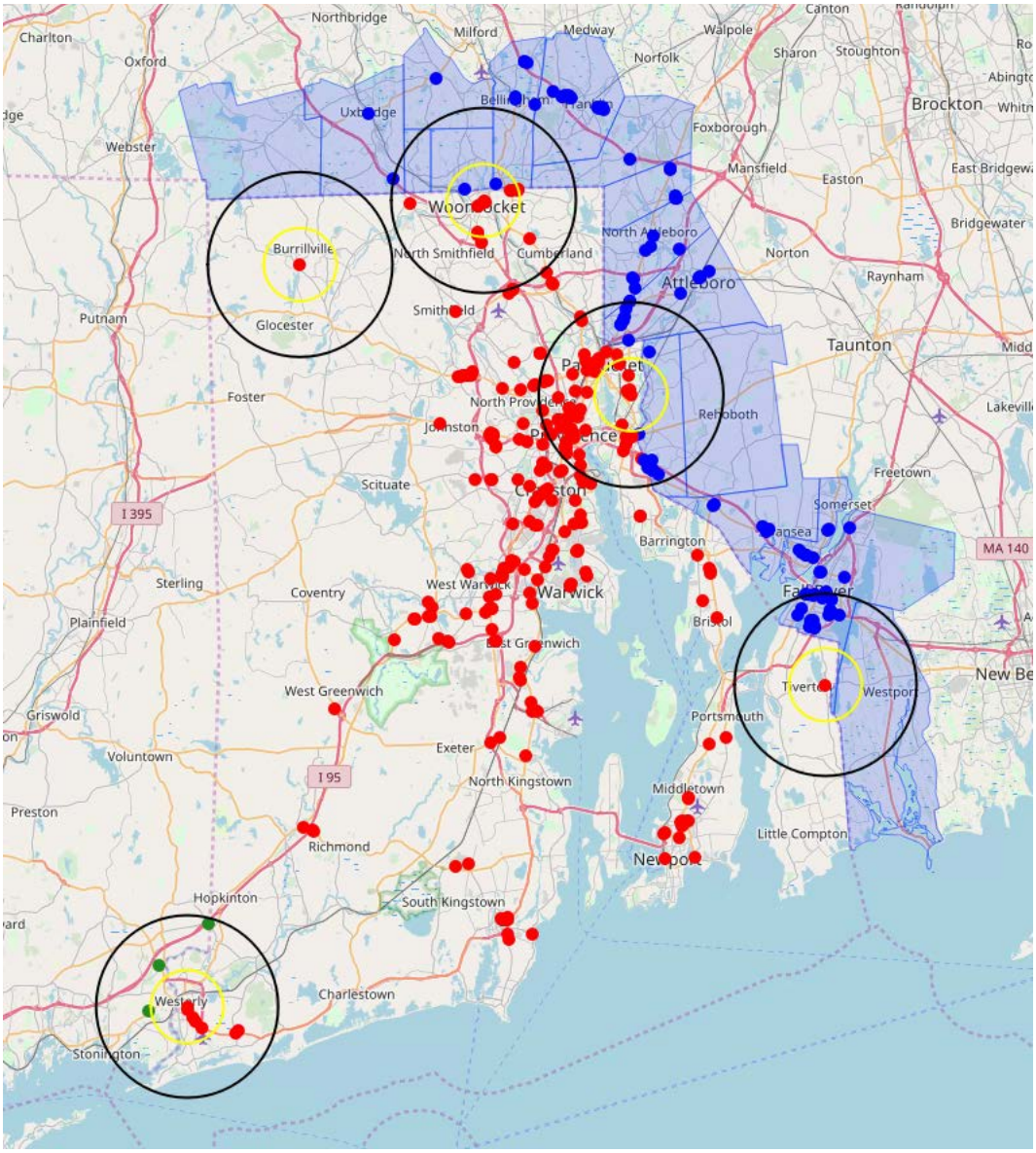
We define the Labor-Group-Specific Total Index (LTI) for a county with the average LI for the total F-QSRs within the county.

$$LTI_k^j = \frac{\sum_{i \in k} LI_i^j}{N_k},$$

where LTI_k^j is the LTI measurement of a county k using a radius of j for each component LI_i^j; and N_k is the number of F-QSR locations in county k.

We use the county-wide LTI for our regression analysis of the effect of concentration on wages, below.

Map 1 shows the location of 305 F-QSRs in Rhode Island (in red) and for Massachusetts (in blue) and Connecticut (in green).



Map 1: F-QSRs in Rhode Island or within 5 Miles of a Rhode Island F-QSR

Sources: 1) http://www.health.ri.gov/lists/licensees/; 2) Google Map and geolocation API; 3) https://www.franchiseregistry.com/; 4) OpenStreetMap for base map. Location of 305 F-QSRs in Rhode Island as of September 4, 2018 (addresses from Rhode Island Department of Health) and November 2019 (geolocation via Google API) for Massachusetts and Connecticut.

Our previous work, Levy and Tardiff (2018), used 262 F-QSRs in assessing the methods of Krueger and Ashenfelter (2017), which used a smaller set of 261 F-QSRs. Here, we use a set of 305 F-QSRs that more accurately reflect the F-QSRs that exist in Rhode Island because we are interested in

determining the actual effect of no-poaching clauses on concentration and wages for F-QSR worker wages, rather than simply assessing the methods used in Krueger and Ashenfelter (2017).[32]

The larger black and smaller yellow circles are, respectively, 5-mile and 2-mile radii around a few selected F-QSRs in RI. Clearly many of the F-QSRs in RI (marked in red) are located close to towns in Massachusetts (MA), shaded blue. Therefore, to determine the number of F-QSRs within a geographic labor market, we include F-QSRs in Massachusetts (blue dots) and Connecticut (green dots) when they are within the radius used to define the labor market. Because there were 305 franchised QSRs in RI, there are 305 LI's calculated for each definition of the geographic market size determined by various radial distances from each of the 305 F-QSRs in RI. We identified 435 F-QSR, including those in MA and CT towns within the 5-miles of any of the 305 RI F-QSRs. We include all of these 435 F-QSRs to calculate the LIs for the 305 RI F-QSRs that fell within the radial distance used to define the labor market.

We obtained QSR locations in RI from RI State health records.[33] We obtained the list of F-QSRs in RI from FRANdata's on-line database.[34] We are not aware of a state-wide database for the QSRs or restaurants in MA. We obtain our location data for MA and CT F-QSRs by searching QSR corporate websites for MA locations and performing Google searches by geographic zones within 5 miles of any RI F-QSR in CT.

We do not know the labor market commuting distance for F-QSR workers, and therefore, we perform our analysis for a range of radial distances. For RI we used 0.5 miles, 1 mile, 2 miles, 3 miles, and 5 miles. In southwest FL, we added the set of 10 miles, 20 miles, and 30 miles. The set of labor market radii for each of the F-QSRs in southwest FL fall within state boundaries. Map 2 shows the 1,884 F-QSRs in the 10 southwest FL counties[35] we analyzed, marked in red, with additional F-QSRs (potentially competing employers) in counties with some F-QSRs within 30 miles of at least one of the F-QSRs within the 10 counties, marked in blue. Based on this definition, we used data about F-QSRs from 19 counties to analyze the change in wages at QSRs within 10 counties.

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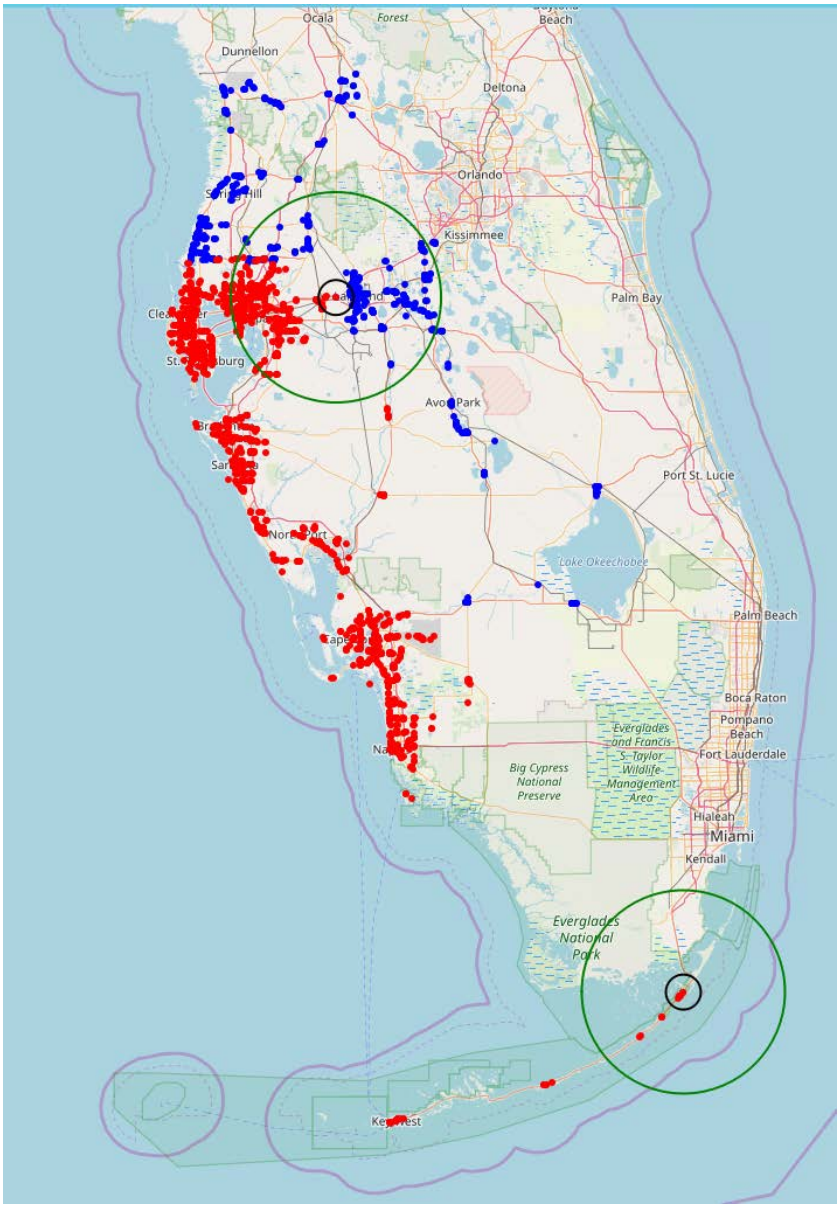
[32] By reviewing FRANdata and data from Rhode Island Department of Health as of July 17, 2018, we identified 39 F-QSR brands, which include brands not identified by Krueger and Ashenfelter, who did not analyze brands with fewer than 500 locations nationwide. Our data include 261 locations among the 20 brands that we included in our previous analysis and an additional 44 locations for the 19 brands not included in Krueger and Ashenfelter (2017).

[33] http://www.health.ri.gov/lists/licensees/

[34] https://www.franchiseregistry.com/

[35] The labor markets analyzed are centered in the 10 following counties of Florida: Charlotte, Collier, DeSoto, Hardee, Hillsborough, Lee County, FL; Manatee, Monroe, Pinellas, and Sarasota County, FL.



Map 2: F-QSRs in Southwest Florida or within 30 Miles of a Southwest Florida F-QSR

Sources: 1) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92; 2) Google Map and geolocation API; 3) https://www.franchiseregistry.com/; 4) OpenStreetMap for base map.

To provide an idea of scale compared to RI, the small black circle on Key Largo (south of Miami) is a five-mile radius. The larger green circle is a 30-mile radius. A similar pair of black and green circles is centered on a F-QSR in the eastern portion of one of the 10 counties analyzed. Much of extreme southwest, mainland Florida (mainland Monroe County) has little, to no, human population or F-QSRs.

We obtained the location of F-QSRs from Florida State licensing records.[36] As for RI, we obtained the list of the names of F-QSR from FRANdata's on-line database. For both RI and FL, we standardized the names of the restaurants in the states' databases to match them to the F-QSR database obtained from FRANdata.

The radius of the labor market influences the measure of concentration. We use a range of radii to test the sensitivity of our analysis. Of course, F-QSR labor markets based on smaller radii are "nested" within all labor markets defined with larger radii centered on the same F-QSR location. Therefore, some consistency of results is expected across the radial labor market definitions, and the markets of differing radii should not be considered independent samples.

Statistical identification of the effect of no-poaching clauses in the F-QSR industry is obtained from the following features of the elimination of no-poaching clauses, structure of the QSR industry, and available explanatory variables. First, as described above, the elimination of no-poaching clauses in the QSR industry was not long-anticipated, occurred nation-wide and was not the result of a validation of a broader upward trend in wages, as is often mentioned about minimum-wage regulations, which could have introduced endogeneity bias.

Second, the timing, speed, nature of the instigation, and simultaneous elimination of those no-poaching clauses across the entire United States makes the change, and the alteration of job concentration resulting from it, exogenous from any local, or even national, change in wages that could drive reverse causality-type of endogeneity bias. In addition, the franchised QSR industry exhibits variation in job market concentration in three dimensions 1) QSR concentration within county, 2) QSR brand distribution within county, and 3) the change in QSR concentration due to the elimination of no-poaching by location and county. This variation results from differences in the geographic density of F-QSRs, and F-QSR brand mix. Even where the density of overall F-QSRs is similar, there is variation in the density of *brands* across counties. Because the concentrative effect from no-poaching clauses is based on the restriction of employee movement *within* a brand, geographies with the same density of F-QSRs, but differing numbers of F-QSR's within each brand, will have differing measures of job concentration under effective no-poaching clauses. After the no-poaching clauses are removed, say from an entire county, geographic areas with the same number of F-QSRs as each other, regardless of brand configuration, have the same measure of job concentration. The brand designation no longer has an impact on job opportunities and hence on concentration. This means that the elimination of some or all no-poaching clauses not only changes concentration over time, but changes it differently over time for geographies that

[36] http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

differ in F-QSR density and also for geographies with the same F-QSR density, but with differing distributions of brands. Our statistical analysis in Section IV takes advantage of the cross-sectional and time-series variation caused by the exogenous change in no-poaching clause enforcement.

We perform various regression models, including first-difference models over time, where change in job density varies exogenously due to the elimination of no-poaching clauses, to the exclusion of any county-specific differences or variation in other variables omitted from the regression that might vary over longer time, such as population density, or" regional GDP" in a way that is temporally unrelated to the change in no-poaching clauses. Also, we perform our analysis separately for RI and FL, further limiting the effect of any cross-sectional variation in macro-economic factors on our estimate of the effect of changes in job concentration on wages. We also perform a variant of our analysis for a single quarter over the year to test whether our results change based on the potential that enforcement of no-poaching clauses stopped sometime after the investigation of no-poaching clauses started, but not necessarily as each brand's elimination of no-poaching was announced (See Appendix B, Table B6).

The WSAG continued to announce agreements to stop enforcement of no-poaching clauses in businesses other than F-QSRs into 2019. In various robustness tests of our model, we include measures of GDP, population by geographic area and unemployment rates to reduce concerns about the effect that omitted variables, which could be correlated with changes in job market density, change in wage, QSR density and these relatively slow changing variables, may have on our estimate of interest (See Appendix B, Tables B3 and B4). We believe that our main analysis, based on first-difference models, also effectively reduce the same omitted variable problems, providing better estimates without inflating the standard errors of the estimates greatly.

III. Effect of No-Poaching Clauses on Labor Market Concentration

In this section, we analyze the effect of no-poaching clauses on the concentration of F-QSR jobs within the counties in Rhode Island and southwest Florida. Figure 1 shows both the level of concentration of F-QSR jobs within a three-mile radius from each of the 305 F-QSR in Rhode Island and the increase in concentration at each of those F-QSRS due to no-poaching clauses. Similar graphs for RI labor markets of differing radii are in Appendix A.

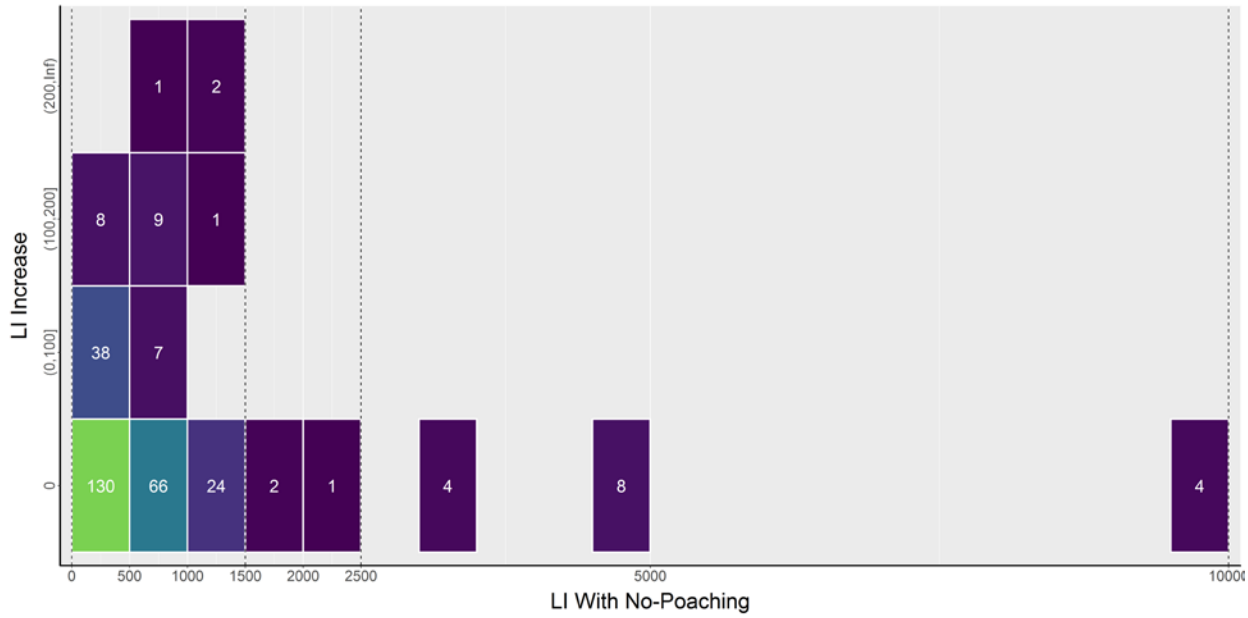


Fig. 1: LI Increase vs. LI With No-Poaching Clause: 305 F-QSR locations in Rhode Island, Radius 3-miles

Sources: Calculations by Authors based on 1) http://www.health.ri.gov/lists/licensees/; 2) Google Map and geolocation API; 3) https://www.franchiseregistry.com/; 4) https://www.atg.wa.gov/pressrelease.aspx.

The horizontal axis is the LI before the elimination of no-poaching clauses. The vertical axis is the increase in LI due to no-poaching clauses. Each box contains the number of F-QSRs that fit the combination of characteristics on each axis. Lighter colored boxes represent higher counts as specifically listed in the box. For example, the 130 listed in the light green box at the bottom left indicates that 130 out of 305 F-QSR locations in RI had an LI of less than 500 with no-poaching clauses, and zero increase in concentration (LI) due to no-poaching clauses.[37] The greatest increase in LI due to no-poaching clauses is in right-hand box in the top row with a LI between 1,000 and 1,500. One of those two F-QSRs had an increase in LI of 416.67, rising from 783 to 1,200 due to no-poaching clauses. The other F-QSR in that box had an increase in LI of 247, rising to 1,358 due to no-poaching clauses.

As Figure 1 shows, for a labor market radius of three miles the increase in LI due to no-poaching clauses is predominantly among F-QSRs that have what is equivalent to more than 10 other employment options of equal size (LI of 1,000 or less), even with no-poaching clauses within the F-QSR industry. This is without considering additional employment options, such as at independent QSRs, among others. The majority of F-QSRs (over 57%) have the equivalent of more than 20 F-QSRs available as employers (LI of 500 or less), even with no-poaching clauses in place. Four F-QSRs in RI do not have another F-

[37] For these 130 locations, there were at least 20 QSRs within 3 miles, with none of these locations belonging to the same brand.

QSR within 3 miles (LI of 10,000), but obviously, therefore, were unaffected by no-poaching clauses. The labor market concentration for any F-QSR in RI with a LI of over 1,500, with no-poaching clause in place, was unaffected by no-poaching clauses because there was no other F-QSR of the same brand within 3 miles of its location. 1,500 is listed at the low end of moderate concern in the DoJ/FTC merger guideline, as referenced by Krueger and Ashenfelter (2017) as their justification for saying the F-QSR industry was highly concentrated by no-poaching clauses. [38] One F-QSR in RI (observable in the graphs in Appendix A) does not have another F-QSR within 5 miles. 284 of the 305 F-QSRs were unaffected by no-poaching clauses, based on the 3-mile labor market definition. As can be seen in Appendix A, even based on a 5-mile labor market radius, 214 of the 305 F-QSRs are unaffected by no-poaching clauses. All of the F-QSRs that were affected at the 5-mile labor market definition have an ending LI of under 1,000, and only 15 of those have an increase in LI of over 100, due to no-poaching clauses.

Figure 1 does not include non-franchised QSRs, other restaurants, or other employment locations that compete within the same labor pool as with F-QSRs. Figure 1 *does* include F-QSRs that did not have no-poaching clauses prior to the recent interest in them.[39] The elimination of no-poaching clauses does not alter the job opportunities of employees at F-QSRs that did not have them, and therefore the F-QSRs that did not have no-poaching clauses appear on the bottom row of Figure 1 along with F-QSRs that did not have another FQSR of a like brand located within 3 miles. The inclusion of additional employers of any type can only reduce the measured effect of no-poaching clauses on the *change* in concentration of jobs even where their inclusion might increase labor market concentration due to what would have to be the addition of a relatively large number of locations controlled by a small number of employers. This means that to the extent that other restaurants or even jobs in other industries should be included in the analysis, the *change* in LI due to no-poaching clauses will be even smaller than presented in Figure 1. This result is detailed in Appendix C. Additional Figures in Appendix A provide similar results. In general, where the concentration (LI) of F-QSR jobs is high there is little to no increase in concentration due to the no-poaching clauses.

[38] DoJ/FTC (2010) Merger Guidelines list moderate concentration as between 1,500 and 2,500. However, Krueger and Ashenfelter (2017) classify their calculation of a concentration index of 1,678 resulting from no-poaching clauses as "a high degree of employer concentration in this labor market."

[39] F-QSRs that were not in the FranData list of F-QSRs used by K&A and which were never identified by the WSAG as having their no-poaching clause eliminated are assumed to have an active no-poaching clause.

Figure 2 shows the same information for the 10 counties in southwest Florida.

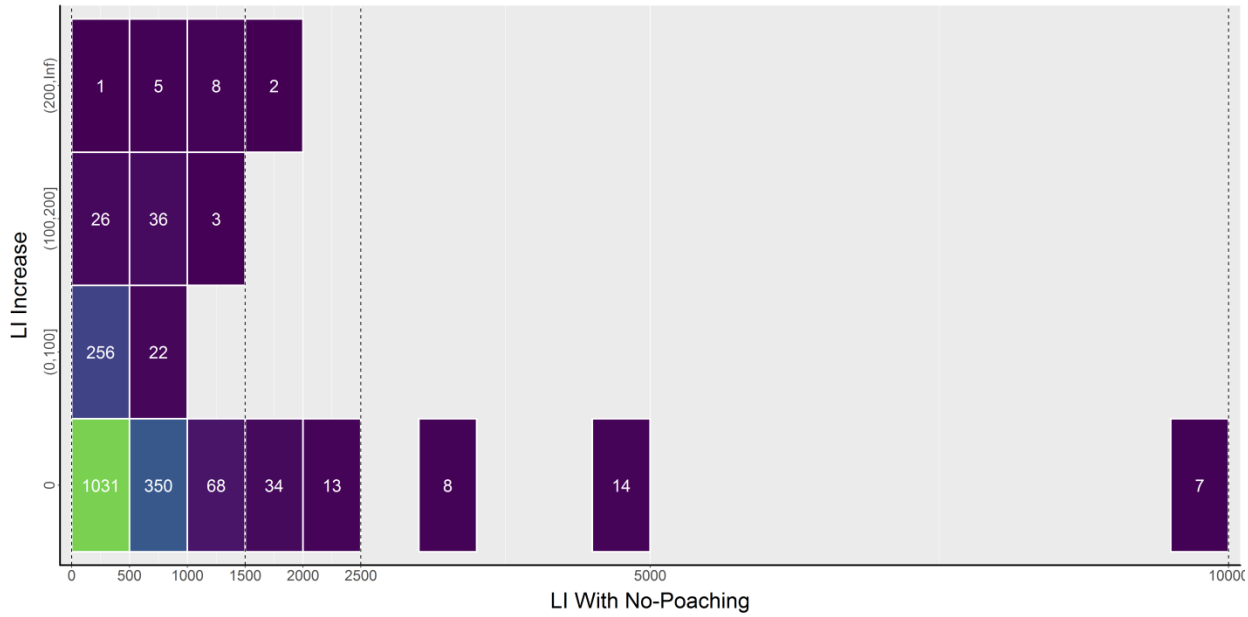


Fig. 2: LI Increase vs. LI With No-Poaching Clause: 1,884 F-QSR locations in Southwest Florida, Radius 3-miles

Sources: Calculations by Authors based on 1) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92; 2) Google Map and geolocation API; 3) https://www.franchiseregistry.com/; 4) https://www.atg.wa.gov/pressrelease.aspx .

Again, the results in Figure 2 are for labor markets of three-mile radius from each F-QSR in the 10 counties of Florida. Again, the large majority of LIs are relatively low and where the LI is high, there is no increase in LI due to the no-poaching clause. Of the 1,884 F-QSRs listed in Figure 2, only 78 have a final LI, with no-poaching in place, of 1,500 or more. Of those78, 76 (in the bottom row, greater than 1.500 LI) are unaffected by no-poaching clauses because there is no F-QSR of the same brand within 3 miles of their location. This leaves only two of the 1,884 F-QSRs (top row, above 1,500 LI) in the 10 southwest counties of Florida that have a final LI of 1,500 and some increase in concentration.

As with RI, variations in the distance of market area around each F-QSR in FL on which the LIs are calculated change the analysis. Variants of Figure 2 for other radii around each F-QSR are presented in Appendix A. The radius chosen impacts the LI, the number of F-QSRs affected by no-poaching clauses and the magnitude of the change in LI for each F-QSR due to no-poaching clauses. For larger radii there tend to be higher counts of the change in LI due to no-poaching clauses, but the LIs even with the no-poaching clause are low. For example, within labor markets based on 10-mile radii, no F-QSR of the 1,884 has an increase in LI of over 200, due to a no-poaching clause, that results in an LI over 1,500. Furthermore, only 2 F-QSRs have an increase of over 200, and only 8 F-QSRs have an LI of over 1,500 (all less than 2,000) and none of those 8 are affected by no-poaching clauses.

Overall, the job opportunities in the F-QSR industry, in the areas studied, were not highly concentrated with no-poaching clauses in place and did not exhibit a large increase due to no-poaching clauses. Although the change in concentration due to no-poaching clauses in these markets was not large, in the next Section we also directly analyze the effect of no-poaching clauses on wages of workers in QSRs in the same counties of RI and FL analyzed above.

IV. Effect of No-Poaching Clauses on Wages

As discussed above the timing, rapidity, and reason for the elimination of no-poaching for a large number of F-QSRs across the country allows the effect of changes in concentration, in the range produced by no-poaching clauses, on wages to be identified. The change in no-poaching clauses reduced concentration over time in many counties, but not all. This change differed in timing and magnitude across counties, depending on the density and brand configuration of F-QSRs across counties.

The dependent variable in our regressions is the county-specific wages for QSRs over time and across counties obtained from the QCEW dataset of the Bureau of Labor Statistics.[40] They are for a broader group of QSRs containing F-QSRs. The independent variable of interest is the LTI, which is the average of the LIs for the F-QSRs defined above. If no-poaching clauses increase market power to the detriment of workers' wages, the elimination of no-poaching clauses, resulting in the lower concentration, claimed by the Krueger and Ashenfelter (2017) and WSAG (2018) among others, should increase wages for F-QSRs and for QSRs on average. In that case, the coefficient on LTI in our regressions would be negative. It is also possible that labor-savings/labor-sparing efficiencies from human capital explanations could result in an increase in wages due to the elimination of no-poaching clauses, not for anticompetitive market power reasons, but rather potentially due to competitive market conditions and inelastic demand for labor services.[41] A positive effect of LTI (concentration) on wages would be consistent only with a dominant human capital or efficiency-enhancing effect of no-poaching clauses on wages. Both the anti-competitive market power effect and the competitive market, human capital/efficiency effect could occur concurrently.

Our basic regression analysis is of the form Wage= f (LTI, county fixed-effects, county-specific time-trend, county-specific quarter, controls):

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[40] https://www.bls.gov/cew/

[41] For example, see Gary S. Becker, "Investment in Human Capital: A Theoretical Analysis," *The Journal of Political Economy* ,1962, Vol. LXX, No. 5, Part 2, which discusses the effect of training on marginal product. If the demand for labor tasks is inelastic, training could cause wages of laborers in general to fall.

$$Wage_{k,t} = \alpha_0 + \beta_1 LTI^j_{k,t} + \alpha_{k-1} County_{k-1} + \gamma_k Trend_{k,t} + \varphi_{kQ-1} Quarter_{k,t} + \delta_5 Controls + \varepsilon_{k,t},$$

where $LTI^j_{k,t}$ is the Labor-Group-Specific Total Index of a county k at time t, using a radius of j for each component $LI^j_{i,t}$;

$County_{k-1}$ is the county fixed-effect for k-1 counties;

$Trend_{k,t}$ is the county-specific linear time trend of county k at time t;

$Quarter_{k,t}$ is the county-specific indicator of quarter of county k at time t;

and $Controls$ are the control variables.

We perform regressions separately for RI and FL because these regions exhibit differing seasonal wage patterns and more generally because different markets may react differently to changes in labor market concentration. Appendix A also lists a fixed-effect model with a dummy variable for counties and each time period, and a first-difference model with dummy variables for time periods. We also report results from fixed-effect and first-difference models of other variants, including additional demographic and economic variables that may be correlated in the time trend with LTI. As we will see, the qualitative results are stable under these variants.

Below we provide summary information about the variables of interest in our regression. Figures 3A and 3B plot the changes in wages over time in the counties of RI and FL, respectively, used in our regressions.[42]

[42] Bristol County, RI is omitted from the regressions (and the other tables in this section) because the Bureau of Labor Statistics does not provide wage data for that county, due to small numbers of employers and confidentiality concerns.

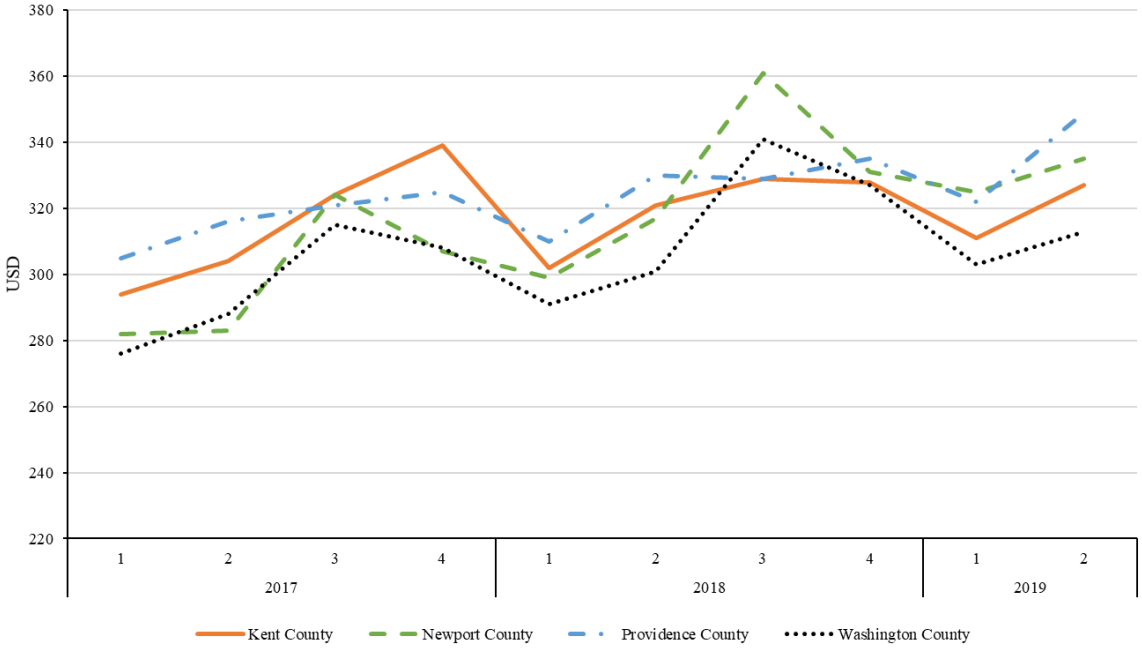

Fig 3A. Average Weekly Wages by County in Rhode Island: 2017:Q1 - 2019:Q2

Source: Quarterly Census of Employment and Wages

There is a clear seasonality to the QSR wages in RI with higher wages paid in the summer quarters. There also appears to be a trend in wages over time prior to the elimination of no-poaching clauses. We control for this trend, and differences in levels, at the county-level in our regressions.

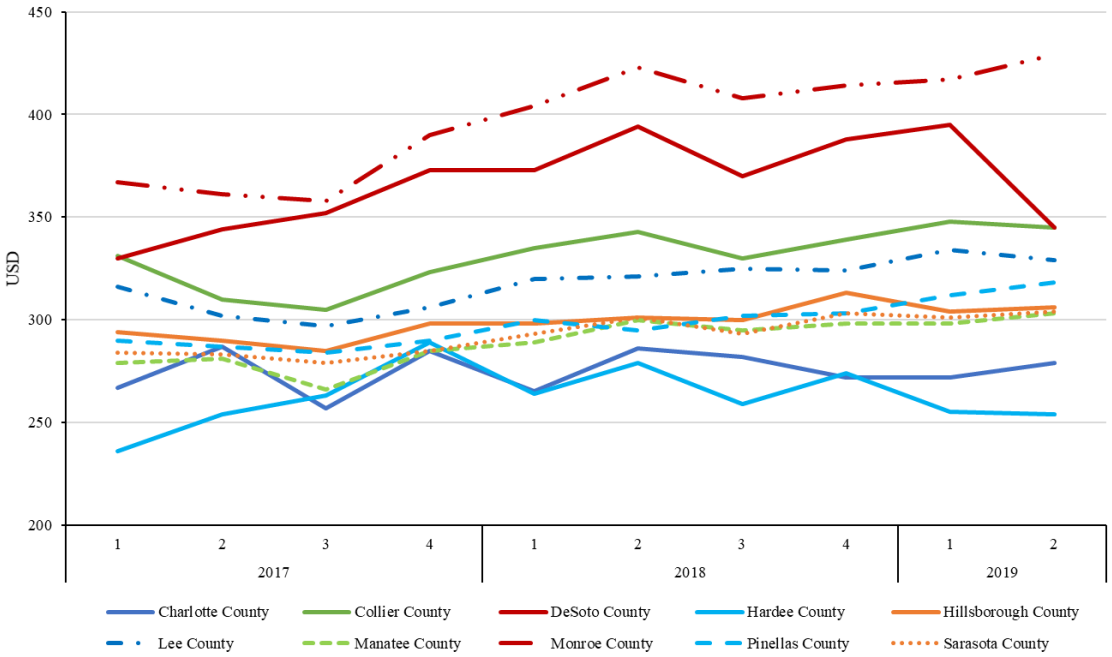

Fig 3B. Average Weekly Wages by County in Southwest Florida: 2017:Q1 - 2019:Q2

Source: Quarterly Census of Employment and Wages

The ten southwest Florida counties do not exhibit such a clear, consistent seasonal pattern in wages as those in Rhode Island. There is also notable dispersion in the wage levels across counties. Again, there is a trend in wages over time prior to the elimination of no-poaching clauses. Levels of wages and trends are controlled for in our regressions.

Table 1 lists the LTI levels at 3 miles for each of the counties in RI and FL over time.

Table 1
LTI By County: 3 Mile Radius

County	2018 Q2 and Before	2018 Q3	2018 Q4	2019 Q1	2019 Q2
Rhode Island					
Kent County	570.8	562.2	560.4	560.4	560.4
Newport County	1,367.8	1,356.9	1,356.9	1,356.9	1,356.9
Providence County	527.6	505.7	503.5	503.5	503.5
Washington County	2,117.1	2,111.3	2,111.3	2,111.3	2,111.3
Southwest Florida					
Charlotte County	1,177.6	1,173.0	1,173.0	1,173.0	1,173.0
Collier County	873.8	861.4	861.4	861.4	861.4
DeSoto County	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Hardee County	1,111.1	1,111.1	1,111.1	1,111.1	1,111.1
Hillsborough County	384.6	373.5	373.3	373.3	373.3
Lee County	663.7	654.4	654.4	654.4	654.4
Manatee County	670.5	649.5	647.2	647.2	647.2
Monroe County	1,641.7	1,641.7	1,641.7	1,641.7	1,641.7
Pinellas County	316.2	305.8	305.4	305.4	305.4
Sarasota County	562.5	542.4	541.6	541.6	541.6

Source: Authors' Calculation

As discussed in Section III, there is relatively little change in concentration due to no-poaching clauses. This is seen looking across the LTIs for a given county. Early in 2018:Q3, the WSAG announced that it had obtained agreements from 5 F-QSR brands to eliminate no-poaching clauses.[43] We calculated the LTI measure of concentration based on the F-QSRs within those franchises as separate employers after that announcement, reflecting the fact that they have agreed to not enforce the no-poaching clause. For each following quarter through 2019:Q2, the remaining F-QSRs with no-poaching clauses continue to be counted as having functioning no-poaching clauses until the WSAG issued an announcement that their brand agreed to eliminate no-poaching clauses.[44] Following their initial announcement, the WSAG continued to issue announcements of elimination of no-poaching clauses at

[43] The 5 F-QSR brands are: Arby's, Auntie Anne's, Carl's Jr., Jimmy John's and McDonald's. See https://www.atg.wa.gov/news/news-releases/ag-ferguson-announces-fast-food-chains-will-end-restrictions-low-wage-workers.

[44] Appendix Tables B3 and B4 present an alternative model based only Q2 data for each year to analyze the effect of no-poaching clauses before and after the no-poaching clauses were in effect and avoids issue of timing of agreements vs announcement dates.

additional F-QSR brands on August 20, 2018; September 13, 2018; October 15, 2018; November 21, 2018; and May 14, 2019.[45] DeSoto, Hardee, and Monroe Counties in Florida experienced no change in LTI over this time based on a three-mile labor market. This is because they did not have two or more F-QSRs of the same brand that eliminated no-poaching clauses within three miles of each other through the second quarter of 2019. Table 2 lists the change in LTI for each county over the period of 2018:Q2 to 2019:Q2 at various labor market radii.

Table 2
Summary of LTI Changes

County	LTI Change due to Elimination of No-Poaching Clauses					
	2 Miles	3 Miles	5 Miles	10 Miles	20 Miles	30 Miles
Rhode Island						
Kent County	-1.0	-10.4	-10.5	N/A	N/A	N/A
Newport County	-16.8	-10.9	-7.3	N/A	N/A	N/A
Providence County	-14.2	-24.1	-22.9	N/A	N/A	N/A
Washington County	0.0	-5.7	-4.7	N/A	N/A	N/A
Southwest Florida						
Charlotte County	0.0	-4.6	-12.1	-12.2	-14.4	-17.3
Collier County	-19.2	-12.4	-11.8	-12.2	-13.3	-13.8
DeSoto County	0.0	0.0	0.0	0.0	-13.9	-18.3
Hardee County	0.0	0.0	0.0	0.0	-30.2	-32.0
Hillsborough County	-8.0	-11.2	-12.4	-12.9	-12.9	-13.7
Lee County	-6.4	-9.3	-15.2	-17.6	-16.8	-16.9
Manatee County	-14.9	-23.2	-20.0	-20.3	-19.6	-19.0
Monroe County	0.0	0.0	0.0	-26.6	-32.0	-31.1
Pinellas County	-7.4	-10.8	-11.1	-12.4	-12.9	-13.2
Sarasota County	-1.3	-20.9	-20.5	-19.3	-20.8	-20.2

Source: Authors' Calculation

Note:
(1) The change is for the time period up to 2019 Q2.

[45] The WSAG's office announced elimination of no-poaching clauses at additional franchises that are not included here for one or more of the following reasons: 1) The franchise was not a F-QSRs, 2) not a F-QSR brand present in either RI or southwest FL, or 3) or the elimination of no-poaching clause for that franchise was issued later than 2019Q2. For a full list of announcements, see https://www.atg.wa.gov/pressrelease.aspx.

As stated above, the appropriate choice of radii depends on how far laborers will travel for work. Since we do not know the appropriate radius for labor markets, we provide our analysis based on each of the radii listed in Table 2.

Table 3 provides additional summary statistics for each county in our analysis, including the average wage, the LTI at various labor market radii, population, and the number and ratio of F-QSRs to QSRs by county.

Table 3
Summary Statistics

County	Average Weekly Wage of Limited Service Restaurants (USD)	Average Weekly Wage of All Industries (USD)	LTI						Population (Thousands)	Population Density (Per Square Mile)	Young Population (15-34) Share (%)	Number of Franchised QSR Restaurants	Franchised QSR Restaurants/Limited Service Restaurants (%)[1]
			2 Miles	3 Miles	5 Miles	10 Miles	20 Miles	30 Miles					
Rhode Island													
Kent County	317.9	905.9	962.6	566.8	267.6	N/A	N/A	N/A	163.8	985.9	24.1	66	43%
	(14.4)	(45.3)	(0.5)	(5.1)	(5.1)				(0.1)		(0.1)		
Newport County	316.4	864.3	1,859.9	1,363.4	655.5	N/A	N/A	N/A	83.0	809.5	25.9	19	23%
	(24.4)	(367.4)	(8.7)	(5.6)	(3.8)				(0.5)		(0.1)		
Providence County	324.2	1,045.3	1,012.5	518.2	222.5	N/A	N/A	N/A	636.7	1,530.3	29.7	177	35%
	(12.7)	(64.3)	(7.2)	(12.2)	(11.5)				(0.7)		(0.1)		
Washington County	306.3	871.8	2,505.4	2,114.8	981.1	N/A	N/A	N/A	126.2	385.7	28.3	35	33%
	(19.1)	(85.5)	(0.0)	(3.0)	(2.3)				(0.0)		(0.4)		
Southwest Florida													
Charlotte County	275.2	718.5	1,561.8	1,175.8	614.6	188.0	89.6	48.9	183.5	235.2	14.8	73	82%
	(10.2)	(30.3)	(0.0)	(2.4)	(6.2)	(6.2)	(7.3)	(8.7)	(1.6)		(0.4)		
Collier County	330.9	905.7	1,300.3	868.9	529.7	196.3	86.9	47.4	375.7	160.9	19.2	135	57%
	(14.5)	(48.4)	(9.9)	(6.4)	(6.1)	(6.3)	(6.8)	(7.1)	(3.0)		(0.0)		
DeSoto County	366.4	669.3	1,000.0	1,000.0	1,000.0	1,000.0	425.3	93.8	N/A	54.7	N/A	10	56%
	(22.7)	(26.4)	(0.0)	(0.0)	(0.0)	(0.0)	(6.8)	(9.2)					
Hardee County	262.7	635.4	1,901.2	1,111.1	1,111.1	1,111.1	365.1	109.8	N/A	43.5	N/A	9	82%
	(15.0)	(35.7)	(0.0)	(0.0)	(0.0)	(0.0)	(15.6)	(16.5)					
Hillsborough County	298.9	1,036.5	738.0	380.1	157.7	64.1	29.6	24.7	1,422.7	1,204.9	28.0	617	59%
	(8.0)	(58.7)	(4.1)	(5.8)	(6.3)	(6.6)	(6.6)	(7.0)	(15.1)		(0.0)		
Lee County	317.4	817.3	1,133.9	660.0	334.9	90.3	45.2	36.6	746.9	788.7	20.9	305	67%
	(12.1)	(32.3)	(3.3)	(4.8)	(7.7)	(8.9)	(8.5)	(8.5)	(8.2)		(0.1)		
Manatee County	289.4	803.2	1,017.2	661.4	222.2	85.2	56.1	37.1	390.2	434.5	20.4	143	59%
	(11.7)	(24.1)	(7.7)	(11.7)	(10.0)	(10.1)	(9.8)	(9.6)	(5.0)		(0.1)		
Monroe County	397.1	755.1	1,906.6	1,641.7	1,612.9	1,094.5	988.0	969.2	76.0	74.3	20.6	31	37%
	(26.5)	(33.1)	(0.0)	(0.0)	(0.0)	(12.6)	(15.5)	(15.0)	(1.1)		(0.4)		
Pinellas County	298.1	928.4	636.8	311.9	125.6	55.2	29.8	23.5	973.0	3,347.5	21.6	416	50%
	(11.0)	(50.6)	(3.7)	(5.5)	(5.6)	(6.3)	(6.6)	(6.7)	(2.5)		(0.2)		
Sarasota County	292.6	880.4	1,145.4	554.2	285.5	155.1	74.1	55.5	422.9	682.6	16.7	147	64%
	(9.4)	(51.3)	(0.7)	(10.7)	(10.5)	(9.7)	(10.5)	(10.2)	(4.1)		(0.2)		

Sources:
(1) American Community Survey (ACS)
(2) 2010 Decennial Census
(3) Quarterly Census of Employment and Wages
(4) LTIs are based on authors' calculation. See text for details.

Notes:
(1) The percentage is based on the number of limited service restaurants in 2019 Q2.
(2) Population density is based on 2010 Census.
(3) The 1-year ACS estimates are available only for counties with more than 65,000 people. As a result, DeSoto County, FL and Hardee County, FL do not have this information.

The percentage of F-QSRs out of all QSRs differs across counties, listed in the last column. In all counties, F-QSRs are less than 82% of all QSRs. In the most populous and densely populated county in Rhode Island, Providence, only 37% of the QSR are F-QSRs, which in turn are only a portion of all the restaurants in Providence. In southwest Florida, the most populous and most densely populated counties in our analysis, Hillsborough and Pinellas, F-QSRs make up 59% and 50%, respectively, of the total QSRs. This clearly has important implications for the nature of competition for labor in the QSR industry within these counties. Labor market opportunities for F-QSR employees may go far beyond simply the F-QSRs. In addition, it has implications for the interpretation of the effect of changes in concentration on our measure of wages, which is the average weekly wage for QSR employees, including both franchised and independents. For example, if the elimination of no-poaching clauses raised wages in Pinellas County by 20% at F-QSRs, but had no effect on independent QSRs, weekly QSR wages would increase by only 10% because only half of the QSRs in Pinellas are F-QSRs. Laborers in the independent QSR and F-QSR may not be in separate markets. However, some academics, several plaintiffs, and regulators in no-poaching disputes have suggested that F-QSR labor market is separate enough to allow increases in concentration within the F-QSR market, regardless of overall concentration in QSR jobs, to drive wages at F-QSRs or even separately within a single brand of F-QSRs.[46] Alternatively, it is possible that the movement of employees between F-QSRs and independent QSRs is more fluid, or completely fluid, across a single F-QSR and the independent QSR labor market, in which case our analysis would nearly, or completely, reflect the impact of changes in concentration on the employees at franchised and independent QSRs.

Table 4 lists the regression results measuring the effect of changes in concentration due to the elimination of no-poaching clauses on wages.

[46] *Op. cit.* note.23.

Table 4
Regression Results Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.081	0.370*	0.005	0.297	0.012	0.349	0.009	0.349
	(0.046)	(0.153)	(0.170)	(0.140)	(0.213)	(0.197)	(0.200)	(0.185)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	40	36	40	36	40	36	40	36
R-Squared	0.948	0.909	0.948	0.911	0.948	0.912	0.948	0.912

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

The dependent variable for wage in the fixed-effect model (FE) is the "Average Weekly Wage of Limited Services Restaurants" in the second row. "Y" indicates that the set of variables in the left-hand column were included in the regression. "N" indicates that they were not. For the first-difference model (FD), the dependent variable is the "First Difference in Average Weekly Wage of Limited Service Restaurants" in the third row. The coefficient of LTI in the top row is the value reflecting the change in wage for the marginal change in LTI (county LTI concentration). Table 4 shows the results of FE and FD models from market radii from 2 miles to 5 miles for RI, none of which are statistically significant at the 5%-level.[47] Standard errors of the estimates are in the parentheses. These standard errors are less than 0.2 for all the FD models. In Section V we discuss the precision of estimates and the magnitudes of estimates that our model is able to detect.

[47] We leave out Bristol County, RI because the QCEW withheld that data due to the small number of QSR observations, which could compromise the confidentiality of wages at those QSRs.

Clearly, there is no evidence that the decrease in concentration of the magnitude caused by the elimination of no-poaching clauses increased wages in the QSR labor market. We do not present variants based on labor markets of smaller radii due to the small change in LTI in those small geographic market definitions. The FD model has some advantages over the FE models in controlling for both the time varying unobserved characteristics within each county, and the effect of other omitted variables that could generate correlation over time, particularly without macro-economic and demographic variables.[48] Macro-economic and demographic variables are included in Appendix Tables B3 (RI) and B4 (FL).

Table 5 provides similar results for the ten counties in southwest FL, including labor market definitions of additional lager radii from 10- to 30-miles.

Table 5
Regression Results Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	FD Model	FE Model	FD Model	FE Model	FD Model	FE Model	FD Model	FE Model	FD Model	FE Model	FD Model
LTI	-0.419	-0.423	-0.303	-0.357	-0.308*	-0.381	-0.224	-0.320	-0.167	-0.268	-0.168	-0.269
	(0.302)	(0.449)	(0.185)	(0.244)	(0.147)	(0.220)	(0.173)	(0.202)	(0.189)	(0.214)	(0.181)	(0.205)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	100	90	100	90	100	90	100	90	100	90	100	90
R-Squared	0.964	0.655	0.964	0.659	0.964	0.662	0.963	0.658	0.963	0.655	0.963	0.655

Sources:
(1) Quarterly Census of Employment and Wages
(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92
(3) https://www.franchiseregistry.com/
(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614
(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:
(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.
(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.
(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.
(4) Observations are weighted by the number of franchised QSR restaurauts in each county.
(5) The sample period is 2017 Q1 through 2019 Q2.

As in Table 4, the first row of Table 5 lists the coefficient of interest. The second and third rows reflect the dependent variable used in the FE and FD models, respectively. In these southwest counties of Florida, the estimated effects of LTI on wages of QSR workers, like in RI, are statistically insignificant. The statistically insignificant point estimates are negative, whereas in RI they were positive. The

[48] See for example Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*, (South-Western, 2009) Pp.487-488; Joan Monras, "Immigration and Wage Dynamics: Evidence from the Mexican Peso Crisis", Journal of Political Economy, 2019, https://doi.org/10.1086/707764, Page 11.

standard errors of the estimates are not very large, meaning we are able to measure the effect of LTI on wages relatively precisely, but the magnitude of the effect is small.

We perform various sensitivity tests, including log models, and models that include other potential correlates of wages, and using only Q2, thereby including only data from before and after the period (not during) in which F-QSRs would have transitioned to the elimination of no-poaching clauses. This analysis based on Q2 data addresses the concern that F-QSRs may have stopped enforcing the no-poaching clauses and workers used their gained market power at some time prior to the WSAG announcement dates for their particular F-QSR but when it was already clear that the press, legislators and industry analysts were investigating no-poaching clauses. Appendix B Tables B14 and B15 provide results for common FE models that include only county dummies and year-quarter dummies, and FD models that include only year-quarter dummies. The results change little across all of these variants.

We also analyze the largest counties, Pinellas and Hillsborough, separately from the other lower density counties (see Appendix B, Tables B11 and B12). We find that for the smallest radii market definition, 2-miles, the high-density counties show a negative coefficient at the 5%-confidence level in the FE models, but not in the FD models. The effect of LTI on Wages is not statistically significant for other radial definitions of the labor market at the 5%-level. The results for the remaining smaller counties show no statistically significant effect of LTI on wages in any models. We have also provided variants that include one additional quarter at the start of our estimation data and one that excluded a quarter, as a sensitivity test. The results are in Appendix B. The variants of these regressions don't alter our overall conclusions. Lastly, we repeat our analysis using county-wide HHI calculated based on Krueger and Ashenfelter's (2017) method. The change in the magnitude of job concentration caused by no-poaching clauses, again, has no statistically significant effect on wages either.

Table B15 in Appendix B performs the RI and FL regressions in combination. It shows that the results for RI (Table 4, above), are statistically significantly different from those for FL (Table 5, above), in most of the FD models. For labor markets defined as 3, 4, and 5 miles, the positive coefficients in RI are statistically significantly greater (5%-level) than the negative point estimates in FL. In addition, in the combined FD regression (Table B15), the coefficient on LTI is positive and statistically significant at the 5%-level for labor markets defined at 2, and 3 miles and at the 10%-level for 4 and 5 miles. These estimates are consistent with a human capital investment, or other positive wage effect, dominating any potential negative market power effect on wages in RI, but not in FL at least at the 2, and 3 mile the labor market definitions. In the FE models, point estimates in RI and FL are not statistically significantly different from each other (5%-level).

V. Precision of Measured Effect

The standard error of the estimated effect of LTI on QSR wages is 0.140 for the 3-mile labor market FD model shown in Table 4. The changes in LTI listed in Table 2, above, are generally greater than -20. In Kent County the LTI Change is about -10. This means that our FD regressions with standard deviations of the estimated coefficient on LTI of 0.140, are able to detect changes in weekly wages of as little $2.4 per week. In Providence County the change in LTI is -24, which means that for that County we can detect wage difference of as little as $6.8 per week, where the average weekly wage in the QSR industry was about $324.

In Table 5, for southwest Florida, the FD 3-mile estimate of LTI on wages has a standard error of 0.244. The change in LTI in Pinellas and Hillsborough is about -11. This means that our FD regression, with standard error of the estimated coefficient on LTI of .244, is able to detect changes in wages of as little $5 per week.

The results in Tables 4 and 5 yield point estimates that are less than these amounts for the 3-mile labor market definitions. The statistically insignificant findings are not the result of poor precision of our estimates, but due to the small estimated effects of change in LTI on Wages of QSR workers.

VI. Conclusion

Although the effect of no-poaching clauses on wages in the franchised quick service restaurant market has been discussed widely in the press, by courts, regulators, and legislators, this is the first study to rigorously, empirically analyze the effect of no-poaching clauses on wages in the franchised quick service restaurant industry. As of this writing, Congress is discussing legislation that would make no-poaching clauses illegal based on the assertion that no-poaching clauses create significant enough labor market concentration to reduce employees' job opportunities and to, in turn, reduce employees' negotiation power and wages.

In the two geographic regions we investigated, Rhode Island and southwest Florida, there is no evidence that the elimination of no-poaching clauses has had a statistically significant positive effect on wages of quick service restaurant workers. In great part, the lack of effect of job concentration on wages caused by no-poaching clauses may result from the minimal amount of concentration created by no-poaching clauses. It is also possible that no-poaching clauses are not enforced at many franchised quick service restaurants, which would reduce the concentrative effects of no-poaching clauses measured here. It also may be that wage effects of no-poaching clauses within franchised quick service restaurants are simply countered by the large number of job opportunities that workers have across the broader labor

market, eliminating any increment to labor market power that no-poaching clauses at franchised quick service restaurants could provide. In effect, this would mean that the labor market in which employees of franchised quick service restaurant workers compete includes other jobs, perhaps in independent quick service restaurants, other restaurants, or other industries. As we have shown, inclusion of a broader set of employers outside of franchised quick service restaurants in the relevant job market can only further reduce the small concentrative effect of no-poaching clauses in the markets observed here. Furthermore, no-poaching clauses place no limitations on workers entering employment at franchised quick service restaurants, which may also have mitigated the effect of no-poaching clauses.

It could also be that the wage enhancing, human capital aspects of no-poaching clauses are approximately off-setting the enhanced market power that franchisees obtain in Rhode Island and Florida, leaving a net effect that is statistically indistinguishable from zero.

In other regions and markets, no-poaching clauses might cause higher or lower wages for franchised quick service restaurant workers. There may be some geographic labor market that is dominated more heavily by a single, or very few, franchise brands. It is possible that in such a situation, no-poaching clauses would have a significant effect on concentrating job opportunities within franchised quick service restaurants and perhaps the labor market more generally, where restaurants compete for labor. If in addition to few brands of franchised quick service restaurants, there were also no, or few, independent quick service restaurants, few corporate-owned quick service restaurants, and few other jobs in or out of the restaurant/food service industry that employees at franchised quick service restaurants might easily move to, no-poaching clauses could significantly concentrate the control of job opportunities in the hands of a few employers. We are not aware of such markets, and it is not the case for the markets studied here, but that does not mean they do not exist. In Rhode Island there are many corporate-owned Starbucks and two-thirds of all quick service restaurants by location are independents, making it an unlikely candidate. Likely candidates might be in smaller isolated markets, such as smaller towns along highways, with access to few other jobs. Other possibilities exist perhaps.

No-poaching clauses theoretically can have a concentrative effect that negatively impacts workers bargaining power and wages. In those same markets, no-poaching clauses theoretically may also provide a greater incentive for employers to invest in on the job training and human capital of workers. The net effect of the human capital and market power effects, even where no-poaching is likely to have a greater impact, is an empirical issue. This first empirical analysis of the effect of no-poaching clauses on employee wages shows that the concentrative effects in two significant markets, containing more 3,000 franchised quick service restaurants, is negligible, causing no statistically significant negative effect on employee's wages, and ultimately is an empirical issue.

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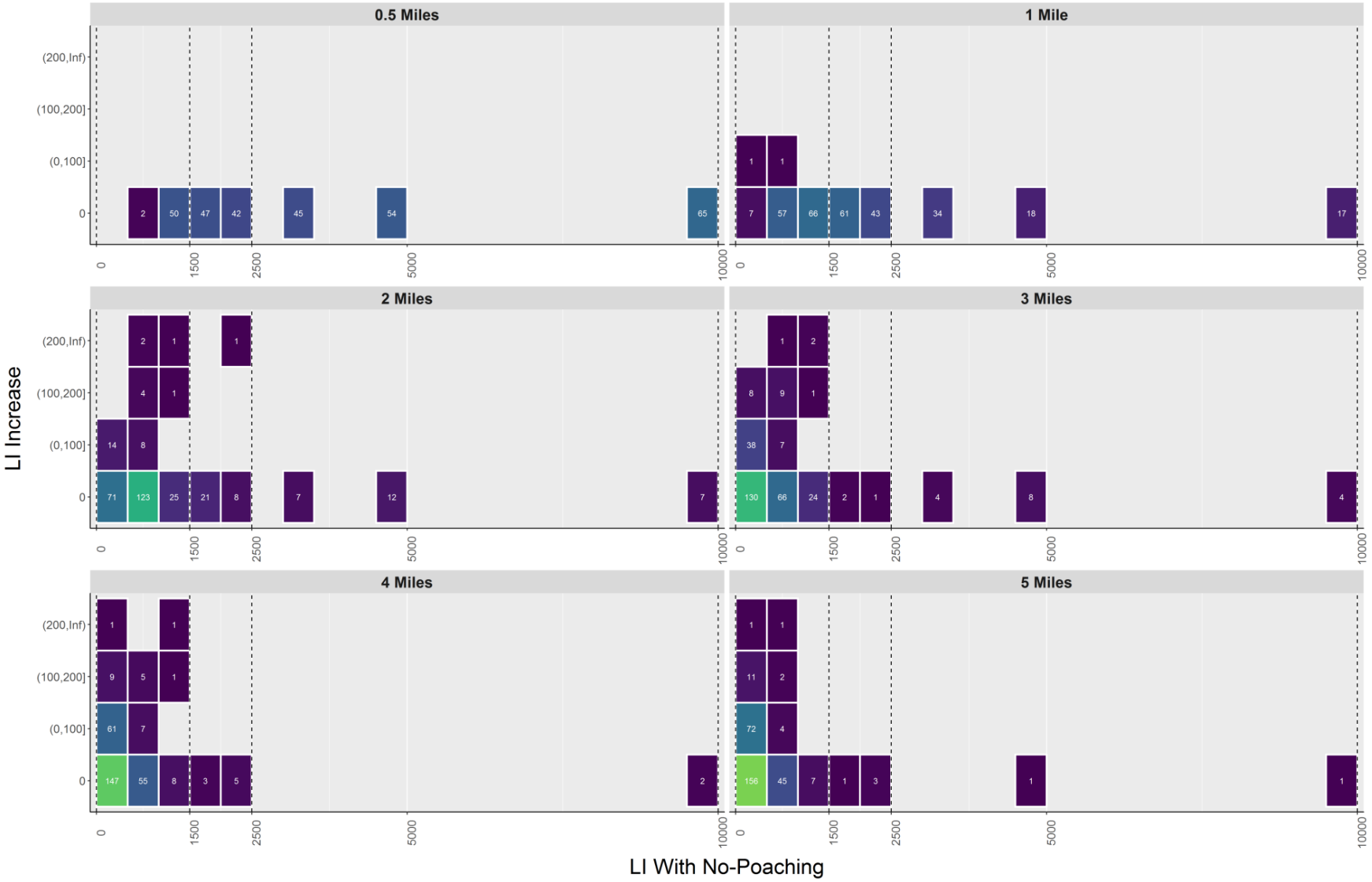
Appendix A: Change in Concentration Graphs for Alternative Labor Market Radii

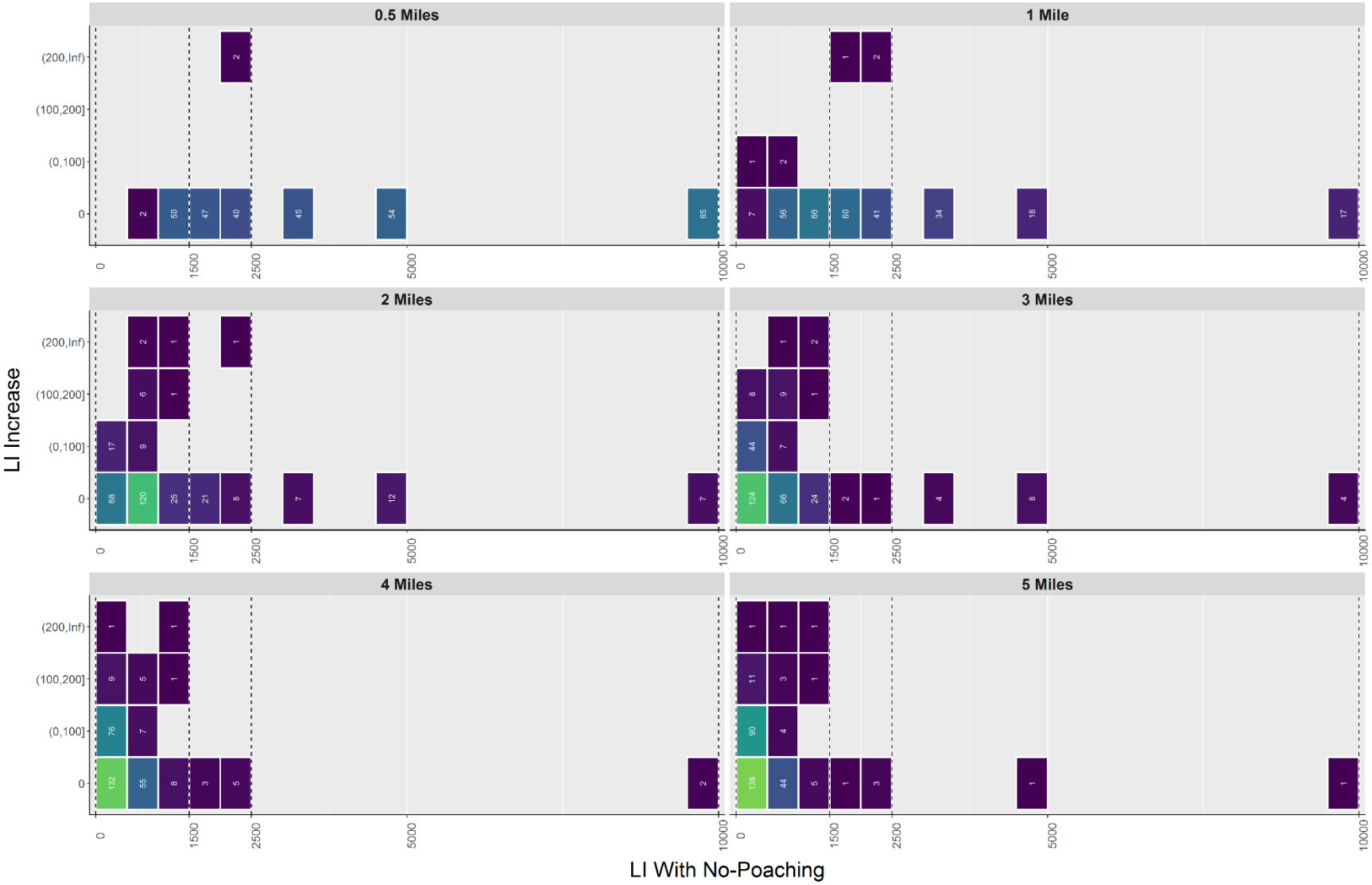
Figure A1: RI LI Increase vs. LI with No-Poaching Clause at Radii from 0.5 to 5 Miles.



Sources: 1) http://www.health.ri.gov/lists/licensees/
2) Google Map and geolocation API;
3) https://www.franchiseregistry.com/;
4) https://www.atg.wa.gov/pressrelease.aspx .

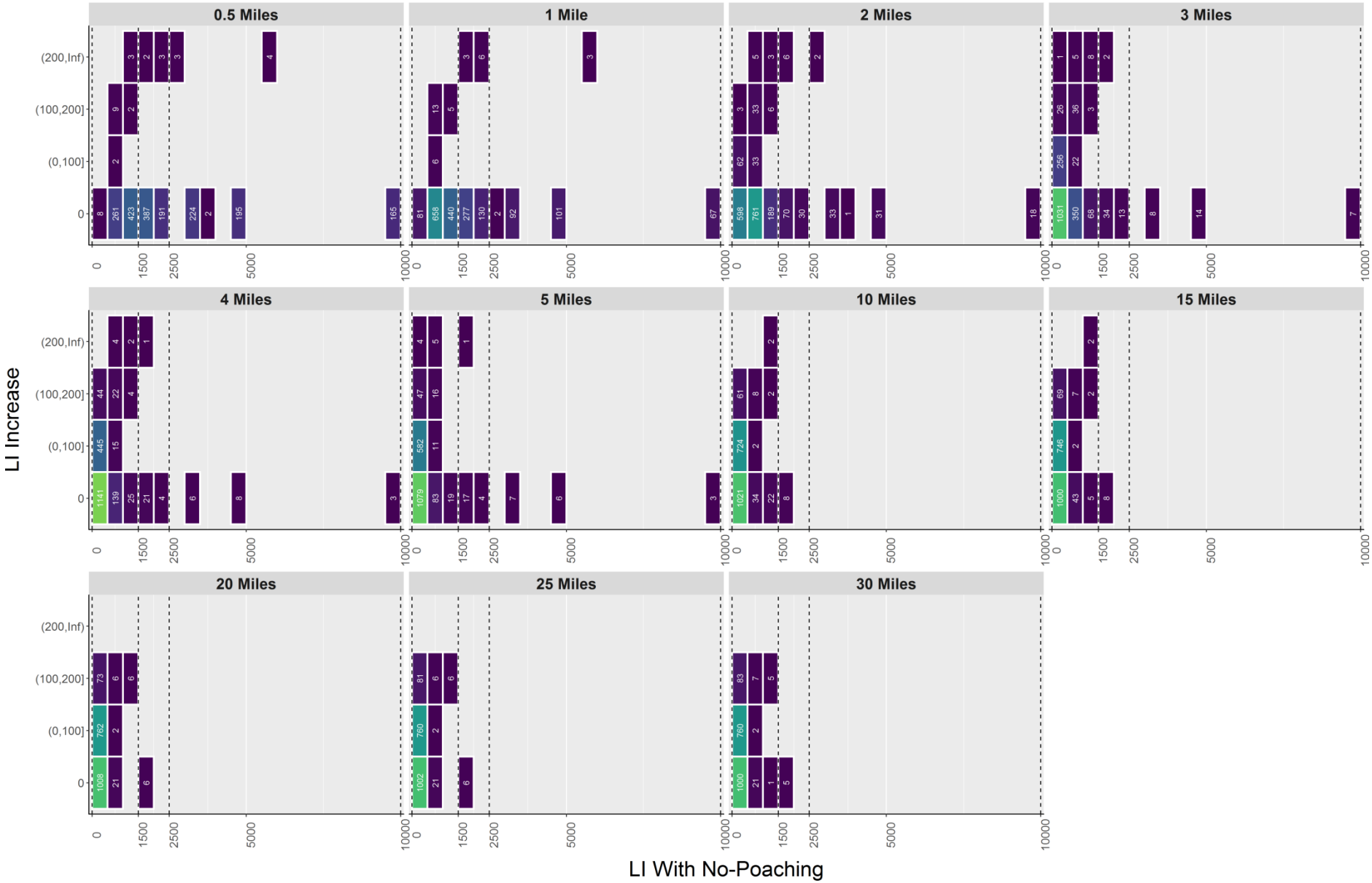
Figure A2: RI LI Increase vs. LI With No-Poaching Clause at Radii from 0.5 to 5 Miles,

Assuming All No-poaching Clauses Were Eliminated, Even Those That Remain Today.



Sources: 1) http://www.health.ri.gov/lists/licensees/
2) Google Map and geolocation API;
3) https://www.franchiseregistry.com/;
4) https://www.atg.wa.gov/pressrelease.aspx .

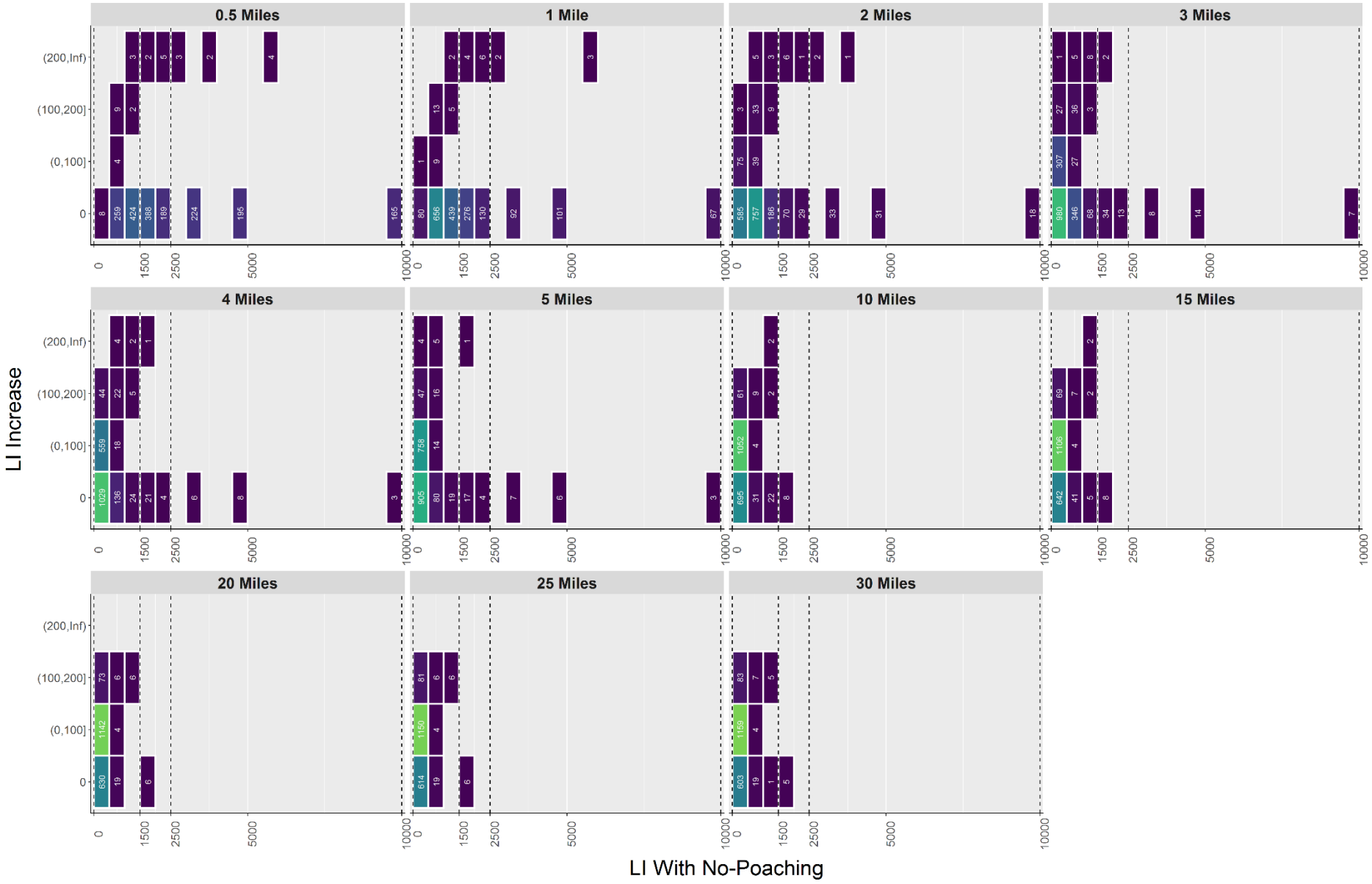
Figure A3: Southwest Florida LI Increase vs. LI With No-Poaching Clause at Radii from 0.5 to 30 miles



Sources: 1) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92;
2) Google Map and geolocation API;
3) https://www.franchiseregistry.com/;
4) https://www.atg.wa.gov/pressrelease.aspx .

Figure A4: Southwest FL LI Increase vs. LI With No-Poaching Clause at Radii from 0.5 to 30 Miles,

Assuming All No-poaching Clauses Were Eliminated, Even Those That Remain Today.



Sources: 1) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92;
2) Google Map and geolocation API;
3) https://www.franchiseregistry.com/;
4) https://www.atg.wa.gov/pressrelease.aspx .

Appendix B: Sensitivity Tests of Regressions

Table B1: Log Models
Regression Results for Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.000	**0.001****	0.000	0.001	0.000	0.001	0.000	0.001
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Log of AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in log of AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	40	36	40	36	40	36	40	36
R-Squared	0.954	0.917	0.954	0.920	0.954	0.920	0.954	0.920

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B2: Log Models
Regression Results for Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.001	-0.002	-0.001	-0.001	-0.001*	-0.001*	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log of AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in log of AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	100	90	100	90	100	90	100	90	100	90	100	90
R-Squared	0.960	0.659	0.960	0.663	0.961	0.667	0.960	0.663	0.959	0.659	0.959	0.660

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B3: Models with Additional Explanatory Variables
Regression Results for Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.486	-0.251	-0.244	-0.127	-0.264	-0.136	-0.267	-0.124
	(0.487)	(0.722)	(0.355)	(0.416)	(0.427)	(0.520)	(0.410)	(0.529)
Population (Thousands)	6.619	2.684	7.114*	2.743	7.105*	2.776	7.079*	2.771
	(3.665)	(3.995)	(2.640)	(3.795)	(2.450)	(3.762)	(2.566)	(3.761)
Young Population(15-34) Share	12.696	28.149	11.001	27.308	11.191	27.130	11.151	26.760
	(22.894)	(58.304)	(19.626)	(54.174)	(19.815)	(53.961)	(20.127)	(54.609)
Average Weekly Wage of All Private Industries	0.082	0.089	0.071	0.085	0.071	0.085	0.071	0.083
	(0.103)	(0.157)	(0.085)	(0.144)	(0.085)	(0.143)	(0.087)	(0.144)
CPI	1.731	1.862	1.698	1.846	1.726	1.851	1.722	1.833
	(0.894)	(1.141)	(1.033)	(1.139)	(1.136)	(1.230)	(1.108)	(1.243)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	38	33	38	33	38	33	38	33
R-Squared	0.966	0.939	0.965	0.939	0.965	0.939	0.965	0.939

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

(6) American Community Survey

(7) CPI for All Urban Consumers (CPI-U), BLS

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) In the FD models, all regressors are first differenced.

(5) For population and yound population share, we extrapolate the 2018 values to 2019 given unavailability of 2019 data.

(6) Observations are weighted by the number of franchised QSR restaurauts in each county.

(7) The sample period is 2017 Q1 through 2019 Q2.

Table B4: Models with Additional Explanatory Variables
Regression Results for Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.447	-0.250	-0.339	-0.233	-0.363*	-0.273	-0.284	-0.226	-0.264	-0.212	-0.269	-0.219
	(0.352)	(0.542)	(0.218)	(0.296)	(0.173)	(0.271)	(0.181)	(0.248)	(0.191)	(0.254)	(0.178)	(0.245)
Population (Thousands)	0.014	0.051	0.021	0.053	0.036	0.053	0.020	0.052	0.015	0.052	0.019	0.052
	(0.127)	(0.143)	(0.113)	(0.141)	(0.105)	(0.142)	(0.117)	(0.142)	(0.119)	(0.141)	(0.119)	(0.142)
Young Population (15-34) Share	16.665	-9.512	16.347	-9.436	16.745	-9.269	17.328	-9.438	17.257	-9.532	17.388	-9.462
	(16.606)	(20.779)	(16.274)	(20.425)	(15.709)	(20.161)	(16.565)	(20.212)	(16.562)	(20.172)	(16.332)	(20.137)
Average Weekly Wage of All Private Industries	0.101	-0.034	0.116	-0.032	0.122	-0.028	0.107	-0.032	0.104	-0.034	0.107	-0.033
	(0.098)	(0.117)	(0.107)	(0.108)	(0.099)	(0.106)	(0.100)	(0.106)	(0.101)	(0.106)	(0.098)	(0.105)
CPI	**1.478****	**1.362****	**1.464****	**1.349****	**1.449****	**1.341****	**1.490****	**1.355****	**1.498****	**1.357****	**1.490****	**1.353****
	(0.546)	(0.499)	(0.537)	(0.479)	(0.520)	(0.472)	(0.532)	(0.480)	(0.534)	(0.481)	(0.532)	(0.481)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	80	72	80	72	80	72	80	72	80	72	80	72
R-Squared	0.983	0.781	0.983	0.784	0.984	0.787	0.983	0.785	0.983	0.784	0.983	0.785

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

(6) American Community Survey

(7) CPI for All Urban Consumers (CPI-U), BLS

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) In the FD models, all regressors are first differenced.

(5) For population and yound population share, we extrapolate the 2018 values to 2019 given unavailability of 2019 data.

(6) Observations are weighted by the number of franchised QSR restaurauts in each county.

(7) The sample period is 2017 Q1 through 2019 Q2.

Table B5: Only Q2
Regression Results for Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.163 (0.488)	-0.163 (0.389)	-0.091 (0.292)	-0.091 (0.233)	-0.089 (0.327)	-0.089 (0.260)	-0.101 (0.302)	-0.101 (0.241)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	12	8	12	8	12	8	12	8
R-Squared	0.990	0.491	0.989	0.486	0.989	0.483	0.990	0.490

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017-2019.

Table B6: Only Q2
Regression Results for Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	0.783	0.783	0.502	0.502	0.476	0.476	0.517	0.517	0.567	0.567	0.554	0.554
	(0.941)	(0.762)	(0.622)	(0.504)	(0.550)	(0.445)	(0.553)	(0.448)	(0.557)	(0.451)	(0.551)	(0.446)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	30	20	30	20	30	20	30	20	30	20	30	20
R-Squared	0.968	0.402	0.967	0.381	0.967	0.385	0.969	0.425	0.972	0.466	0.972	0.466

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017-2019.

Table B7: 2016 Q4 Included
Regression Results for Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.025	0.370*	0.052	0.297	0.065	0.349	0.062	0.349
	(0.087)	(0.146)	(0.161)	(0.135)	(0.202)	(0.189)	(0.190)	(0.177)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	44	40	44	40	44	40	44	40
R-Squared	0.943	0.899	0.943	0.901	0.943	0.902	0.943	0.902

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2016 Q4 through 2019 Q2.

Table B8: 2016 Q4 Included
Regression Results for Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.386	-0.423	-0.296	-0.357	-0.302	-0.381	-0.233	-0.320	-0.166	-0.268	-0.162	-0.269
	(0.379)	(0.431)	(0.213)	(0.235)	(0.184)	(0.211)	(0.191)	(0.194)	(0.207)	(0.205)	(0.201)	(0.197)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	110	100	110	100	110	100	110	100	110	100	110	100
R-Squared	0.958	0.634	0.959	0.637	0.959	0.640	0.958	0.637	0.958	0.634	0.958	0.634

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2016 Q4 through 2019 Q2.

Table B9: 2017 Q1 Excluded
Regression Results for Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	**0.360****	0.370	0.276	0.297	0.294	0.349	0.293	0.349
	(0.062)	(0.162)	(0.202)	(0.149)	(0.245)	(0.209)	(0.236)	(0.196)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	36	32	36	32	36	32	36	32
R-Squared	0.948	0.941	0.951	0.944	0.951	0.945	0.951	0.945

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q2 through 2019 Q2.

Table B10: 2017 Q1 Excluded
Regression Results for Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	0.036	-0.423	-0.018	-0.357	-0.028	-0.381	0.065	-0.320	0.102	-0.268	0.090	-0.269
	(0.386)	(0.474)	(0.191)	(0.258)	(0.167)	(0.232)	(0.219)	(0.213)	(0.225)	(0.226)	(0.217)	(0.216)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	90	80	90	80	90	80	90	80	90	80	90	80
R-Squared	0.969	0.700	0.969	0.705	0.969	0.709	0.969	0.704	0.970	0.700	0.970	0.701

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q2 through 2019 Q2.

Table B11: Regression Results
Southwest Florida High-Density Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	**-0.849****	-0.897	-0.418	-0.407	-0.384	-0.380	-0.370*	-0.389	-0.362*	-0.381	-0.358*	-0.378
	(0.232)	(0.421)	(0.248)	(0.346)	(0.176)	(0.265)	(0.134)	(0.217)	(0.146)	(0.227)	(0.134)	(0.215)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	40	36	40	36	40	36	40	36	40	36	40	36
R-Squared	0.950	0.757	0.946	0.739	0.947	0.740	0.947	0.745	0.947	0.744	0.947	0.745

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Hillsborough County, FL; Lee County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B12: Regression Results
Southwest Florida Low-Density Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.032	-0.008	-0.042	-0.235	-0.057	-0.383	0.210	-0.088	0.313	0.045	0.298	0.023
	(0.131)	(0.543)	(0.061)	(0.385)	(0.103)	(0.539)	(0.366)	(0.572)	(0.338)	(0.525)	(0.337)	(0.523)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	60	54	60	54	60	54	60	54	60	54	60	54
R-Squared	0.970	0.576	0.970	0.580	0.970	0.584	0.971	0.576	0.971	0.576	0.971	0.576

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Manatee County, FL and Monroe County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B13: K&A HHI as Measure of Concentration

	Rhode Island		Southwest Florida	
	FE Model	**FD Model**	**FE Model**	**FD Model**
HHI	0.007	0.025	0.009	-0.002
	(0.030)	(0.039)	(0.028)	(0.028)
AverageWeekly Wage of Limited Service Restaurants	Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N
County FE	Y	Y	Y	Y
Number of Observations	40	36	100	90
R-Squared	0.959	0.929	0.966	0.517

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) http://www.health.ri.gov/lists/licensees/

(4) https://www.franchiseregistry.com/

(5) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(6) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered in RI are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) Counties covered in FL are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(4) The HHI indexes are calculated using K&A (2017) method. Each franchised QSR's "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B14: Common Time Controls
Rhode Island Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.290	0.970	0.126	1.559	0.205	1.719*	0.206	1.703*
	(0.587)	(1.279)	(0.445)	(0.771)	(0.431)	(0.672)	(0.444)	(0.686)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	N	Y	N	Y	N	Y	N
Number of Observations	40	36	40	36	40	36	40	36
R-Squared	0.820	0.705	0.817	0.739	0.818	0.738	0.818	0.744

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.health.ri.gov/lists/licensees/

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B15: Common Time Controls
Southwest Florida Counties

	2 Miles		3 Miles		5 Miles		10 Miles		20 Miles		30 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI	-0.167	0.346	0.048	0.324	0.222	0.251	-0.528	0.164	-0.341	**1.041****	-0.188	**1.317*****
	(0.254)	(0.489)	(0.299)	(0.338)	(0.371)	(0.621)	(0.396)	(0.551)	(0.482)	(0.336)	(0.593)	(0.404)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y		Y		Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
County FE	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Number of Observations	100	90	100	90	100	90	100	90	100	90	100	90
R-Squared	0.938	0.376	0.938	0.375	0.938	0.373	0.940	0.372	0.939	0.386	0.938	0.390

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) https://www.franchiseregistry.com/

(4) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(5) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Table B16: Regression Results
Rhode Island and Southwest Florida Counties

	2 Miles		3 Miles		4 Miles		5 Miles	
	FE Model	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**	**FE Model**	**FD Model**
LTI-Rhode Island	-0.081*	**0.370****	0.005	**0.297****	0.012	0.349*	0.009	0.349*
	(0.041)	(0.137)	(0.153)	(0.126)	(0.191)	(0.177)	(0.180)	(0.166)
LTI-Southwest Florida	-0.419	-0.423	-0.303	-0.357	-0.270	-0.319	-0.308*	-0.381
	(0.299)	(0.445)	(0.183)	(0.242)	(0.186)	(0.230)	(0.146)	(0.218)
AverageWeekly Wage of Limited Service Restaurants	Y		Y		Y		Y	
First Difference in AverageWeekly Wage of Limited Service Restaurants		Y		Y		Y		Y
County-Specific Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
County-Specific Linear Time Trend	Y	N	Y	N	Y	N	Y	N
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Number of Observations	140	126	140	126	140	126	140	126
R-Squared	0.965	0.746	0.965	0.749	0.965	0.747	0.966	0.752
Difference in LTI	-0.338	-0.792	-0.308	-0.654**	-0.283	-0.668**	-0.317	-0.730**
(Southwest Florida-Rhode Island)	(0.302)	(0.465)	(0.238)	(0.273)	(0.267)	(0.290)	(0.231)	(0.274)

Sources:

(1) Quarterly Census of Employment and Wages

(2) http://www.myfloridalicense.com/DBPR/hotels-restaurants/public-records/#1506342906764-aas49b05-4f92

(3) http://www.health.ri.gov/lists/licensees/

(4) https://www.franchiseregistry.com/

(5) Alan B. Krueger and Orley Ashenfelter, "Theory and Evidence on Employer Collusion in the Franchise Sector", 2017, NBER Working Paper #614

(6) https://www.atg.wa.gov/pressrelease.aspx

Notes:

(1) Standard errors are clustered by county. * p<0.1, ** p<0.05, *** p<0.001.

(2) Counties covered in RI are Kent County, RI; Newport County, RI; Providence County, RI and Washington County, RI. Counties covered in FL are Charlotte County, FL; Collier County, FL; DeSoto County, FL; Hardee County, FL; Hillsborough County, FL; Lee County, FL; Manatee County, FL; Monroe County, FL; Pinellas County, FL and Sarasota County, FL.

(3) The LI indexes are calculated for all franchised QSR chains identified based on Frandata. Their "no-poaching" status in each quarter is determined based on K&A (2017) (except for Long John Silver's and Wendy's) and various announcements made by Washington State Attorney General. If a chain was not mentioned, we assumed it had and continues to have "no-poaching" clauses.

(4) Observations are weighted by the number of franchised QSR restaurauts in each county.

(5) The sample period is 2017 Q1 through 2019 Q2.

Appendix C: Effect of Additional Locations on Change in LTI.

In the following we provide a simple proof that adding additional restaurant locations to our analysis outside of the F-QSRs that originally had no-poaching clauses can only reduce the *change* in LI and LTI we calculate in this paper. This means that *change* in the LIs and LTIs we have calculated are upper bound estimates of changed in concentration in the market due to no-poaching clauses if additional employment options are considered part of the market, such as independent QSRs, other restaurant work or even jobs in other industries.

For each franchised fast-food restaurant, define n_1, n_2, n_3, n_4 as follows:

$n_1 =$ the number of franchised restaurants owned by the same owner within the same chain;

$n_2 =$ the number of franchised restaurants owned by different owners within the same chain;

$n_3 =$ the number of franchised restaurants from other chains;

$n_4 =$ the number of other employers that a worker may consider. $n_4 \geq 0$ and unobservable.

$$LI^{no\ poaching} = 100^2 * [\left(\frac{n_1 + n_2}{n_1 + n_2 + n_3}\right)^2 + n_3 \left(\frac{1}{n_1 + n_2 + n_3}\right)^2]$$

$$LI^{\ poaching} = 100^2 * [\left(\frac{n_1}{n_1 + n_2 + n_3}\right)^2 + (n_2 + n_3) \left(\frac{1}{n_1 + n_2 + n_3}\right)^2]$$

$$\Delta LI = LI^{no\ poaching} - LI^{poaching} = 100^2 * \frac{n_2(2n_1 + n_2 - 1)}{(n_1 + n_2 + n_3)^2}$$

$$HHI^{no\ poaching} = 100^2 * [\left(\frac{n_1 + n_2}{n_1 + n_2 + n_3 + n_4}\right)^2 + (n_3 + n_4) \left(\frac{1}{n_1 + n_2 + n_3 + n_4}\right)^2]$$

$$HHI^{\ poaching} = 100^2 * [\left(\frac{n_1}{n_1 + n_2 + n_3 + n_4}\right)^2 + (n_2 + n_3 + n_4) \left(\frac{1}{n_1 + n_2 + n_3 + n_4}\right)^2]$$

$$\Delta HHI = HHI^{no\ poaching} - HHI^{poaching} = 100^2 * \frac{n_2(2n_1 + n_2 - 1)}{(n_1 + n_2 + n_3 + n_4)^2}$$

Therefore, $\Delta LI \geq \Delta HHI$. In other words, ΔLI is the upper bound of the true HHI change.

$Q.E.D.$