

The Operational Consequences of Private Equity Buyouts: Evidence from the Restaurant Industry

Shai Bernstein and Albert Sheen*

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ABSTRACT

Do private equity buyouts disrupt company operations to maximize short-term goals? We document significant operational changes in 103 restaurant chain buyouts between 2002 and 2012 using health inspection records for over 50,000 stores in Florida. Store-level operational practices improve after private equity buyout, as restaurants become cleaner, safer, and better maintained. Supporting a causal interpretation, this effect is stronger in chain-owned stores than in franchised locations -- “twin restaurants” over which private equity owners have limited control. Private equity targets also reduce employee headcount, lower menu prices, and experience a lower likelihood of store closures -- a proxy for poor financial performance. These changes to store-level operations require monitoring, training, and better alignment of worker incentives, suggesting PE firms improve management practices throughout the organization.

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* Shai Bernstein (shaib@stanford.edu) is from Graduate School of Business, Stanford university, and Albert Sheen (asheen@hbs.edu) is from Harvard Business School. We thank John Beshears, Nick Bloom, Victoria Ivashina, Arthur Korteweg, Josh Lerner, Paola Sapienza, Francisco Perez-Gonzalez, Michael Roberts, Jeff Zweibel, ..., and participants at Boston College, Duke, IDC, London Business School, Washington University at St. Louis, Tel University, and Stanford finance brown bags for helpful comments.

The 2012 presidential campaign reignited a long-standing debate over the merits and costs of the private equity (PE) industry. Labor and political leaders often argue that PE transactions are largely financial engineering schemes, adding little operational value. Moreover, PE firms are commonly accused of practicing “strip and flip” strategies, in which portfolio companies’ high leverage cause an excessive focus on short-term financial goals, leading to cost-cutting adversely affecting customers, employees, and the firm as a whole. For example, discussing the recent Burger King acquisition by 3G Capital, a New York Times article argues, “financial engineering has been part of the Burger King story for so long that it’s hard to believe there is still anything worth plucking from its carcass.”¹

Jensen (1989) argues instead that leveraged buyouts are a superior governance form leading to better managed companies. Specifically, PE firms mitigate management agency problems through the disciplinary role of debt, concentrated and active ownership, and high-powered managerial incentives, which lead managers to improve operations. Consistent with this view, a substantial body of literature documents significant improvements in profitability and increases in operating income of buyout targets (e.g., Kaplan (1989), Guo, Hotchkiss, and Song (2008), among others). However, as noted by Kaplan and Stromberg (2009), the decline in capital expenditures found in the literature, raises the possibility that private equity firms may trade off an increase in current cash flows for deterioration in long run operations. Moreover, most of the evidence is based on leveraged buyouts completed before the latest private equity wave.²

¹ “Burger King, the Cash Cow,” New York Times, June 2012

² Transaction activity of private equity buyouts exhibits substantial cyclicity. Transaction values peaked in 1988, fluctuated during the 1990s, and increased dramatically from 2005 to 2007. Afterwards, deal activity decreased substantially in the wake of the financial crisis. During the last wave of private equity transactions, more than

In this work, we explore whether private equity buyouts disrupt firm operations in an attempt to maximize short-term goals. To do so, we focus on a single industry, restaurants, with its unique data and institutional setting, during the recent wave of the private equity buyout activity. We focus on a variety of micro-level operational dimensions to explore the consequences of private equity acquisitions. We find evidence that PE firms are active investors that improve firm operations. The improvements we document require better monitoring, training, and alignment of worker incentives, suggesting PE firms improve management practices throughout the organization.

Identifying whether private equity firms causally affect firm operations is challenging.³ Ideally, we would compare two identical firms: one treated with PE ownership and one untreated. To achieve a close variation of such an experiment, we exploit the dual ownership structure pervasive in the restaurant industry in which, within a chain, stores can be owned by either the parent company or a franchisee. Franchisees are legally independent entities that acquire a turnkey business format from a franchisor, to which royalties and fixed fees are paid. Franchised outlets have the same brand, menus, and appearance as those owned directly by the chain. Beyond such contractual specifications, however, headquarters has limited ability to influence the decision-making of franchisees (Kidwell, Nygaard, and Silkoset, 2007; Vroom and Gimeno, 2007). Hence, this setting allows us to compare *twin* stores that differ only in their ownership structure and thus degree of PE influence.

5,000 private equity transactions occurred globally, with an enterprise value of \$1.6 trillion (in 2007 dollars), accounting for 43 percent of the total real transaction value since 1984 (Kaplan and Stromberg 2009).

³ The standard approach in the literature is to match PE-backed firms with control firms selected using observable characteristics. Such counterfactuals will generate unbiased estimates under the assumption that these characteristics are precisely the ones that led PE to invest in the portfolio company in the first place. Given the lengthy due diligence and high stakes involved, this is quite a strong assumption.

Determining how PE firms affect operations is difficult primarily because data is scarce. PE-backed firms are private companies and therefore not required to disclose financial information. While prior literature has focused mostly on financial statements of companies that either issued public debt or went public, Cohn et al. (2012) illustrate that such an approach leads to biased estimates.⁴ Even absent such biases, financial statements shed light only on aggregate firm performance. We peer into micro-level firm operations through the lens of health inspections, which provide a backstage view of restaurants' operating practices as defined by the Food and Drug Administration (FDA). All restaurants in the United States, public and private, are subject to periodic surprise inspections aimed at identifying threats that may lead to foodborne illnesses.⁵ Restaurants are evaluated on operational practices such as food handling, kitchen maintenance, consumer advising, and employee training. Thus, these inspections provide a unique view of practices and routines employed by restaurant managers.⁶

We compile every restaurant inspection conducted in Florida between 2002 and 2012.⁷ Private equity firms acquired 103 restaurant chains with a presence in Florida over this period, accounting for approximately 3,700 individual restaurants out of over 50,000 in operation.⁸ We first employ a difference-in-difference analysis to explore the overall treatment effect of private equity firms on chain stores. The use of store data allows us to include zip code by year

⁴ Exceptions are papers that focus on non-financial performance margins such as innovation (Lerner, Sorensen and Stromberg 2012), and employment (Davis et al. 2013)

⁵ Each year roughly 48 million people get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases in the United States (Center for Disease Control and Prevention).

⁶ We provide a complete list of practices examined by inspectors in the Appendix.

⁷ Health inspections in the U.S. are commonly conducted at the level of the county. Each county has its own inspection standards and grading system, making cross-county health inspection comparisons difficult. The choice to conduct the study in Florida was motivated by the fact that health inspections in Florida are conducted at the state level, allowing consistent comparison of inspection outcomes across a larger sample.

⁸ Recent buyouts of restaurant chains by private equity funds include Burger King, Sbarro, California Pizza Kitchen, Chilis, Quiznos, PF Changs, Outback Steakhouse, among others.

fixed effects in the analysis, controlling for varying customer demographics and local demand shocks.

Our key result is that restaurants commit fewer health violations after being acquired by a private equity firm. The improvement is concentrated in those practices whose potential hazards are deemed by the FDA most dangerous for customers. The effect remains strong with store fixed effects and when we control for changes in number of employees and number of seats per store. In addition, we show that there are no pre-existing trends in health inspections before private equity takes over, and the treatment effect increases steadily over five years after the private equity buyout.

These operational practices matter. Jin and Leslie (2003) show that a reduction in violations, triggered by the introduction of hygiene quality grade cards, improved store revenue and reduced the number of foodborne illness hospitalizations. We find that such violations are also strongly correlated with customer reviews posted on Yelp.com. Moreover, we show that deterioration in such operational practices is correlated with future likelihood of restaurant closures, a proxy for store profitability.

Why would such practices ever be violated in a restaurant? Arguably, serving food at an appropriate temperature, storing toxic substances properly, or sanitizing food surfaces, are all practices whose implementation is cheap relative to the hazards they entail. Violations arise frequently, however, potentially because workers responsible for the actions are not the ones likely to suffer the consequences. The restaurant manager's role is to mitigate such agency problems and ensure workers internalize the externalities they generate in their actions, implying that managerial practices play an important part in implementing such changes.

Are these operational improvements driven by active PE involvement or mere selection and chain expected trajectory? We find a differential treatment effect within a chain

using the twin restaurants analysis: improvements in health-related practices are concentrated in directly owned restaurants where private equity firms have more influence. This difference holds even when including zip code by year fixed effects, controlling for local demand shocks and varying customer demographics. Moreover, we show that both directly owned stores and franchisees experience similar pre-existing trends prior the PE buyout. These results indicate an active involvement of private equity firms in the operations of their portfolio companies.

Interestingly, we also find evidence of spillover effects, as franchisees located in the same zip code as directly owned restaurants catch up over time and improve their practices as well, in contrast to franchisees located in areas with no proximate directly owned restaurants. This suggests that competitive pressures lead franchisees to adopt the improved practices.

Next, we explore whether these changes are driven by other margins of restaurant operations. Are these improvements accompanied by the hiring of more employees or increases in menu prices? We find the opposite. PE-backed restaurants slightly reduce employee headcount at the store level. Moreover, using a panel of menu from nearly 2,200 restaurant chains from 2005 to 2012, we find that PE-backed restaurants lowered prices relative to those of similar menu items sold by direct competitors.

The evidence so far suggests that private equity acquisitions induce significant operational changes at the level of the individual store. It is natural to wonder whether such changes translate into increased profitability. While we do not observe store-level financial information, we ask whether the likelihood of store closure, a proxy for poor financial performance, changes following the PE buyout. We find that store closure risk declines following the PE buyout. Moreover, this decline is concentrated in directly owned stores, in which PE firms have greater influence, and where operational improvements are largest.

We interpret the results as evidence that private equity ownership improves existing operations by mitigating agency problems through the improvement of management practices in the organization. While we do not observe changes in employee contracts directly, improving such practices in a restaurant chain requires not simply appropriate capital budgeting but rather better training, monitoring, and alignment of worker incentives throughout the chain. In that regard, this paper is related to an extensive literature that explores the consequences of private equity ownership (e.g., Kaplan 1989; Lichtenberg and Siegel 1990; Boucly, Sraer and Thesmar 2011; and John, Lang and Netter 1992). Davis et al. (2013) provide evidence for productivity improvements. Our evidence complements their paper by illustrating that such improvements are potentially driven by better management practices employed in the organization. We also contribute to the literature with a new approach to identifying whether private equity buyouts causally affect their portfolio companies.

A second related literature is that on the impact of human resource management (HRM) on productivity, illustrating a link between management practices and firm performance.⁹ Our findings illustrate that PE firms improve operations management practices, consistent with Bloom, Sadun and Van Reenen (2009) who survey over 4,000 firms in Asia, Europe, and the U.S. to assess their management methods. They show that PE-backed firms are on average the best-managed group in the sample. However, they cannot rule out the possibility that these firms were better managed before private equity takeovers. Our paper is also closely related to Matsa (2011), who explores the impact of leverage on product quality, finding that firms that undertook high leverage appear to degrade their products' quality. Our

⁹ For example, Bartel, Ichniowski, and Shaw, (2007), Black and Lynch (2001), Bloom and Van Reenen (2007), Ichniowski, Shaw, and Prennushi (1997), and Lazear (2000).

contrasting finding may be explained by our focus on the recent wave of private equity buyouts, as the nature of PE buyouts and amounts of leverage taken has changed over time (Guo, Hotchkiss and Song 2011).

The remainder of the paper proceeds as follows. Section I describes the data sources and the nature of health violations. Section II provides empirical results on the impact of private equity on restaurant operations, and Section III concludes.

I. Data description

The data in this analysis is constructed from several sources combining information on PE buyouts (CapitalIQ), health inspection results and restaurant ownership in Florida (Florida Department of Business and Professional Regulation), store level employment (InfoUSA), restaurant menu prices (Datassential) and restaurant consumer reviews (Yelp.com). In this section we also illustrate key characteristics of the health inspection results and their correlation with consumer satisfaction and restaurant closures.

A. Health Inspections

The focus of this paper is on operational practices related to sanitation and food-hazard safety. Such practices are correlated with store revenue (Jin and Leslie 2003), and in section I.C we also show correlation with overall consumer satisfaction and restaurant closures. But safety and sanitation practices are important in their own right, as their violation poses a threat to public health safety. Each year in the U.S. roughly one in six people get sick (48 million people), 128,000 are hospitalized, and 3,000 die of foodborne diseases in the United States (Center for Disease Control and Prevention). Most of these outbreaks originate from commercial food facilities through food held at improper temperature, poor personal

hygiene of workers, food handling, and cross contamination (Collins 1997). Due to such concerns, all restaurants in the United States are subject to periodic health inspections conducted by trained specialists in food service evaluation certified by the Food and Drug Administration. Failed inspections can result in fines, suspensions, and closure.

We gather health inspection data from the Florida Department of Business and Professional Regulation. This data encompasses every restaurant inspection conducted in the state of Florida from 2002 through 2012. U.S. health inspections are typically organized and conducted at the county level, and each county is free to use its own criteria and scoring methodology. There is no common standard used across states and counties. The advantage of using data from Florida is that inspections here are conducted at the state level using consistent criteria, and historical records are available back to 2002. Each record gives the name of the restaurant, the address, the date of the inspection, and lists violations across 58 different operational practices.

Florida health inspections divide violations into critical and non-critical. Critical violations are those “likely to directly contribute to food contamination, illness or environmental degradation.” Examples of critical violations are improper disposal of waste, improper temperatures for cooked or stored food, dirty restrooms, and contaminated food surfaces. Non-critical violations “do not directly relate to foodborne illness risk, but preventive measures are required.” Examples include clean non-food contact surfaces, adequate lighting, clean clothes and hair restraints. A complete description of inspection violations is provided in Appendix A. Inspections fall primarily into three categories: routine surprise, follow-up, and initial setup. We consider only surprise inspections for this study. Follow-ups are arranged in response to violations that need to be fixed and, like startup inspections, occur on known dates, which allow restaurants to put their best foot forward.

B. Other data sources

We supplement the inspection data with restaurant ownership data, also from the Florida Department of Business and Professional Regulation. Restaurants need to renew licensing agreements with the state each year. These licenses, available from 2002 to 2012, provide the name and address of the owner at each restaurant. This allows us to separate restaurant branches into those owned directly by the parent brand, for which the owner name and address coincide with those of the parent firm, and those that have been franchised to independent owners. We incorporate data from InfoUSA, which makes phone calls to establishments to gather, among other data items, the number of full-time equivalent employees. This data is also gathered on an annual basis. Employee count is matched to the inspection database by name, address, and geocode coordinates. We collect median income at the county level from the Bureau of Economic and Business Research (BEBR) at the University of Florida.

We gather restaurant-pricing information from Datassential. This provider samples a representative menu from over 2,000 chains each year from 2005 to 2012. These menus give each item name, food category, and price. Datassential also categorizes each restaurant by price range and cuisine type. We also collect information on restaurant consumer reviews from Yelp.com.

To determine which of these restaurants were acquired by private equity firms, we download from Capital IQ all Leveraged Buyout, Management Buyout, and Secondary LBOs in the restaurant industry. We research each deal to find the names of the restaurant chains

involved and record the date the deal closes. There are 103 separate deals involving 117 distinct brand names and approximately 3,500 individual restaurant locations in Florida.

Table I provides summary statistics on inspections and the restaurant sample. Panel A shows that over 20,000 eating establishments are inspected roughly twice each year.¹⁰ The mean number of critical violations found is 4.5 with a standard deviation of 4.3. Panels B-D show that restaurants acquired by private equity firms are not observably different from restaurants in general. Chains acquired by PE firms have, on average, 175 outlets in Florida. These stores generate 3.8 critical violations per inspection, similar to violation counts in untreated chains with at least 5 stores in Florida. Treated and untreated stores appear similar on employee counts, size, and county income as well. Panel C shows that private equity is present in all types of cuisines, with a greater relative presence in hamburger chains, and panel D shows that treated and untreated chains have similar price distribution.

C. Correlation between health inspections and other restaurant outcomes

Before introducing the impact of private equity, we begin by studying the determinants of restaurant violations generally. In Table II, columns 1 and 3, we regress critical and non-critical violations on various store characteristics. Larger restaurants—those with more seats and employees—have more violations. Richer neighborhoods see fewer violations. The more units in the restaurant chain, the better the inspection outcomes. This may be evidence of professional management; a firm running multiple stores has more experience and better controls and procedures in place to monitor operational practices than a proprietor opening her first store. By cuisine type, Asian establishments fare the worst, while donut shops, ice

¹⁰ We include only those stores for which we have employee and seat counts. There are fewer inspections in 2002 because the data do not cover the entire year.

cream parlors, and beverage stores are the cleanest. These latter categories offer simpler items and less variety, which may explain fewer violations. Columns 2 and 4 add restaurant chain fixed effects and drop chain-invariant variables. The remaining results are unchanged. Interestingly, higher median county income leads to fewer violations even within the same chain.

We extract data from Yelp.com, a consumer review website, to explore whether health-related operational practices are correlated with overall customer satisfaction. People who register as users with Yelp by providing a valid email address can leave star ratings, ranging from 1-5, and comments on restaurants and other businesses. Anyone can read these reviews. In Florida, Yelp reviews are sparse before 2010 and increase significantly by 2012. We thus do not have a sufficient panel structure to examine the impact of PE on consumer satisfaction, but we exploit the cross-sectional correlation between this review-based restaurant quality measure and health violations in Table III, panel A.

For the year 2012, we average at the chain level the number of critical violations found in all inspections for all branches. We also average the number of stars given in Yelp for that chain. Column 1a shows the results of a simple univariate regression of stars on critical violations. The coefficient on critical violations is -0.025 and highly significant. A four-violation increase (one standard deviation) is thus associated with a rating lower by $1/10$ of a star. This is meaningful given that 90% of ratings fall between 2 and 5 stars, and half-stars are associated with significant changes in revenue (Luca 2011). Column 2a adds restaurant price range by cuisine fixed effects (e.g., \$10-\$15 check size – Asian). Violations and customer satisfaction are strongly negatively related even among similar restaurants. Column 3a shows the results of a robustness check requiring at least five Yelp reviews for a restaurant or chain,

and the results remain the same. Columns 4a – 6a add non-critical violations. These are also negatively related to Yelp scores but not as strongly as are critical violations.

This relationship between health-related practices and perceived quality could be a direct effect—customers downrate stores with poor hygiene levels. The correlation may also reflect more broadly that a restaurant that sustains good practices may also perform better on other quality dimensions such as service and food. Both explanations suggest that our findings may have a broader interpretation on customer satisfaction.

Panel B of Table III shows that poor practices are correlated with even more dire outcomes—restaurant closure, a proxy for store profitability.¹¹ For each individual restaurant, we average all inspection scores received each year. We then create the dummy variable *store closure* which equals one in the year a store closes, if it closes. Closure is defined as having no inspection record in a given year or in subsequent years. The inspection database is comprehensive, and every restaurant is inspected at least once and usually twice each year. Thus, if no inspections occur in a given year, we assume it must have closed. In column 1b, we regress store closure on the number of critical violations received in the year of closure and the year before (*lagged annual critical violations*) as well as year and store fixed effects. The coefficient on annual critical violations is 0.001 and highly significant. A one standard deviation increase in critical violations is associated with a nearly ½ percent increase in the likelihood of closure that year. This is not small considering the unconditional likelihood of closure is 7 percent per year, implying a 7.1 percent increase in closure likelihood. The number of violations the prior year has more than double this impact, suggesting that an increase in one standard deviation in critical violations in prior year is associated with almost

¹¹ Mandatory closures that are enforced due to poor health inspections are rare. The closures discussed here are voluntary ones decided by the restaurant owners.

15 percent increase in likelihood of store closure. Non-critical violations, added in columns 2b and 3b, are again not as strong a factor.

II. Results on Private Equity Ownership

A. Health Inspections and Private Equity Ownership

We turn to the relationship between private equity ownership and health violations. We create a variable, *PostPE*, which equals one if an inspection at a particular restaurant occurs after it was acquired by a private equity firm. Panel A of Table IV regresses critical violations on *PostPE*. The sample here consists of all restaurants, not just those purchased by private equity. Year fixed effects are included to pick up any changes in violations over time. Hence, the other restaurants in Florida serve as the counterfactual for PE treated chains. In column 1a chain fixed effects are included to control for different baseline levels of operational standards so that the impact of PE entry can be isolated. The coefficient on *PostPE* is -0.662 and significant at the 1% level. Given that inspections average approximately 4 critical violations, this is a sizable decline of 15%. Is the effect driven by changes in restaurant workforce? Column 2a includes seats and employees as controls, motivated by Table II. The larger the restaurant, the more critical violations, but the *PostPE* coefficient maintains similar magnitude. This suggests that health-related practices improve following the PE acquisition regardless of changes in restaurant size and number of employees.

Critical health violations at the chain fall when private equity takes over. Two distinct effects could drive this. Individual restaurants could be getting cleaner, or poor performing branches could be closing. To explore within-store changes, columns 3a and 4a replace chain fixed effects with individual store fixed effects. The coefficient on *PostPE* remains the same

with slightly lower significance, now at the 5% level, in this stricter test. Thus a given restaurant sees improvement in operational practices.

We introduce an even more precise counterfactual in columns 5a and 6a by replacing year fixed effects with zip code-by-year fixed effects.¹² This specification compares PE treated restaurants to competitors in the same zip code. Restaurants serve different demographics and experience different economic conditions across neighborhoods, possibly leading to different patterns in performance. Even after adjusting for location, critical violations still decline after PE entry.

Panel B of Table IV replaces critical with non-critical violations. In all six specifications, the effect of private equity management is essentially zero. Non-critical violations have a much smaller effect on health outcomes, and as illustrated in Table III, have a much weaker effect on customer satisfaction and store closures. It is not surprising that improvements appear to be concentrated where violated practices matter more.

Figure 1 shows the path of critical and non-critical violations around private equity takeover. The red bars plot the coefficients of a regression in which critical violations are regressed on private equity entry event year dummies¹³. Violations are flat in the three years before PE entry. Thus there does not appear to be a pre-deal trend. This helps mitigate endogeneity concerns that private equity was simply capitalizing on a trend of improved health and sanitation. The decline in critical violations then occurs steadily over the subsequent four years (becoming statistically significant in year 3 onward). This is consistent with anecdotal

¹² In practice, it is computationally difficult to estimate a regression that has so many layers of fixed effects. Fortunately, algorithms have recently been developed that can handle such high-dimensional fixed effect regressions. In our analysis, we use the iterative algorithm of Guimaraes and Portugal (2010). See Gormley and Matsa (2013).

¹³ This regression include store fixed effects, zip code by year fixed effects, log number of seats and log number of employees. The regression results are in the Appendix, Table 1A. The average number of critical violations was added to coefficients in the graph to illustrate the relative size of the coefficients.

evidence on the speed of operational change in restaurants (Gompers, Mugford and Kim 2012). The blue bars plot the evolution of non-critical violations. There appears to be no pattern before or after the PE buyout.

To provide a better understanding of the critical violations that drive the results, Table V breaks these critical and non-critical violations down into specific categories. Appendix A provides a list of which violations belong to which category. Improvements are concentrated in practices such as food handling, kitchen maintenance, and consumer advising. Changes in practices such as food handling cannot be simply achieved by capital reallocation within the firm, but rather likely involve substantial training and monitoring of store employees. These results suggest that better operations are likely to be achieved through improvement in management practices following the PE buyout.

B. Identification Strategy

B.1 Empirical Design

The results thus far indicate that after private equity firms take over a restaurant chain, health inspection outcomes improve. It could be the case, however, that private equity firms are simply passive owners who target brands that would have experienced improvement regardless of the buyout. We employ a number of strategies to address this concern. First, as illustrated in Figure 1, there was no pre-existing trend in health scores in the three years leading up to the deal. PE firms would need predictive power to anticipate these improvements. Second, we implicitly match our treated stores with non-treated restaurants by including all restaurants in Florida and year fixed effects in our regressions. If there is an overall trend for health scores, the other restaurants will pick that up and control for it. The homogeneity of restaurants ensures these are relevant matches. Further, because our analysis

is at the establishment level, we can include zip code by year fixed effects. Therefore, for example, the counterfactual for a McDonalds restaurant is a Burger King branch in the same neighborhood. The two restaurants cater to similar demographics, compete in the same market, and likely experience similar fluctuations in demand.

The ideal counterfactual experiment, however, would be to compare two identical stores, one treated with PE ownership and one without. The prevalence of the franchising model in the restaurant industry allows us to run a close variation of this experiment. In a franchising arrangement, a parent franchisor sells a business format, typically including a brand, operating strategies, and design concepts, to a franchisee. Franchisees range from a single proprietor running a single restaurant to publicly traded firms that operate hundreds of restaurants across multiple brands. In return for an “off-the-shelf” business, the franchisee supplies the capital for the restaurant and pays royalties and fixed fees to the franchisor, typically based on the sales of the franchised outlet. Importantly, a franchise is a legally independent business not vertically integrated with the parent company and has a connection to headquarters only through contractual agreements.¹⁴ Such contracts are typically written for 10 to 20 years.

Restaurant chains vary in the fraction of individual stores that are franchised. Each Olive Garden, for example, is run directly by parent company Darden Restaurants, while Subway sandwich shops are all franchised, and half of TGI Friday’s nationwide are franchised. For chains that employ a mixture of outsourcing and direct ownership, there thus exist outwardly identical restaurants that differ only in ownership. When a private equity firm acquires a chain, legally, they only acquire the company-owned branches and the contractual

¹⁴ Since franchisees are independent legal entities, their capital structure is separate and thus they do not experience any increases in debt loads following the PE buyout.

obligation of the franchisees to pay royalties. While the name of the store, its logo, basic menu and food are the same, there are substantial differences in the ability of PE owners to actively affect the operations of franchisees relative to directly owned restaurants.

These differences can be dramatic. In many instances franchisors' formal control over franchisees has limited impact (Kidwell, Nygaard, and Silkoset, 2007; Vroom and Gimeno, 2007) and is insufficient to ensure compliance (Shane, 1996). In addition, PE buyers inherit the existing structure of franchisees in the chain, as well as pre-existing contracts. Such contracts are often written loosely to allow adoption of franchisees to local markets (Bradach, 1997; Sorenson and Sørensen, 2001). Because the franchisees are the residual claimants of their business, they often have discretion over actions not explicitly contracted with the firm. For example, private equity owned Burger King faced numerous lawsuits in 2010 from the Burger King National Franchisees Association (NFA), a group representing a majority of their independent operators in the United States. The franchisees “opposed a company mandate [to] sell a double cheeseburger for \$1,” “challenged a mandate that they keep their restaurants open late at night,” and “haven’t upgraded their checkout terminals as quickly as management wanted” (Wall Street Journal, 5/17/10). Hence, our prediction is that any effects of private equity takeover of a parent will manifest more strongly in company-owned than in franchised stores.

There can, of course, be endogeneity in the decision to franchise. Why are certain stores company-owned, and do these same underlying reasons drive the hygiene results? The literature on franchising (see Lafontaine and Slade (2007) for a recent survey) explores the determinants of the variation across firms in the degree of vertical integration of retail branches. One prediction from a moral-hazard model borne out in the data is that when individual store effort matters more, franchising is more common. Some additional variables

modeled and tested include branch size and complexity of tasks to be performed by store managers. As units of a *particular* restaurant chain are nearly identical, however, most of these cross-sectional predictions cannot explain why Burger King chooses to own store A but franchise store B. One theory that can apply, because stores of a chain do differ in location, is that stores further from headquarters are more likely to be franchised. This is because it is more costly for HQ to monitor product quality for more distant stores, and thus incentives need to be stronger for distant managers to do the right thing. This is achieved by giving them claim over residual franchise profits. This can be a concern if distance to HQ is correlated with operational practices through channels other than PE degree of control. For example, areas closer to HQ may have higher income, and higher income areas may exhibit a greater response to managerial changes. We mitigate with this concern by including zip code-by-year fixed effects in our regressions.

Figure 2 presents an example of franchising outcomes. Of the 21 Burger Kings in Tampa, Florida in 2012, eight are owned by franchisees. These stores are dispersed among the company owned units. The Figure compares two stores, one direct owned and one franchised, a few miles apart. The appearance is similar and customers cannot trivially detect whether a store is franchised or directly owned.

B.2 Main Results

For the sake of this test, we are interested in chains that have a mixture of both franchises and directly owned restaurants. Therefore, our sample only includes chains that employ franchising for at least 5% of its units and no more than 95% of its units in Florida.¹⁵

¹⁵ Results remain similar if we use a 10% top/bottom cutoff.

In Table VI we regress critical violations on *PostPE* but now also include the indicator variable *DirectOwn* and the interaction *PostPE * DirectOwn*. We have the licensed owner each year at each address, and thus *DirectOwn* equals one if the storeowner is the same as the ultimate parent. This specification allows extraction of a differential private equity effect on directly owned versus franchised units. We also include store and year fixed effects.

In column 1 the interaction term is negative and significant. The coefficient on *PostPE * DirectOwn* is -0.32, while the coefficient on *PostPE* alone is still negative at -0.22 but is insignificant.¹⁶ Thus the reduction in critical violations is concentrated in directly owned stores. In column 2 we include the number of employees and seats and results are similar, suggesting that improvements at health practices at directly owned restaurants are not driven by changes to the number of employees or number of seats. Moreover, these improvements in health-related practices cannot be driven by hidden variation in strength of brand, popularity of food genre, or advertising strategy because all branches are identical along these dimensions. In columns 3 and 4 we replace year fixed effects with zip code-by-year fixed effects to address concerns regarding franchisee location choice. The results are unchanged. Overall, these results suggest that within the organization, improvements in health and sanitation practices are concentrated in stores in which PE has greater control.

Figure 3 explores the evolution of operational practices of franchisees and directly owned stores around private equity takeover. The red bars plot the coefficients from a regression in which critical violations are regressed on private equity entry event year dummies, focusing on directly owned stores only.¹⁷ Violations are flat in the three years before PE entry,

¹⁶ The independent variable *DirectOwn* does not drop out of the regression with store fixed effects because some stores switch between parent and franchise ownership.

¹⁷ This regression is identical to the one reported in column (1) of Table 1A, but the sample is restricted to directly owned stores only. The regression includes store fixed effects, zip code by year fixed effects, log number

mitigating concerns that private equity was targeting a chain because of an upward trend in its directly owned stores. The decline in critical violations then occurs steadily over the subsequent four years (becoming statistically significant from year 2 onward). In contrast, the blue bars plot the evolution of critical violations of the franchisees around the PE buyout. Similarly to the directly owned stores, no trends exist in the years leading to the buyout. In addition, franchisees as a whole do not seem to improve their operational practices in the years following the buyout, as none of the event year coefficients are statistically different from zero.

B.3 Spillovers

Are all franchisees equally reluctant to implement changes? We find evidence of management spillover effects. We hypothesize that a franchisee that sees the impact of private equity or feels the competitive pressure from a better-managed store will be more likely to improve its own operations. In Table VII, we separate franchised branches into those with and without a same-brand, company owned store in the same zip code. Rather than singling out directly owned stores (as in Table VI), we focus on franchised stores in Table VII. The variable *CloseBy* equals one for a franchised store if a directly owned store of the same chain exists in the same zip code in a given year. Column 1 shows that franchisees have significantly more critical violations after PE entry than company stores—a mirror image of the result in Table VI. The negative coefficient on the triple interaction $PostPE * Franchisee * CloseBy$ shows, however, that those franchisees located in the same zip code as directly owned restaurants

of seats and log number of employees. The regression results are in column (3) of Table 1A, in the Appendix. The average number of critical violations was added to coefficients in the graph to illustrate the relative size of the coefficients.

behave more similarly to PE controlled stores. Columns 2 and 3 register the post-PE effect only one and two years after PE firms actually enter.

Operational practices in franchisees that are *CloseBy* appear to converge to their directly-owned counterparts over time, as this interaction term grows over time both in terms of magnitude and statistical significance. This suggests that within-chain competitive pressures lead franchisees to adopt the improved practices.¹⁸

C. Employment

Private equity firms may make operational changes to restaurants along margins besides health-related practices. Their effect on employment is controversial. The popular press often chides private equity for eliminating jobs for debt service and short-term profits, while Davis, et al. (2013) find that private equity transactions result in only modest net impact on employment.

We explore the effect on this stakeholder in Table VIII. The dependent variable is the log of the number of employees at the level of the store. In column (1) we include year fixed effects and explore variation within a store by adding individual store fixed effects. The coefficient on *PostPE* is negative and significant, suggesting that PE firms do appear to operate existing restaurants with fewer employees than before. The magnitude is fairly modest, as the coefficient equals -0.028, suggesting a 2.8% decline in a store's workforce. To control for the possibility that PE targets are located in areas that, perhaps due to varying economic conditions, have employment patterns different from other restaurants, we include zip code-by-year fixed effects in column (2). PE restaurants still see a decline in workers even when

¹⁸ One may be concerned that the main results is that franchisee restaurants are optimally operated and therefore operational improvements occur at directly owned stores only. This evidence on spillover effects illustrates that this is not the case, as franchisees adopt practices once they are subject to competitive pressures.

adjusting for geographic variation and local shocks. In columns 3 and 4 of Table VIII we include the *PostPE * DirectOwn* interaction to see if the employment effect is stronger in directly controlled branches. To do so, we restrict the sample to chains that employ franchising for at least 5% of its units and no more than 95% of its units in Florida as in Section B. The interaction is essentially zero, meaning both company-owned and franchised outlets see a similar decline in headcount. It is possible that relative to health-related practices, employee counts are more easily contractible and hence easier for the parent to mandate. Franchisees may also be more amenable to suggestions that lower their costs.

D. Menu prices

To continue identifying operational changes at private equity owned restaurants, we turn to pricing. Do the improved operational practices come at the expense of higher prices? Or is cost cutting passed on to the consumer? We gather annual menus from 2005-2012 for 2,178 restaurant chains from Datassential. Datassential draws a representative menu each year from each of these chains. There can be regional differences in pricing; we assume that the randomly drawn menu is representative of the entire chain. Unlike with inspections and employment, our pricing analysis will thus necessarily be at the overall chain level, as individual store pricing is not widely available. The menu data includes the restaurant name, every menu item (e.g., “Hot and sour soup”), its price, and its broad item category (“Soup—appetizer”). Each restaurant is also categorized into one of four segments (Quick service, Casual, Midscale, Fine dining) and one of 24 cuisine types (e.g., Chinese).

For each restaurant-year, we first generate *itemtype_price*, which averages the prices of all items in each broad category. Thus instead of having five soups with different prices, we collapse these into a single average “soup” price for each restaurant, each year. We also again

create the variable *PostPE* which equals one for all restaurant-year menus drawn after a private equity firm has acquired the chain. The unit of observation is restaurant's *itemtype_price* each year. In Table IX, column 1, *itemtype_price* is regressed on *PostPE* and chain and year fixed effects. The coefficient is -0.29 and weakly significant. This means, relative to average prices for all restaurants, the average menu item is 29 cents cheaper in years after PE takeover, reflecting a 4.4% decline in menu prices.

We refine this analysis by using only close competitor pricing as a counterfactual. Holding steak prices constant is actually a relative decline if other steakhouses charge more. We replace year fixed effects with “year × cuisine type × segment × item type” fixed effects. The unit of observation in these regressions is a restaurant's *itemtype_price* each year. For Applebee's “cold sandwich” price in 2005, then, the new fixed effect controls for “cold sandwich” (item type) prices sold by all other American (cuisine type), Casual (segment) restaurants in 2005¹⁹. The regression in column 2 with these fixed effects shows a coefficient of -30 cents on *PostPE*, still significant at 10% with magnitude corresponding to a 4.7% decline in average menu prices. Thus private equity restaurant prices fall relative to those of their closest competitors. Regressions 3-7 look at pricing changes in specific categories. Entrées, the most expensive menu item, show the largest and most significant declines.

Overall, food prices go down following the PE buyout, suggesting that improvements in operational practices and food safety do not translate into higher prices for consumers.

¹⁹ For these fixed effects to provide meaningful comparisons, we drop observations without at least 10 cuisine type × segment × item type competitors. “Italian, Fine Dining, Fried Chicken” data points, for example, would likely be dropped. For consistency, we also apply this cutoff in column 1 of Table VIII.

E. Store Closures

So far, the evidence suggests that private equity induces significant operational changes to health practices, workforce, and menu prices. It is natural to wonder whether these changes translate into increased profitability. While we do not observe store-level revenue and profits, store closures can be used as a proxy for poor financial performance. In this section, we explore how PE buyouts affects store closures.

The store closures analysis is reported in Table X. The dependent variable is a dummy variable indicating the last year in which a store operated.²⁰ In column 1 we control for year and store fixed effects, as well as number of employees and number of seats in the restaurant. The coefficient on *PostPE* is negative and statistically significant, suggesting that PE firms do reduce closure hazard. The magnitude of the effect is meaningful, as following the PE buyout, closure likelihood drops by almost 4%. Since closure likelihood may vary across regions and demographics, we control for zip-code by year fixed effects in column 2. PE restaurants still illustrate a decline in store closure even when adjusting for geographic variation and local shocks.

In columns 3 and 4 of Table X, we explore whether both franchisees and directly owned stores experience a reduction in closure likelihood. We include *PostPE * DirectOwn*, and as in previous analysis, restrict the sample to chains that employ franchising for at least 5% of its units and no more than 95% of its units in Florida. The interaction is negative and statistically significant, implying that the decline in closure likelihood is concentrated in directly owned restaurants.

These results are consistent with the earlier finding that improvements in operational practices are concentrated in directly owned stores as well. Consistent with Jin and Leslie

²⁰ Since our panel data ends in 2012, we cannot detect store closures in that year.

(2003), the results suggest that improvements in health-related operational practices translate into store profitability.

III. Conclusion

We study the operational consequences of private equity buyouts in the restaurant industry. This industry provides a unique and detailed view of the daily operational practices of firms. We find that restaurants improve operational practices following the PE buyout and commit fewer health violations. These effects are driven by those practices that pose critical hazards for customers and public health and also most correlate with customer satisfaction and restaurant closures.

We illustrate that the effect is causal and not a mere outcome of the initial investment decision of the PE firm. Within the same chain and region, the effects are strongest in stores over which PE firms have complete control. Franchisees, which are otherwise identical, do not see the same initial improvement, suggesting that PE firms cause these changes. However, franchisees do improve subsequently if they are facing competition from directly owned stores, illustrating spillover effects. We also find that PE-backed restaurants slightly reduce employee headcount at existing stores, lower menu prices, and are less likely to close.

These findings suggest that PE firms take an active role in the firms they acquire and improve operational practices. Improving such practices requires not only capital budgeting, but also, perhaps more importantly, better training, monitoring, and alignment of worker incentives throughout the chain. We interpret this as evidence that private equity firms mitigate agency problem and improve management practices in the organization.

References

- Bartel, Ann, Casey Ichniowski, and Kathryn Shaw, 2007, How does information technology affect productivity? Plant-level comparisons of product innovation, process improvement, and worker skills, *The Quarterly Journal of Economics* 122, 1721-1758.
- Black, Sandra E, and Lisa M Lynch, 2001, How to compete: The impact of workplace practices and information technology on productivity, *Review of Economics and statistics* 83, 434-445.
- Bloom, Nicholas, and John Van Reenen, 2007, Measuring and explaining management practices across firms and countries, *The Quarterly Journal of Economics* 122, 1351-1408.
- Bloom, Nick, Raffaella Sadun, and John Van Reenen, 2009, Do private equity owned firms have better management practices?
- Boucly, Quentin, David Sraer, and David Thesmar, 2011, Growth Ibos, *Journal of Financial Economics* 102, 432-453.
- Bradach, Jeffrey L, 1997, Using the plural form in the management of restaurant chains, *Administrative Science Quarterly* 276-303.
- Cohn, Jonathan, Lillian Mills, and Erin Towery, 2011, The evolution of capital structure and operating performance after leveraged buyouts: Evidence from us corporate tax returns, *McCombs Research Paper Series No. ACC-02-11*.
- Collins, Janet E, 1997, Impact of changing consumer lifestyles on the emergence/reemergence of foodborne pathogens, *Emerging Infectious Diseases* 3, 471.
- Davis, Steven J, John C Haltiwanger, Kyle Handley, Ron S Jarmin, Josh Lerner, and Javier Miranda, 2013, Private equity, Jobs and Productivity, *National Bureau of Economic Research*.
- Gompers, Paul, Kristin Mugford, and J. Daniel Kim, 2012, Bain capital: Outback steakhouse, *Harvard Business School Case study N2-212-087*.
- Gormley, Todd A., and David A. Matsa, 2013, Common errors: How to (and not to) control for unobserved heterogeneity, *Working Paper*.
- Guimaraes, Paulo, and Pedro Portugal, 2010, A simple feasible procedure to fit models with high-dimensional fixed effects, *Stata Journal*, 10, 628–649.
- Guo, Shourun, Edith S Hotchkiss, and Weihong Song, 2011, Do buyouts (still) create value?, *The Journal of Finance* 66, 479-517.

- Ichniowski, Casey, Kathryn Shaw, and Giovanna Prennushi, 1997, The effects of human resource practices on manufacturing performance: A study of steel finishing lines, *American Economic Review* 87, 291-313.
- Jin, G. Z. and P. Leslie (2003). "The effect of information on product quality: Evidence from restaurant hygiene grade cards." *The Quarterly Journal of Economics* 118(2): 409-451.
- Jin, G. Z. and P. Leslie (2009). "Reputational incentives for restaurant hygiene." *American Economic Journal: Microeconomics*: 237-267.
- John, Kose, Larry HP Lang, and Jeffrey Netter, 1992, The voluntary restructuring of large firms in response to performance decline, *The Journal of Finance* 47, 891-917.
- Kaplan, Steven, 1989, The effects of management buyouts on operating performance and value, *Journal of financial economics* 24, 217-254.
- Kidwell, Roland E, Arne Nygaard, and Ragnhild Silkoset, 2007, Antecedents and effects of free riding in the franchisor–franchisee relationship, *Journal of Business Venturing* 22, 522-544.
- Lafontaine, Francine, and Margaret Slade, 2007, Vertical integration and firm boundaries: The evidence, *Journal of Economic Literature* 629-685.
- Lazear, Edward P, 2000, Performance pay and productivity, *American Economic Review* 1346-1361.
- Lerner, Josh, Morten Sorensen, and Per Strömberg, 2011, Private equity and long-run investment: The case of innovation, *The Journal of Finance* 66, 445-477.
- Lichtenberg, Frank R, and Donald Siegel, 1990, The effects of leveraged buyouts on productivity and related aspects of firm behavior, *Journal of Financial Economics* 27, 165-194.
- Luca, Michael, 2011, Reviews, reputation, and revenue: The case of yelp. Com, (Harvard Business School).
- Matsa, David A, 2011, Running on empty? Financial leverage and product quality in the supermarket industry, *American Economic Journal: Microeconomics* 3, 137-173.
- Shane, Scott A, 1996, Hybrid organizational arrangements and their implications for firm growth and survival: A study of new franchisors, *Academy of Management Journal* 39, 216-234.

Shleifer, Andrei, and Lawrence Summers, 1988, Breach of Trust in Hostile Takeovers, in Alan J. Auerbach, editor, *Corporate Takeovers: Causes and Consequences*. Chicago: University of Chicago Press.

Sorenson, Olav, and Jesper B Sørensen, 2001, Finding the right mix: Franchising, organizational learning, and chain performance, *Strategic Management Journal* 22, 713-724.

Vroom, Govert, and Javier Gimeno, 2007, Ownership form, managerial incentives, and the intensity of rivalry, *Academy of Management Journal* 50, 901-922.

Figure 1: Critical and non-critical violations around private equity deal date.

This figure plots the coefficients and 95% confidence interval bands of regressions of critical and non-critical violations on event year dummy variables around the date private equity acquires a restaurant. Additional control variables are restaurant fixed effects, year fixed effects, number of employees, and number of seats. Standard errors are clustered at the level of the chain. Event year 0 is the omitted variable, corresponding to inspections that occur from 1 to 365 days after the deal close date. The average number of critical and non-critical violations was added to coefficients in the graph.

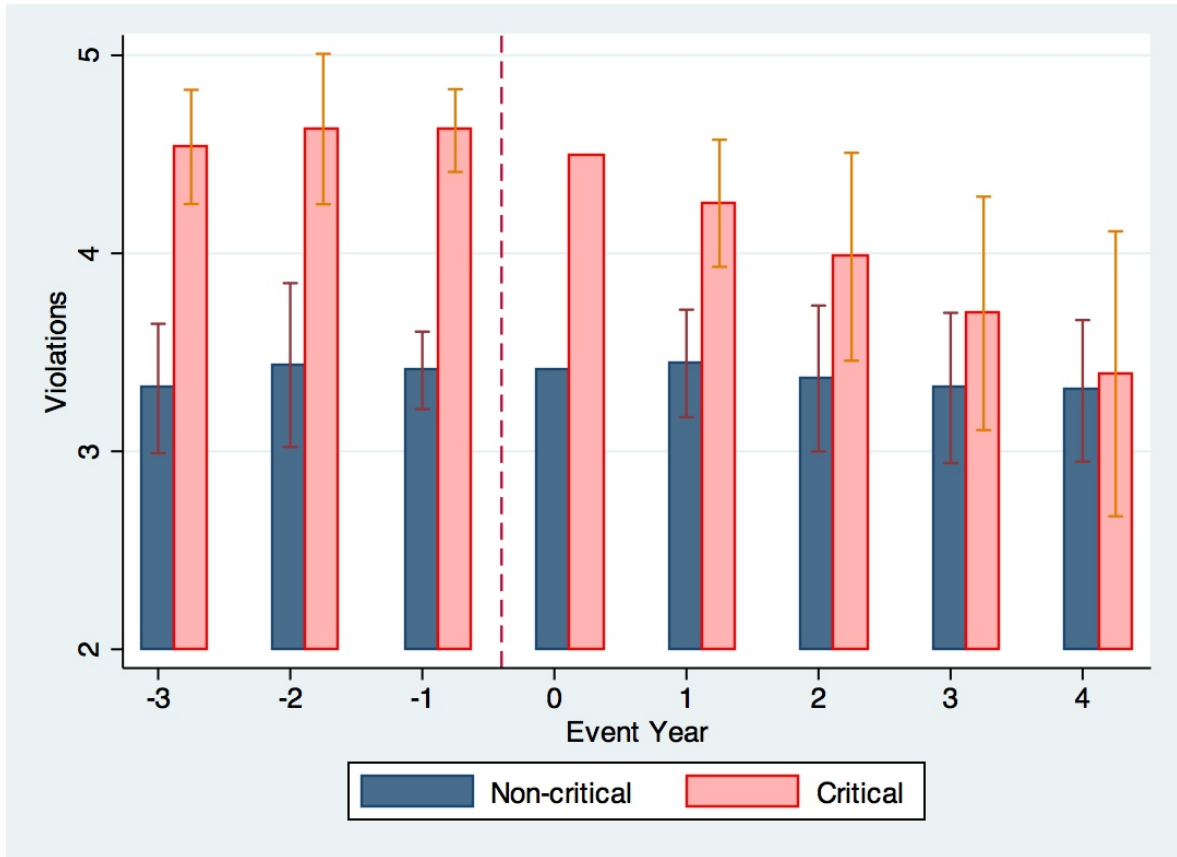


Figure 2: Franchised vs. directly owned Burger King restaurants – Tampa, Florida



Directly-owned



Franchised

Figure 3: Franchisees and directly-owned restaurants around private equity deal date.

This figure plots the coefficients and 95% confidence interval bands of regressions of critical violations by directly-owned and franchised stores on event year dummy variables around the date private equity acquires a restaurant. Additional control variables are restaurant fixed effects, year fixed effects, number of employees and number of seats. Standard errors are clustered at the level of the chain. Event year 0 is the omitted variable, corresponding to inspections that occur from 1 to 365 days after the deal close date. The average number of critical violations was added to coefficients in the graph.

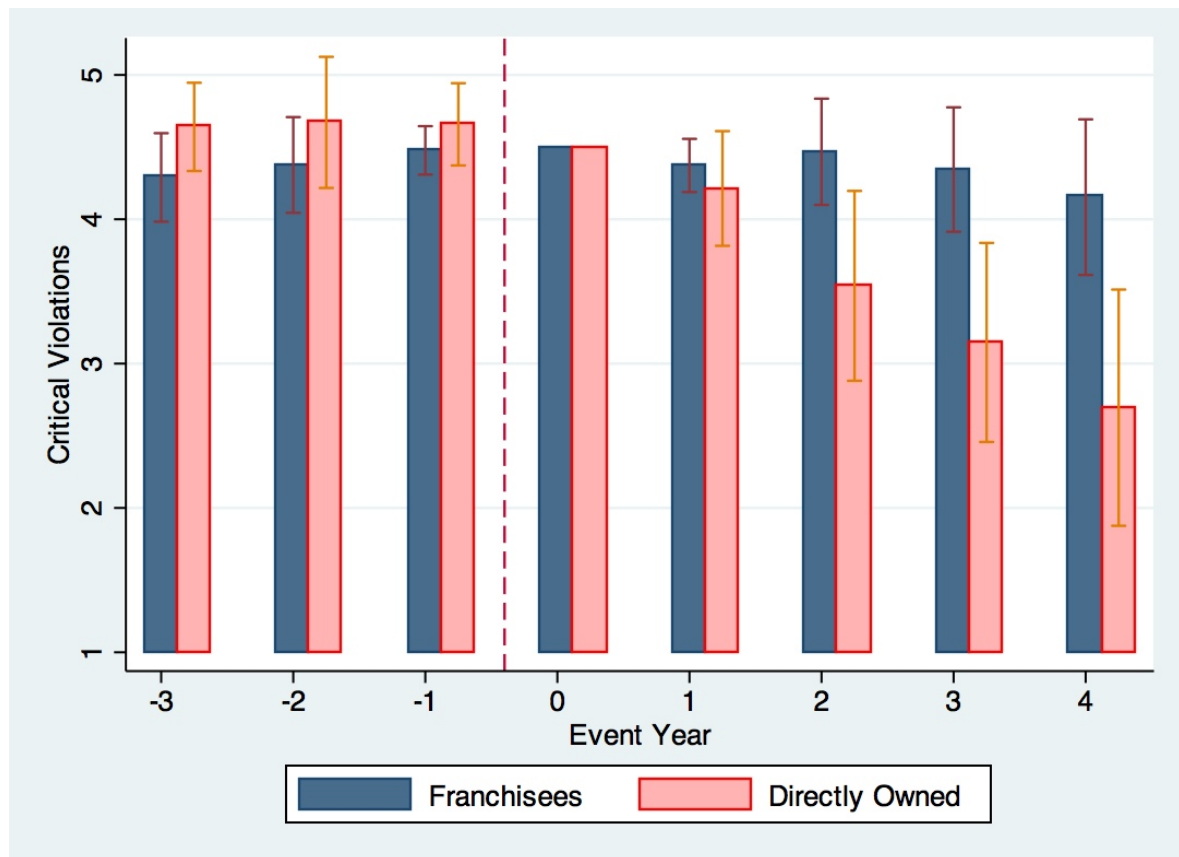


Table I
Inspection Summary Statistics

This table summarizes the Florida restaurant health inspection data. Critical violations are those “likely to directly contribute to food contamination, illness or environmental degradation.” Non-critical violations “do not directly relate to foodborne illness risk, but preventive measures are required.” Only routine, surprise inspections are counted.

Panel A – Distribution of Inspections over time

Year	Inspections Conducted	Restaurants Inspected	Inspections per restaurant	Average critical violations	Average non-critical violations
2002	21,676	15,656	1.38	1.67	2.31
2003	45,658	19,024	2.40	2.17	3.07
2004	37,374	18,910	1.98	2.31	3.68
2005	38,419	19,352	1.99	2.80	4.22
2006	42,981	20,701	2.08	4.85	4.72
2007	43,472	21,079	2.06	6.62	4.00
2008	50,519	21,755	2.32	6.19	3.95
2009	61,103	23,959	2.55	5.34	3.26
2010	66,997	27,240	2.46	5.25	3.25
2011	69,460	27,396	2.54	4.70	2.76
2012	63,503	25,800	2.46	4.56	2.71
Mean	49,197	21,897	2.20	4.49	3.41

Panel B – Restaurant Characteristics

	Ever Treated Stores		Never Treated Stores		Never Treated Stores (at least 5 stores)		All Stores	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Violations	7.21	5.19	8.19	6.17	6.91	5.25	8.09	6.08
Critical Violations	3.79	3.15	4.69	4.01	3.80	3.31	4.59	3.94
Non-critical Violations	3.42	2.82	3.50	3.07	3.11	2.71	3.49	3.04
Log Seats	4.16	1.28	3.77	1.51	3.56	1.69	3.81	1.49
Log Employees	3.07	0.83	2.39	1.08	2.83	1.03	2.46	1.07
Chain units (in Florida)	175.01	168.18	109.82	247.54	282.14	331.85	116.62	241.31
Log County income	10.50	0.20	10.53	0.21	10.51	0.20	10.53	0.21
Store-year observations	25,752		221,228		85,511		246,980	
Unique Stores	3,727		48,451		13,192		52,178	
Unique Chains	103		30,257		376		30,360	

Panel C – Distribution across cuisines (%)

Cuisine	Ever Treated Stores	Never Treated Stores	Never Treated Stores (at least 5 stores)	All Stores
American	18.36	27.32	17.29	25.95
Asian	0.90	10.94	8.59	9.41
Chicken	11.96	6.44	10.25	7.28
Donut, Ice Cream, Beverage	5.09	5.00	5.88	5.01
Hamburgers	32.42	10.74	17.73	14.05
Other Ethnic	6.64	8.64	5.68	8.33
Pizza, Past, and Italian	7.77	13.63	13.89	12.74
Sandwiches, Soups, and Salads	9.16	12.70	17.35	12.16
Steak, Seafood, and Fish	7.70	4.60	3.35	5.07

Panel D – Distribution across price categories (%)

Average Restaurant Check	Ever Treated Stores	Never Treated Stores	Never Treated Stores (at least 5 stores)	All Stores
Under \$7	50.52	31.12	48.08	34.12
\$7 to \$10	29.47	26.41	28.11	26.88
\$10 to \$15	15.58	36.68	21.8	33.42
Over \$15	4.43	5.79	2.02	5.58

Table II
Drivers of Restaurant Health and Cleanliness

This table reports general determinants of restaurant health inspection outcomes. Violations are as defined in Table I. *Units in chain* counts the total number of separate stores of that particular restaurant chain in Florida each year. *Median county income* is the median income each year in the restaurant's county. Standard errors are omitted for cuisine types for brevity. Standard errors are clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	Critical violations	Critical violations	Non-critical violations	Non-critical violations
	(1)	(2)	(3)	(4)
Log(Units in chain)	-0.238*** (0.026)		-0.112*** (0.020)	
Log(Seats)	0.262*** (0.024)	0.195*** (0.027)	0.223*** (0.022)	0.141*** (0.022)
Log(Employees)	0.065** (0.033)	0.079*** (0.020)	0.179*** (0.024)	0.096*** (0.015)
Log(Median county income)	-0.535*** (0.101)	-0.334** (0.132)	-0.509*** (0.074)	-0.345*** (0.088)
Average check under \$7	-0.632** (0.275)		-0.232 (0.219)	
\$7 - \$10	-0.394** (0.164)		-0.095 (0.128)	
\$10 - \$20	0.220* (0.132)		0.207* (0.120)	
<u>Cuisine type</u>				
American- omitted category				
Asian	1.628***		1.050***	
Chicken	0.032		0.543***	
Donut, ice cream, beverage	-0.542**		-0.530**	
Hamburgers	-0.240		-0.433	
Other ethnic	-0.101		-0.224	
Pizza, pasta, Italian	0.178		-0.136	
Sandwiches, soup, deli	-0.417*		-0.594***	
Steak, seafood	-0.263		-0.038	
Year fixed effects	X	X	X	X
Chain fixed effects		X		X
Observations	345,489	345,489	345,489	345,489
R2	0.20	0.32	0.10	0.21

Table III
Health Violations, Customer Satisfaction, and Store Closure

This table presents results from OLS regressions of customer satisfaction and restaurant closure on restaurant sanitation. In panel A, each observation is a restaurant chain. The dependent variable *Avg Yelp stars* is the average star rating (which can range from 1 to 5) for all reviews given to all branches in a chain in 2012 on the website Yelp.com. The independent variable *Avg critical (non-critical) violations* averages the critical (non-critical) violations for all inspections for all branches in a chain in 2012. The restriction “5 or more reviews” refers to the number of Yelp reviews for the chain in 2012. In panel B, each observation is a store-year. The dependent indicator variable equals one if the store closed in that year. *Annual critical violations* is the average number of such violations in all inspections at that store that year. Lagged violations average those the year before the closure year. Standard errors are in parentheses and clustered by restaurant chain in panel B. *, **, *** indicate significance at 10%, 5%, 1%.

Panel A: Dependent variable = Avg Yelp stars						
	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)
Avg critical violations	-0.0252*** (0.0030)	-0.0247*** (0.0031)	-0.0228*** (0.0031)	-0.0190*** (0.0038)	-0.0208*** (0.0038)	-0.0189*** (0.0039)
Avg non-critical violations				-0.0153** (0.0060)	-0.0099* (0.0059)	-0.0101 (0.0068)
Price × Cuisine fixed effects		X	X		X	X
5 or more reviews			X			X
Observations	5,876	5,876	2,814	5,876	5,876	2,814
R2	0.012	0.048	0.099	0.013	0.048	0.100
Panel B: Dependent variable = Store closure						
	(1b)	(2b)	(3b)			
Annual critical violations	0.0010*** (0.00027)		0.0012*** (0.00029)			
Lagged annual critical violations	0.0024*** (0.00026)		0.00213*** (0.00027)			
Annual non-critical violations		-0.00013 (0.00028)	-0.00064** (0.00030)			
Lagged non-annual critical violations		0.0018*** (0.00028)	0.00068** (0.00028)			
Log(Seats)	0.0085** (0.0038)	0.0092** (0.0038)	0.0085** (0.0038)			
Log(Employees)	0.0090*** (0.0013)	0.0089*** (0.0013)	0.0090*** (0.0013)			
Year fixed effects		X	X			
Firm fixed effects		X	X			
Observations	219,179	219,179	219,179			
R2	0.53	0.52	0.53			

Table IV
Violations under Private Equity Ownership

This table presents results from OLS regressions of restaurant inspection results on private equity ownership and store characteristics. An observation is an inspection on a specific date at a specific restaurant address. The dependent variables are defined in Table I. *PostPE* is a dummy variable which equals one if a restaurant is owned by a private equity firm on that inspection date. *Log(Seats)* and *Log(Employees)* count the number of seats and full-time equivalent employees at the restaurant in the year of the inspection. *Zip × Year* fixed effects use the zip code of each restaurant. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

Panel A: Dependent variable = Critical violations						
	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)
PostPE	-0.662*** (0.238)	-0.647*** (0.240)	-0.627** (0.249)	-0.625** (0.251)	-0.614** (0.252)	-0.612** (0.253)
Log(Seats)		0.212*** (0.0257)		0.239*** (0.0503)		0.178*** (0.054)
Log(Employees)		0.0676*** (0.0169)		-0.0289 (0.0188)		-0.028 (0.020)
Chain fixed effects	X	X				
Store fixed effects			X	X	X	X
Year fixed effects	X	X	X	X		
Zip × Year fixed effects					X	X
Observations	541,147	541,147	541,147	541,147	541,147	541,147
R2	0.122	0.134	0.122	0.137	0.536	0.535
Panel B: Dependent variable = Non-Critical violations						
	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)
PostPE	0.0526 (0.139)	0.0685 (0.141)	0.087 (0.154)	0.084 (0.156)	0.024 (0.148)	0.023 (0.150)
Log(Seats)		0.155*** (0.0208)		0.006 (0.041)		0.037 (0.037)
Log(Employees)		0.0841*** (0.0134)		-0.007 (0.012)		-0.003 (0.012)
Chain fixed effects	X	X				
Store fixed effects			X	X	X	X
Year fixed effects	X	X	X	X		
Zip × Year fixed effects					X	X
Observations	541,147	541,147	541,147	541,147	541,147	541,147
R2	0.031	0.046	0.030	0.031	0.471	0.470

Table V
Restaurant Health Violations by Category

This table presents results from OLS regressions of violations in disaggregated categories of restaurant maintenance and sanitation on private equity ownership and store characteristics. An observation is an inspection on a specific date at a specific restaurant address. Appendix A details the specific critical and non-critical violations that belong to each category. The independent variables are as defined in Table IV. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	Food Handling	Maintenance (Kitchen)	Maintenance (Non-Kitchen)	Consumer Advising	Training/ Certification
	(1)	(2)	(3)	(4)	(5)
PostPE	-0.351*** (0.133)	-0.0274* (0.0163)	-0.0743 (0.0530)	-0.0929*** (0.0321)	-0.0167 (0.0194)
Log(Seats)	0.107*** (0.0301)	0.0111 (0.00873)	0.0301** (0.0125)	0.0151* (0.00828)	0.00854 (0.00758)
Log(Employees)	-0.0112 (0.0107)	-0.000521 (0.00237)	-0.00705 (0.00551)	-0.00524* (0.00278)	-0.00574** (0.00235)
Store fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Observations	541,147	541,147	541,147	541,147	541,147

Table VI
 Inspection Results in Directly Owned versus Franchised Stores

This table presents results from OLS regressions of critical violations on private equity ownership and store characteristics. An observation is an inspection on a specific date at a specific restaurant address. The independent variable *DirectOwn* is a dummy variable which equals one if the restaurant is owned and operated by its brand's parent company in a given year. *DirectOwn* equals zero if the restaurant is run by an independent franchisee. The remaining variables are as defined in Table IV. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	Critical Violations	Critical Violations	Critical Violations	Critical Violations
	(1)	(2)	(3)	(4)
PostPE	-0.223 (0.306)	-0.222 (0.306)	-0.160 (0.266)	-0.159 (0.266)
PostPE * DirectOwn	-0.316** (0.150)	-0.315** (0.150)	-0.319** (0.141)	-0.319** (0.141)
DirectOwn	0.106 (0.133)	0.102 (0.134)	0.114 (0.121)	0.111 (0.121)
Log(Seats)		0.232*** (0.071)		0.146* (0.086)
Log(Employees)		-0.034 (0.024)		-0.023 (0.025)
Store fixed effects	X	X	X	X
Year fixed effects	X	X		
Zip × Year fixed effects			X	X
Observations	179,390	179,390	179,390	179,390
R2	0.107	0.111	0.520	0.520

Table VII

Spillovers from Directly-Owned Stores to Franchisees

This table presents results from OLS regressions of critical violations on private equity ownership and store characteristics. An observation is an inspection on a specific date at a specific restaurant address. PE entry year of “1 year lag” treats PE entry dates as if they occurred one year later. The independent variable *Franchisee* is a dummy variable which equals one if the restaurant is owned and operated by an independent franchisee in a given year. *Franchisee* equals zero if the restaurant is run by the brand’s parent company. *Closeby* is a dummy variable equal to one if a store is franchisee-owned and there exists a company-owned branch of the same chain in the same zip code. All cross-terms are included but not reported for brevity. The remaining variables are as defined in Table IV. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

PE entry year	Critical violations	Critical violations	Critical violations
	Actual entry	1 year lag	2 year lag
	(1)	(2)	(3)
PostPE	-0.479 (0.299)	-0.701* (0.364)	-0.924*** (0.278)
PostPE * Franchisee	0.332** (0.149)	0.378*** (0.131)	0.484*** (0.137)
PostPE * Franchisee * CloseBy	-0.25 (0.232)	-0.362* (0.197)	-0.590*** (0.212)
Log(Seats)	0.147* (0.0858)	0.151* (0.0821)	0.155** (0.0787)
Log(Employees)	-0.0229 (0.0249)	-0.0221 (0.0248)	-0.0167 (0.0247)
Store fixed effects	X	X	X
Zip × Year fixed effects	X	X	X
Observations	179,390	179,390	179,390

Table VIII
Restaurant Employment Under Private Equity Ownership

This table presents results from OLS regressions of restaurant employment on private equity ownership. The dependent variable *Employees* is the average number of full-time equivalent employees at a store in a given year. The remaining variables are as defined in Table VI. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	(1)	(2)	(3)	(4)
	Employees	Employees	Employees	Employees
PostPE	-0.028** (0.009)	-0.022** (0.011)	-0.027*** (0.011)	-0.021** (0.009)
PostPE * DirectOwn			0.003 (0.009)	-0.001 (0.009)
DirectOwn			0.008 (0.009)	0.016 (0.011)
Log(Seats)	0.022*** (0.006)	0.028*** (0.007)	0.014* (0.007)	0.022*** (0.008)
Store fixed effects	X	X	X	X
Year fixed effects	X		X	
Zip × Year fixed effects		X		X
Observations	238,415	238,415	74,067	74,067
R2	0.004	0.971	0.019	0.426

Table IX
Restaurant Prices under Private Equity Ownership

This table presents results from OLS regressions of restaurant menu prices on private equity ownership. An observation is a menu item type at a particular restaurant in a given year. The dependent variable *Item type price* is the average price of all menu items in a food category (e.g., “cold sandwiches”) sold by a particular restaurant in a given year. An example of a Year × Cuisine × Segment × Item type fixed effect is “2005, Chinese, Fine dining, dessert.” The data comprise menus from 2,178 restaurant chains sampled annually from 2005-2012. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

Menu items	All	All	Appetizer	Beverage	Dessert	Entrée	Side
	Dependent variable = Item type price						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PostPE	-0.285* (0.171)	-0.304* (0.180)	-0.144 (0.374)	-0.178* (0.0976)	-0.318 (0.523)	-0.456** (0.208)	-0.0896 (0.115)
Chain fixed effects	X	X	X	X	X	X	X
Year fixed effects	X						
Year × Cuisine × Segment × Item type fixed effects		X	X	X	X	X	X
Observations	374,891	374,891	65,281	67,757	32,635	116,190	77,076
R2	0.185	0.497	0.51	0.426	0.523	0.479	0.427

Table X
Store Closure Under Private Equity Ownership

This table presents results from OLS regressions of restaurant closure likelihood on private equity ownership. An observation is a store-year. The dependent variable *Close* is an indicator variable equal to one for store-years which occur in the last year in which a store operates. The remaining variables are as defined in Table VI. Standard errors are in parentheses and clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	(1)	(2)	(3)	(4)
	Close	Close	Close	Close
PostPE	-0.0398*** (0.011)	-0.019* (0.011)	-0.006 (0.006)	0.003 (0.004)
PostPE * DirectOwn			-0.007* (0.003)	-0.0105** (0.004)
DirectOwn			0.006 (0.004)	0.006 (0.005)
Log(Seats)	0.003 (0.003)	0.005 (0.004)	-0.001 (0.005)	-0.005 (0.006)
Log(Employees)	0.009*** (0.002)	0.016*** (0.002)	0.001 (0.002)	0.002 (0.003)
Store fixed effects	X	X	X	X
Year fixed effects	X		X	
Zip × Year fixed effects		X		X
Observations	238,415	238,415	74,067	74,067
R2	0.041	0.458	0.019	0.415

Appendix

Table 1A

Year-by-year Impact of Private Equity on Violations

This table replaces the variable *PostPE* replaced with event year dummies for the year relative to PE entry. Event year 0, corresponding to inspections that occur from 1 to 365 days after the deal close date, is omitted. The dependent variable in columns (1), (3) and (4) is critical violations, and non-critical violations in column (2). In columns (1) and (2), the sample includes restaurants. In columns (3) and (4) samples consist of directly-owned or franchised restaurants respectively. The coefficients in columns (1) and (2) are plotted in Figure 1, and columns (3) and (4) are plotted in Figure 2. Standard errors are clustered by restaurant chain. *, **, *** indicate significance at 10%, 5%, 1%.

	(1)	(2)	(3)	(4)
Dependent Variable	Critical Violations	Non-critical Violations	Critical Violations	Critical Violations
Sample	All	All	Directly Owned	Franchisees
Year -3	0.0473 (0.175)	-0.092 (0.199)	0.150 (0.186)	-0.200 (0.186)
Year -2	0.138 (0.231)	0.025 (0.252)	0.181 (0.276)	-0.114 (0.202)
Year -1	0.130 (0.127)	-0.002 (0.119)	0.168 (0.173)	-0.012 (0.102)
Year 1	-0.237 (0.195)	0.033 (0.165)	-0.277 (0.241)	-0.117 (0.112)
Year 2	-0.507 (0.319)	-0.042 (0.224)	-0.951** (0.400)	-0.022 (0.224)
Year 3	-0.793** (0.358)	-0.090 (0.231)	-1.343*** (0.419)	-0.146 (0.262)
Year 4	-1.098** (0.438)	-0.105 (0.217)	-1.795*** (0.497)	-0.337 (0.328)
Log (Seats)	0.162*** (0.051)	0.030 (0.038)	0.149** (0.059)	0.098 (0.081)
Log (Employees)	-0.019 (0.020)	0.001 (0.012)	-0.039* (0.023)	-0.020 (0.030)
Store fixed effects	X	X	X	X
Zip × Year fixed effects	X	X	X	X
Observations	510,457	510,457	347,406	163,051
R2	0.538	0.475	0.549	0.525

Inspection Violation Descriptions

Critical violations recorded by the Florida Department of Business and Professional Regulation:

- Food obtained from approved source
- Original container; properly labeled, date marking, shell stock tags
- Consumer advisory on raw/undercooked animal products
- Cold food at proper temperatures during storage, display, service, transport and cold holding
- Foods properly cooked/reheated
- Foods properly cooled
- Unwrapped or potentially hazardous food not re-served
- Food protection during storage, preparation, display, service, transportation
- Foods handled with minimum contact
- Personnel with infections restricted
- Hands washed and clean, good hygienic practices (observed), alternative operating plan
- Food contact surfaces clean and sanitized
- Restrooms with self-closing doors, fixtures operate properly, facility clean, supplied with hand soap, disposable towels or hand drying devices, tissue, covered waste receptacles
- Toxic substances properly stored
- Employee training verification
- Facilities to maintain product temperature
- Thermometers provided and conspicuously placed
- Potentially hazardous foods properly thawed
- Potential for cross-contamination, storage practices; damaged food segregated
- Dishwashing facilities designed, constructed, operated
- Sanitizing temperature
- Water source safe, hot and cold under pressure
- Sewage and waste water disposed properly
- Cross-connection, back siphonage, backflow
- Toilet and hand washing facilities, number, convenient, designed, installed
- Presence of insects/rodents. Animals prohibited
- Outer openings protected from insects, rodent proof
- Fire extinguishers - proper and sufficient
- Exiting system - adequate, good repair
- Electrical wiring - adequate, good repair
- Gas appliances - properly installed, maintained
- Flammable/combustible materials - properly stored
- Current license, properly displayed
- False/misleading statements published or advertised relating to food/beverage

Non-Critical violations recorded by the Florida Department of Business and Professional Regulation:

- In use food dispensing utensils properly stored
- Food contact surfaces designed, constructed, maintained, installed, located
- Wiping cloths clean, used properly, stored
- Clean clothes, hair restraints
- Non-food contact surfaces designed, constructed, maintained, installed, located
- Pre-flushed, scraped, soaked
- Wash, rinse water clean, proper temperature
- Non-food contact surfaces clean
- Single service articles not re-used
- Plumbing installed and maintained
- Containers covered, adequate number, insect and rodent proof, emptied at proper intervals, clean
- Outside storage area clean, enclosure properly constructed
- Floors properly constructed, clean, drained, coved
- Walls, ceilings, and attached equipment, constructed, clean
- Lighting provided as required. Fixtures shielded
- Rooms and equipment - vented as required
- Employee lockers provided and used, clean
- Premises maintained, free of litter, unnecessary articles. Cleaning and maintenance equipment properly stored. Kitchen restricted to authorized personnel
- Complete separation from living/sleeping area, laundry
- Clean and soiled linen segregated and properly stored
- Other conditions sanitary and safe operation
- Florida Clean Indoor Air Act

We subdivide all violations into categories for use in Table IV:

Food Handling

- Approved source
- Food Out of Temperature
- Unwrapped or potentially hazardous food not re-served
- Potentially hazardous food properly thawed
- Food protection, cross-contamination
- Foods handled with minimum contact
- Personnel with infections restricted
- Hands washed and clean, good hygienic practices, eating/drinking/smoking
- Sanitizing concentration or temperature
- Food contact surfaces of equipment and utensils clean
- Toxic items properly stored, labeled and used properly
- In use food dispensing utensils properly stored
- Food contact surfaces designed, constructed, maintained, installed, located

- Wiping cloths clean, used properly, stored
- Clean clothes, hair restraints

Kitchen Equipment Maintenance

- Facilities to maintain product temperature
- Thermometers provided and conspicuously placed
- Dishwashing facilities designed, constructed, operated
- Thermometers, gauges, test kits provided

Restaurant Maintenance (non-kitchen)

- Sewage and wastewater disposed properly
- Toilet and hand-washing facilities, number, convenient, designed, installed
- Presence of insects/rodents. Animals prohibited. Outer openings protected from insects, rodent proof
- Restrooms with self-closing doors, fixtures operate properly, facility clean, supplied with hand-soap, disposable towels or hand drying devices, tissue, covered waste receptacles
- Cross-connection, back siphonage, backflow
- Water source safe, hot and cold under pressure
- Non-food contact surfaces designed, constructed, maintained, installed, located
- Pre-flushed, scraped, soaked
- Wash, rinse water clean, proper temperature
- Non-food contact surfaces clean
- Storage/handling of clean equipment, utensils
- Single service items properly stored, handled, dispensed
- Single service articles not re-used
- Plumbing installed and maintained
- Containers covered, adequate number, insect and rodent proof, emptied at proper intervals, clean
- Outside storage area clean, enclosure properly constructed
- Floors properly constructed, clean, drained, coved
- Walls, ceilings, and attached equipment, constructed, clean
- Lighting provided as required. Fixtures shielded
- Rooms and equipment - vented as required
- Employee lockers provided and used, clean
- Premises maintained, free of litter, unnecessary articles. Cleaning and maintenance equipment properly stored. Kitchen restricted to authorized personnel
- Complete separation from living/sleeping area, laundry
- Clean and soiled linen segregated and properly stored
- Other conditions sanitary and safe operation
- Florida Clean Indoor Air Act

Consumer Advising

- Original container: properly labeled, date marking, consumer advisory
- False/misleading statements published or advertised relating to food/beverage

Training/Certification

- Current license properly displayed
- Food management certification valid / Employee training verification
- Hospitality Education Program information provided (information only – not a violation)