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

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ABSTRACT

Do private equity firms affect portfolio company operations? Or are changes a mere artifact of initial investment selection? We document significant operational changes in 101 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 same-zip code franchised locations -- "twin restaurants" over which private equity owners have limited control. Private equity targets also reduce employee headcount and lower menu prices. 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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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, employee layoffs, and adverse cost-cutting. For example, discussing the recent Burger King acquisition by 3G Capital, a New York Times op-ed argues that "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 prior literature documents a positive response to private equity buyouts. Kaplan (1989) finds increases in operating income in buyout targets. Guo, Hotchkiss, and Song (2008) find significant improvements in profitability in a more recent sample. Davis et al. (2013) find productivity improvements at target buyouts, driven mostly by an accelerated exit of less productive establishments and entry of more productive ones.

In this work, we focus on two questions. First, do PE firms cause this value creation, or is the outperformance documented in the literature driven by the selection of companies with promising trajectories? This question has important implications for the debate of the merits of private equity. Second, what levers do PE firms pull to improve operations if, indeed,

[1] "Burger King, the Cash Cow," New York Times, June 2012

[2] The standard approach in the literature is to match PE-backed firms with control firms based on several observable characteristics. Such counterfactuals will generate unbiased estimates under the assumption that this set of characteristics is precisely the ones that led the PE to invest in the portfolio company in the first

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they do? We focus on the restaurant industry, with its unique data and institutional setting, to shed light on both questions. 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.

Identifying whether private equity firms causally affect firm operations is challenging.[2] 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 explore the differential treatment of PE ownership on two *twin* stores that reside in the same zip code but differ in their ownership structure and thus degree of PE influence.

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

[2] The standard approach in the literature is to match PE-backed firms with control firms based on several observable characteristics. Such counterfactuals will generate unbiased estimates under the assumption that this set of characteristics is precisely the ones that led the 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.

approach leads to biased estimates.[3] 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 back-stage 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 to public health safety that may lead to foodborne illnesses.[4] 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.[5]

We compile every restaurant inspection conducted in Florida between 2002 and 2012.[6] Private equity firms acquired 101 restaurant chains with a presence in Florida over this period, accounting for approximately 3,500 individual restaurants out of over 50,000 in operation.[7] 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 fixed effects in the analysis, controlling for customer demographics and local demand shocks.

Our key result is that restaurants commit fewer health violations after being acquired by a private equity firm. This effect is concentrated in those practices whose potential hazards

[3] To avoid such sample selection, other papers have focused on other performance margins such as innovation (Lerner, Sorensen and Stromberg 2012), and employment (Davis et al. 2013)

[4] 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).

[5] We provide a complete list of practices examined by inspectors in the Appendix.

[6] 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 level of the state, not the county, allowing consistent comparison of inspection outcomes across a larger sample.

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

are deemed 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.

Are these operational improvements driven by active PE involvement or through mere selection and chain expected trajectory? We find a differential treatment effect within a chain using the twin restaurants analysis when comparing directly owned restaurants with franchisees located in the same zip code. Specifically, improvements in health-related practices are concentrated in directly owned restaurants where private equity firms have more influence. 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 turn to explore whether these changes are driven by changes in other margins of restaurant operations. Are these improvements driven by the hiring of more employees or by 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 samples 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 competitors in the same cuisine and price segments.

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 only appropriate capital budgeting but rather better training, monitoring, and alignment of worker incentives throughout the chain. In that regard, the 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 in an attempt to identify 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.[8] 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 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

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

section we also provide basic correlations that illustrate key characteristics of the health inspection results and their correlation with consumer satisfaction and restaurant closures.

A. Health Inspections Data

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 pose 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, split into critical and non-critical violations, is provided in Appendix A.

These 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. Table I summarizes surprise inspections by year. Approximately 40,000 eating establishments are inspected roughly twice each year.[9] The mean number of critical violations found is 4.1 with a standard deviation of 4.3.

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

[9] There are fewer inspection in 2002 because the data do not cover the entire year.

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 also 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 the 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 101 separate deals involving 117 distinct brand names and approximately 3,500 individual restaurant locations in Florida.

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 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 increases significantly by 2012. We thus do not have a sufficient panel structure to examine the impact of PE on consumer satisfaction, but we examine 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 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 down rate stores with poor hygiene levels. The correlation may also reflect more broadly that a restaurant that manages to sustain 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.[10] 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

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

closure is 7 percent per year, implying 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 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 4.1 critical violations, this is a sizable decline of 16%. 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 remains unchanged with 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. This specification compares PE treated restaurants to competitors in the same zip code. Restaurants are serving different demographics, and experience different economic conditions across neighborhoods, which could lead to different patterns in performance. Even after adjusting for such variations, 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 1a shows the path of critical violations around private equity takeover. Plotted here are the coefficients of a regression in which critical violations are regressed on private equity entry event year dummies[11]. 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

[11] The regression results are in the Appendix, Table 1A.

statistically significant in year 2 onward). This is consistent with anecdotal evidence on the speed of operational change in restaurants (Gompers, Mugford and Kim 2012). Figure 1b plots 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 Figures 1a and 1b, there was no pre-existing trend in health scores in the three years leading up to the deal. PE firms would need to have 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.

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.[12] 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

[12] 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.

acquires a chain, legally, they only acquire the company-owned branches and the contractual 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. Franchises do not appear to b e situated in different types of locations. Figure 3 compares two particular 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.[13] 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[14]. 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.

B.3 Spillovers

Are all franchisees equally reluctant to implement changes? Interestingly, we also find evidence of management spillover effects. We hypothesize that a franchisee that sees the

[13] Results remain similar if we use a 10% top/bottom cutoff.
[14] The independent variable *DirectOwn* does not drop out of the regression with store fixed effects because some stores switch between parent and franchise ownership.

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. Therefore, rather than focusing on directly owned stores (as in Table VI) we are focusing 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 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.[15]

C. Employment

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

[15] A potential story that may explain 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.

creation and destruction via reallocation across new establishments and closures, but the net impact on employment is modest.

We explore the effect on this stakeholder in Table VIII. First, do PE firms increase the number of stores? We total all units by chain each year. We regress the log of this annual restaurant count on *PostPE* in column 1 with chain and year fixed effects and find a positive but insignificant coefficient[16]. Acquired chains do not appear to be expanding more or less quickly than before. One caveat is our data covers only Florida, so we do not know if PE firms are expanding or contracting nationally. Next, we calculate the average number of employees by chain each year. Across all chains, the mean and median employee counts are 20 and 12. In column 2 of Table VIII, we regress the mean employee count by chain on *PostPE* and a chain fixed effect. The coefficient is -0.14 and significant at the 5% level. The average store in the chain has approximately one less full-time equivalent employee after PE takes over. In column 3, the log of the average number of seats in the chain is included as a control. Larger restaurants employ more people, and the coefficient on *PostPE* is still negative.

Employees per store at the chain level can fall for two reasons: PE firms could be shifting the composition to smaller, more efficient stores or reducing headcount at existing stores. To distinguish between these possibilities we turn our analysis to the restaurant level, and individual restaurants are now the unit of observation. In column 4 the dependent variable is number of employees, and we add individual store fixed effects. The coefficient on *PostPE* is still negative and significant, and thus PE firms do appear to operate existing restaurants with fewer employees than before. To control for the possibility that PE targets are located in areas that, perhaps due to varying economic conditions, have employment patterns different

[16] Because employees are measured at an annual frequency at an unknown date during each year, we drop data points in the year of PE entry since we cannot pinpoint whether the employee count that year was made before or after the deal closing date.

from other restaurants, we include zip code-by-year fixed effects in column 5. PE restaurants still see a decline in workers even when adjusting for geographic variation. In columns 6 and 7 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 2005[17]. 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, the results illustrate that item prices go down following the PE buyout, suggesting that improvements in operational practices and food safety do not translate into higher prices for consumers.

[17] For these fixed effects to provide meaningful comparisons, we drop observations without at least 10 cuisine type × segment × item type competitors. For example, "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.

III. Conclusion

We study the operational consequences of private equity buyouts in the restaurant industry. The restaurant 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, and lower menu prices.

These findings suggest that PE firms take an active role in the firms they acquire and improve operational practices. Improving such practices not only requires capital budgeting, but also, and maybe most importantly, requires 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.

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Figure 1a: Critical violations around private equity deal date.
This figure plots the coefficients and 95% confidence interval bands of a regression of 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.

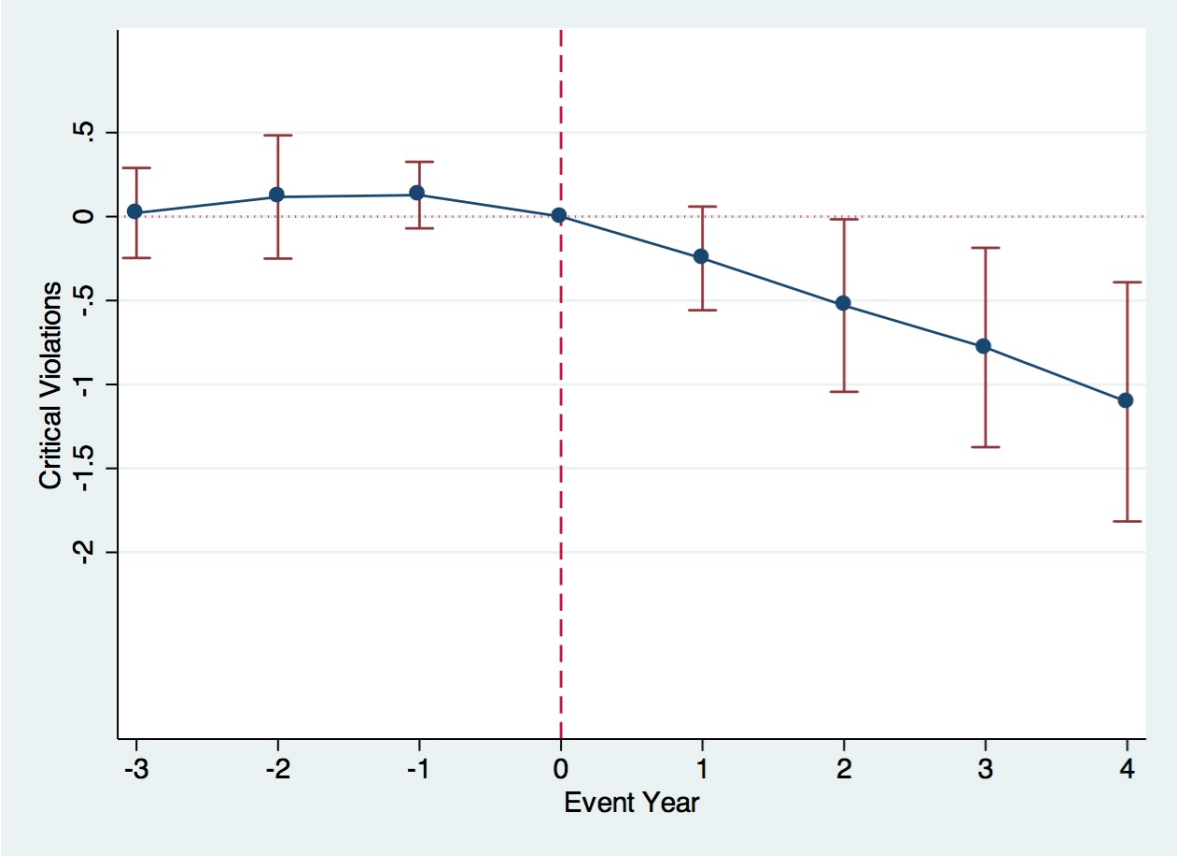


Figure 1b: Non-Critical violations around private equity deal date.
This figure plots the coefficients and 95% confidence interval bands of a regression of non-critical violations on event year dummy variables around the date private equity acquires a restaurant. Additional control variables are restaurant 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.

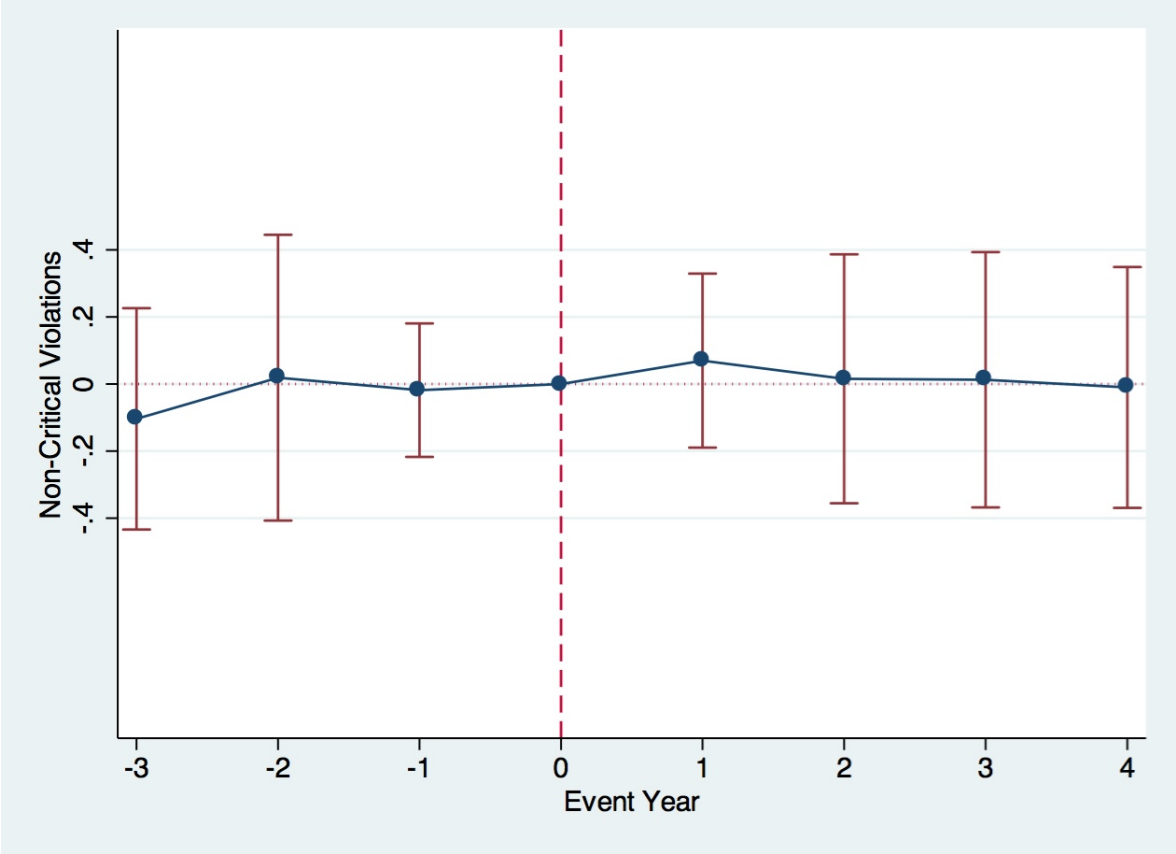


Figure 2: Burger King Restaurants in Tampa, Florida
Map presents the locations of Burger King restaurants in Tampa, Florida, as of December 2012. Black circles are restaurants directly owned by Burger King headquarters, while red cirlcle are franchisees.

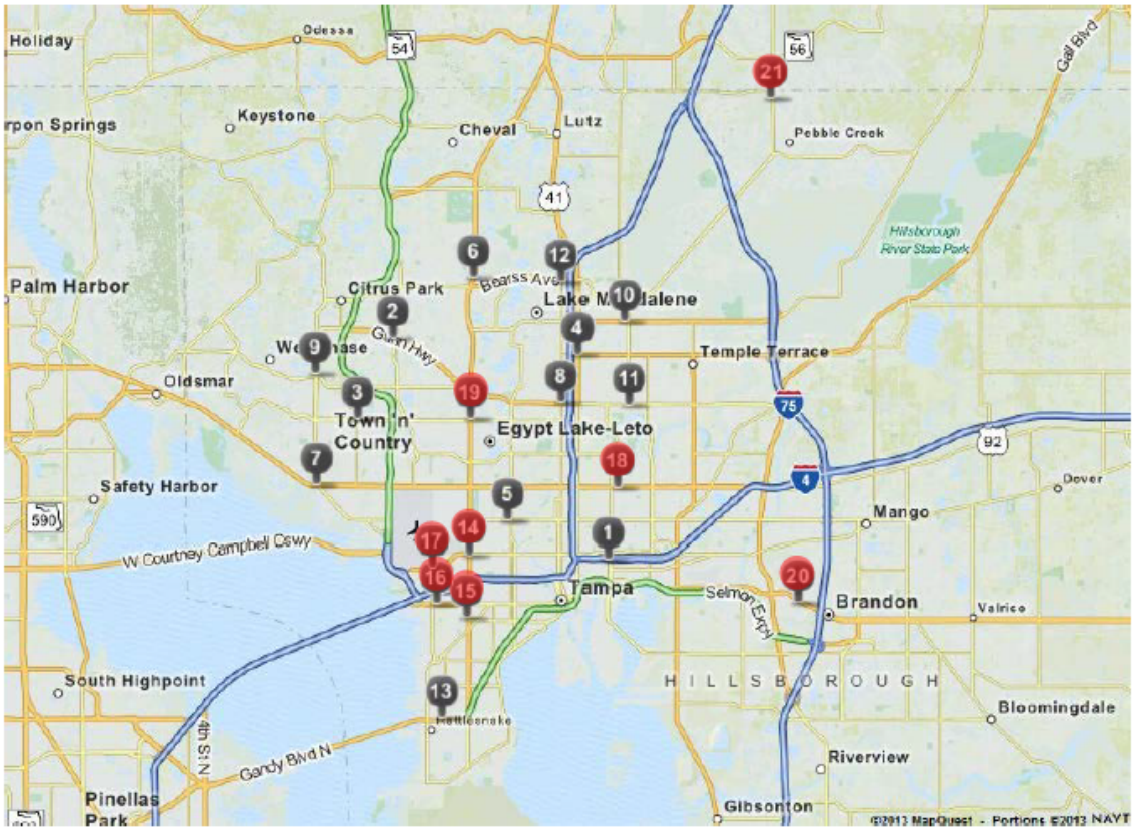


Figure 3: Franchised vs. Directly owned Burger King restaurants – Tampa, Florida
Restaurant numbers indicate the location in the map in Figure 2.



#5 Direct-owned



#16 Franchised

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.

Year	Inspections conducted	Restaurants inspected	Inspections per restaurant	Avg # critical violations	Avg # non-crt violations
2002	45,437	35,265	1.29	1.46	1.84
2003	84,089	38,682	2.17	1.96	2.65
2004	67,569	37,925	1.78	2.08	3.20
2005	73,419	40,397	1.82	2.50	3.59
2006	75,872	40,840	1.86	4.42	4.08
2007	76,857	41,246	1.86	6.06	3.44
2008	89,680	43,371	2.07	5.76	3.43
2009	101,819	44,610	2.28	4.97	2.85
2010	99,264	44,760	2.22	4.91	2.88
2011	105,914	45,917	2.31	4.31	2.41
2012	106,067	48,561	2.18	4.18	2.31
Mean				4.07	2.96
St Dev				4.27	3.27

Table II

Drivers of Restaurant Health and Cleanliness

This table reports general determinants of restaurant health inspection outcomes. 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." *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; positive significance is bolded, negative significance is bolded and italicized. 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***		-0.112***	
	(0.026)		(0.020)	
Log(Seats)	0.262***	0.195***	0.223***	0.141***
	(0.024)	(0.027)	(0.022)	(0.022)
Log(Employees)	0.065**	0.079***	0.179***	0.096***
	(0.033)	(0.020)	(0.024)	(0.015)
Log(Median county income)	-0.535***	-0.334**	-0.509***	-0.345***
	(0.101)	(0.132)	(0.074)	(0.088)
Average check under $7	-0.632**		-0.232	
	(0.275)		(0.219)	
$7 - $10	-0.394**		-0.095	
	(0.164)		(0.128)	
$10 - $20	0.220*		0.207*	
	(0.132)		(0.120)	
Cuisine type				
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					
	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
Avg critical violations	-0.0252***	-0.0247***	-0.0228***	-0.0190***	-0.0208***	-0.0189***
	(0.0030)	(0.0031)	(0.0031)	(0.0038)	(0.0038)	(0.0039)
Avg non-critical violations				-0.0153**	-0.0099*	-0.0101
				(0.0060)	(0.0059)	(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		
	(B1)	(B2)	(B3)
Annual critical violations	0.0010***		0.0012***
	(0.00027)		(0.00029)
Lagged annual critical violations	0.0024***		0.00213***
	(0.00026)		(0.00027)
Annual non-critical violations		-0.00013	-0.00064**
		(0.00028)	(0.00030)
Lagged non-annual critical violations		0.0018***	0.00068**
		(0.00028)	(0.00028)
Log(Seats)	0.0085**	0.0092**	0.0085**
	(0.0038)	(0.0038)	(0.0038)
Log(Employees)	0.0090***	0.0089***	0.0090***
	(0.0013)	(0.0013)	(0.0013)
Year fixed effects	X	X	X
Firm fixed effects	X	X	X
Observations	219,179	219,179	219179
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 variable *Critical violations* is the number of critical violations, those "likely to directly contribute to food contamination, illness or environmental degradation," recorded during the inspection. Non-critical violations are those that "do not directly relate to foodborne illness risk, but preventive measures are required." *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***	-0.647***	-0.627**	-0.625**	-0.614**	-0.612**
	(0.238)	(0.240)	(0.249)	(0.251)	(0.252)	(0.253)
Log(Seats)		0.212***		0.239***		0.178***
		(0.0257)		(0.0503)		(0.054)
Log(Employees)		0.0676***		-0.0289		-0.028
		(0.0169)		(0.0188)		(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	0.0685	0.087	0.084	0.024	0.023
	(0.139)	(0.141)	(0.154)	(0.156)	(0.148)	(0.150)
Log(Seats)		0.155***		0.006		0.037
		(0.0208)		(0.041)		(0.037)
Log(Employees)		0.0841***		-0.007		-0.003
		(0.0134)		(0.012)		(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***	-0.0274*	-0.0743	-0.0929***	-0.0167
	(0.133)	(0.0163)	(0.0530)	(0.0321)	(0.0194)
Log(Seats)	0.107***	0.0111	0.0301**	0.0151*	0.00854
	(0.0301)	(0.00873)	(0.0125)	(0.00828)	(0.00758)
Log(Employees)	-0.0112	-0.000521	-0.00705	-0.00524*	-0.00574**
	(0.0107)	(0.00237)	(0.00551)	(0.00278)	(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 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 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	-0.222	-0.160	-0.159
	(0.306)	(0.306)	(0.266)	(0.266)
PostPE * DirectOwn	-0.316**	-0.315**	-0.319**	-0.319**
	(0.150)	(0.150)	(0.141)	(0.141)
DirectOwn	0.106	0.102	0.114	0.111
	(0.133)	(0.134)	(0.121)	(0.121)
Log(Seats)		0.232***		0.146*
		(0.071)		(0.086)
Log(Employees)		-0.034		-0.023
		(0.024)		(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 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 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 direct effects 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%.

	Critical violations	Critical violations	Critical violations
PE entry year	Actual entry	1 year lag	2 year lag
	(1)	(2)	(3)
PostPE	-0.479	-0.701*	-0.924***
	-0.299	-0.364	-0.278
PostPE * Franchisee	0.332**	0.378***	0.484***
	-0.149	-0.131	-0.137
PostPE * Franchisee * CloseBy	-0.25	-0.362*	-0.590***
	-0.232	-0.197	-0.212
Log(Seats)	0.147*	0.151*	0.155**
	-0.0858	-0.0821	-0.0787
Log(Employees)	-0.0229	-0.0221	-0.0167
	-0.0249	-0.0248	-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 count and employment characteristics on private equity ownership. *Number of restaurants* is at the chain level, measured each year, and only includes stores in Florida. *Avg employees/store across chain* is a single average for all restaurants in a chain in a 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%.

	Log number of restaurants	Log avg emp/store across chain	Log avg emp/store across chain	Log employees / store	Log employees / store	Log employees / store	Log employees / store
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PostPE	0.074	-0.140**	-0.142**	-0.032**	-0.026*	-0.022*	-0.019*
	(0.120)	(0.059)	(0.059)	(0.014)	(0.014)	(0.012)	(0.011)
PostPE * DirectOwn						0.002	0.000
						(0.012)	(0.010)
DirectOwn						0.009	0.018
						(0.010)	(0.012)
Log avg seats			0.180***	0.021***	0.028***	0.007	0.013
			(0.018)	(0.007)	(0.008)	(0.009)	(0.009)
Chain fixed effects	X	X	X				
Store fixed effects				X	X	X	X
Year fixed effects	X	X	X	X		X	
Zip × Year fixed effects					X		X
Observations	111,733	111,733	111,733	235,090	235,090	70,554	70,554
R2	0.904	0.940	0.926	0.961	0.971	0.954	0.967

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*	-0.304*	-0.144	-0.178*	-0.318	-0.456**	-0.0896
	(0.171)	(0.180)	-0.374	-0.0976	-0.523	-0.208	-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

Appendix

Table 1A

Year-by-year Impact of Private Equity on Violations

This table replaces the variable *PostPE* in Table IV columns 4a, 6a, 4b, and 6b 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 coefficients in columns 1 and 3 are plotted in Figures 1a and 1b, respectively. 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)
Year -3	0.0216	0.0466	-0.104	-0.0930
	(0.163)	(0.176)	(0.201)	(0.199)
Year -2	0.117	0.137	0.0189	0.0253
	(0.223)	(0.230)	(0.259)	(0.251)
Year -1	0.128	0.129	-0.0183	-0.00227
	(0.120)	(0.127)	(0.121)	(0.119)
Year 1	-0.249	-0.238	0.0697	0.0340
	(0.188)	(0.195)	(0.158)	(0.166)
Year 2	-0.530*	-0.508	0.0156	-0.0419
	(0.312)	(0.320)	(0.226)	(0.225)
Year 3	-0.780**	-0.794**	0.0127	-0.0896
	(0.361)	(0.359)	(0.231)	(0.231)
Year 4	-1.104**	-1.099**	-0.0102	-0.104
	(0.433)	(0.438)	(0.218)	(0.218)
Log(Seats)	0.210***	0.168***	-0.00779	0.0314
	(0.054)	(0.0521)	(0.046)	(0.0397)
Log(Employees)	-0.0201	-0.0193	0.000181	0.00103
	(0.019)	(0.0200)	(0.013)	(0.0127)
Store fixed effects	X	X	X	X
Year fixed effects	X		X	
Year × Zip fixed effects		X		X
Observations	510,457	510,457	510,457	510,457
R2	0.137	0.537	0.033	0.474

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)