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Michelin Is Coming to Town: Organizational Responses to Status Shocks

Saverio Dave Favaron,[a] Giada Di Stefano,[b] Rodolphe Durand[c]

[a] SKEMA Business School, Université Côte d'Azur, Campus Grand Paris, 92156 Suresnes, France; [b] Department of Management and Technology, Bocconi University, 20136 Milan, Italy; [c] Department of Strategy and Business Policy, HEC Paris, 78351 Jouy-en-Josas, France

Contact: saverio.favaron@skema.edu, https://orcid.org/0000-0002-1026-1584 (SDF); giada.distefano@unibocconi.it, https://orcid.org/0000-0002-9144-5966 (GDS); durand@hec.fr, https://orcid.org/0000-0003-4989-057X (RD)

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Abstract. What happens in the aftermath of the introduction of a new status ranking? In this study, we exploit the unique empirical opportunity generated by the release of the first edition of the Michelin Guide for Washington, DC, in the fall of 2016. We build on prior work on rankings as insecurity-inducing devices by suggesting that newly awarded high-status actors modify their self-presentation attributes to fit with what they believe audiences expect from the elite. Our results show that, depending on their standing prior to Michelin's entry, restaurants acted upon different attributes of their self-presentation. Restaurants with high prior standing emphasized attributes that channeled authenticity and exclusivity, which may imply that their Michelin designation triggered operational changes. Actors with low prior standing, on the other hand, acted on descriptive attributes that did not necessarily imply operational changes and could be easily manipulated to signal their belonging among the elite. We contribute to research on status and conformity by disentangling the sources and types of conformity behaviors that newly awarded high-status actors deploy.

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Introduction

Organizational scholars have devoted substantial attention to the concept of status, defined as the position occupied by an actor in a social hierarchy (e.g., Podolny 1993 and Piazza and Castellucci 2014). Created by arbiters and critics who issue public judgements and evaluations, status hierarchies have been credited with influencing actors' performance and survival chances (Rao et al. 2005, Sauder 2006). Status brings increased visibility and informational control (Goode 1978, Cole and Singer 1991, Gould 2002) that ultimately provide access to resources and performance advantages (Simcoe and Waguespack 2011, Sauder et al. 2012). High-status firms command higher prices, face lower costs, obtain easier access to resources, and enjoy greater freedom to deviate from norms (Podolny 1993, Benjamin and Podolny 1999, Phillips and Zuckerman 2001, Sauder et al. 2012). Prior studies show that, once status is attributed, high-status actors automatically accrue disproportionate rewards and resources, and status positions become difficult to change (Gould 2002, Malter 2014). It, hence, comes as no surprise that these studies describe high-status actors as more willing to deviate, as the risk of diluting their status is weak (Phillips and Zuckerman 2001, Durand and Kremp 2016).

But is it, really? We are all familiar with stories of restaurants gaining or losing stars, premium carmakers seeing their appeal ascend or plummet, and elite schools and athletes climbing or falling in rankings.[1] The relative, unstable, and highly visible nature of status hierarchies has more recently been framed as a great source of insecurity for high-status actors (Sauder and Espeland 2009). Correspondingly, a more recent stream of literature has started to examine sources of instability in status hierarchies (Jensen and Roy 2008, Sauder and Espeland 2009, Phillips et al. 2013, Hahl and Zuckerman 2014, Kovács and Sharkey 2014, Hahl et al. 2017, Jourdan et al. 2017, Prato et al. 2019). In particular, prior work has discussed at least two reasons why an actor who lands a high-status position should not be immune to status insecurity. First, the process of attaining status encourages moral compromises and demands an assertion of superiority (Hahl and Zuckerman 2014), leading a suspicious public to perceive high-status actors as inconsiderate and inauthentic (Hahl et al. 2017, Jourdan et al. 2017). Second, recent studies have argued that high-status actors are not insulated from negative evaluations (Jensen and Roy 2008, Kovács and Sharkey 2014) and may be subject to penalties for deviance (Sauder and Espeland

2009, Prato et al. 2019). Faced with such insecurity, high-status actors have been shown to engage in compensatory actions aimed at resolving concerns about morality and authenticity and at recovering lost ground in the face of negative evaluations and penalties. In particular, prior work has discussed how high-status actors use ostensibly compensatory behaviors to counteract the tendency to "denigrate heroes" (Hahl and Zuckerman 2014); examples include lowbrow culture appreciation (Hahl et al. 2017) and low-profit arthouse investments (Jourdan et al. 2017). Other research suggests that actors react to status losses by reaffirming their worth through mimicking high-status value attributes, such as pricing (Askin and Bothner 2016) and categories (Delmestri and Greenwood 2016, Bowers and Prato 2018).

In this study, we focus our attention on actors who experience a positive change to their status, examining how the insecurity pressures generated by such an increase in status induce them to justify and defend their newly acquired position (Correll et al. 2017, Hahl et al. 2017, Wang and Jensen 2019). Studying responses to status changes demands specific empirical conditions. Most prior studies have examined changes within existing status hierarchies by looking at population data that lacked a clearly stipulated counterfactual and/or control population to establish causality (Azoulay et al. 2013). More recently, empirical work in this domain has started to employ laboratory experiments (Hahl and Zuckerman 2014, Hahl et al. 2017). Although crucial for identifying the causal mechanisms at play, these studies cannot provide us with real-world evidence of actors' behavior. To avoid these problems, while also overcoming identification issues, we leverage the unique empirical opportunity of an exogenous shock in the attribution of status—namely, the release of the first edition of the Michelin Guide for Washington, DC, in the fall of 2016. This approach allows us to move away from a simple discussion of status gains and losses, which could originate endogenously over time. Instead, the exogenous shock of Michelin's entry allows us to observe how focal actors respond to the status change, net of potential actions taken by actors to influence their status positions.

Although not easy to observe, exogenous status shocks are not uncommon. Bowers and Prato (2018), for example, leveraged one of these events to study the effects of changes in status hierarchies among financial analysts. In our case, Michelin is the most prestigious critic in the restaurant industry (Rao et al. 2003, 2005; Ferguson 2008), and the release of its signature red Guide is a significant event for the U.S. fine-dining scene. Washington, DC, was indeed only the fourth U.S. city to be acknowledged by Michelin as worthy of their attention. Such exclusivity clearly exacerbated insecurity pressures associated with the establishment of a new status hierarchy, as all restaurants included in the Guide were admitted for the first time to a ranking that allowed them to join an avant-garde of national restaurants and the elite of the industry worldwide. Using a difference-in-differences approach, we examine changes enacted by restaurants included in the Guide vis-à-vis similar DC restaurants that failed to be included. Arguably, these restaurants were also "treated" by their exclusion, and they are potentially subject to contamination effects. We, hence, further compare the behavior of included restaurants to a second control group, consisting of similar restaurants in Boston, a comparable city that Michelin has not entered. This allows us to more precisely link changes in restaurants' behavior to the status shock they experienced as the result of a new, influential hierarchy being introduced.

Beyond making a fundamental empirical contribution to the literature on status, this work extends current theory in new and important ways. We focus our attention on the behavior of actors who experience a sudden and positive increase in status—that is, a positive status shock—that elevates them to the elite of the industry worldwide. As such, it may seem they would not need to engage in compensatory actions to justify and defend their newly acquired positions. Still, we argue, these high-status actors will respond to a positive status shock by modifying their self-presentation attributes to conform to the expectations associated with their newly acquired status. Our results show that restaurants that experienced a positive status shock acted on three sets of self-presentation attributes. They modified the content of their menus to make their *descriptive* attributes consistent with the ethos of the elite. They better emphasized the techniques and ingredients used to display the *authenticity* that characterizes elite players. Finally, they adjusted pricing to signal awareness of the *value* they create for, and capture from, their customers. We further discuss how responses to status gains are not homogeneous across high-status actors. Results from our analyses suggest that, although all of the status-shocked restaurants acted on all three sets of attributes, the tendency to act was stronger for restaurants that were not placed at the top of the new ranking—that is, those that were not awarded a Michelin star. Contrary to our predictions, our results also suggest that restaurants with high prior standing—which should have been less concerned about proving their worth, but are potentially subject to the denigrating tendencies described by Hahl and colleagues (Hahl and Zuckerman 2014, Hahl et al. 2017)—also engaged in substantial changes to their self-presentation. In particular, they emphasized attributes channeling authenticity and value, implying that their new Michelin designation may have triggered operational changes. Restaurants with

low prior standing, on the other hand, mostly acted on descriptive attributes that did not necessarily imply operational changes, but signaled that they "fit the mold"—that is, that they belong to the elite (Askin and Bothner 2016). Overall, we believe this work complements prior studies on status insecurity and conformity by showing that high-status actors may conform to different pressures depending on the source(s) of their status insecurity—that is, on whether their insecurity originates from concerns about authenticity or belonging.

Theoretical Development

Higher status brings several advantages to actors. Prior literature has associated status with the ability to charge higher prices and generate higher revenues (Benjamin and Podolny 1999); to more easily access resources and, as a result, lower costs (Podolny 1993, Phillips and Zuckerman 2001); and to enjoy a higher likelihood of survival in general (Baum and Oliver 1992, Podolny et al. 1996, Park and Podolny 2000). It should, hence, come as no surprise that organizations actively seek status, and, once they gain it, they endeavor to capture all of the associated benefits (Benjamin and Podolny 1999). Most of prior work has looked at status as a relatively stable property of actors (Washington and Zajac 2005). This stability enables high-status actors to act against general expectations (Phillips and Zuckerman 2001, Durand and Kremp 2016) and span categories without experiencing punishment (Kovács and Johnson 2014, Goldberg et al. 2016).

Scholars have more recently started to question these assumptions and embrace a more nuanced view of status. As Sauder and Espeland (2009, pp. 74–75) observe, the same processes by which actors are placed in a status hierarchy are also "engines of status anxiety," with "perennial" insecurity fostered by the fact that status hierarchies are relative, unstable, and highly visible. Accordingly, recent work examines how actors behave when facing insecurity about their position in a status hierarchy (Askin and Bothner 2016) and the denigrating tendencies associated with status attainment (Hahl and Zuckerman 2014). These studies show that actors react to status losses by signaling that they belong in the high-status group (Askin and Bothner 2016) and that they address doubts about their fit by engaging in acts of deference (Jourdan et al. 2017). When status is not questioned, but authenticity is, they tend to publicly display appreciation for authentic products and practices (Hahl et al. 2017). We contribute to this line of work by uncovering how actors react to gaining status.

How Actors React to Gaining Status

If one were to adopt the traditional view of status as a relatively stable property that shields actors from negative evaluations and penalties, one may think that actors who suddenly *gain* status would feel no need to engage in actions aimed at signaling their worth. However, once we embrace the more recent and nuanced view of status, it follows that suddenly gaining status can trigger insecurity pressures, leading some actors to justify and defend their newly acquired positions (Correll et al. 2017, Hahl et al. 2017, Wang and Jensen 2019). That is precisely the conjecture our study explores.

Status signals an acknowledgment of capabilities and, in turn, triggers expectations from an audience (Ridgeway and Erickson 2000, Lynn et al. 2009). We argue that actors newly awarded with status will internalize these expectations, leading them to modify both ceremonial and material aspects of their offering to qualify as legitimate members of the elite group (Goffman 1959, Podolny 1993). An organization that reacts to a positive status shock by making changes to conform is essentially acting on its self-presentation, in an effort to better align with its perception of its audience's expectations (Ridgeway and Erickson 2000, Schlenker 2002, Jourdan et al. 2017, Wang and Jensen 2019). We, hence, refine the dominant idea that high-status actors are less likely to conform to what is "normal" or observable in their industry (Phillips and Zuckerman 2001) by suggesting that they will *also* display a tendency to conform (Prato et al. 2019). More specifically, our main hypothesis postulates that actors will react to positive status shocks by modifying their self-presentation, with the aim of conforming to what they believe audiences expect from high-status players:

Hypothesis 1. *Organizations that experience a positive status shock will modify their self-presentation with the aim of conforming to the expectations associated with their newly acquired status.*

In our specific empirical setting, we look at how restaurants included in the Guide modify their self-presentation by acting on their menus. Our intuition rests on the idea that restaurant menus play a fundamental role that goes well beyond the obvious provision of information about items and prices. Menus are the "first clear opportunity for the restaurant to identify itself to the patrons and give an indication about what kind of establishment it is" (Lakoff 2006, p. 151)—that is, they communicate the essential nature of an establishment. Indeed, there is increasing emphasis in the restaurant industry on the science behind "menu engineering,"[2] a topic that may sound obscure to us as restaurant customers, but that is nowadays part of the curriculum taught to industry professionals.[3] Fine-dining menus may use sophisticated names for each dish. They often provide details about ingredient sourcing or the story behind the creation of the dish itself

(see Figure 1 for an example). These choices help a restaurant set expectations with customers, and, as noted by Liberman (2004), they are used as status markers—tangible manifestations of the standing of the establishment. Viewing menus as a tangible manifestation of restaurants' efforts to mark their status is also practical from an empirical standpoint, as it allows us to compare changes within and across organizations (Rao et al. 2003). If menus can be used as markers of status, we suggest that restaurants will act to ensure that their

Figure 1. Example of Menu

MENU NOTES

ROASTED BANANA BAVAROIS
I was working on a truffle dish around the holidays when we happened upon this combination. I wanted something lighter than the traditional garlic or potato that might get paired with the truffles and started thinking about other ingredients that had depth and which make work with the truffles' earthiness. Sea urchin is what came to mind with its unctuousness and that feeling of "breath of ocean". In order not to overpower the sea urchin, we needed a medium that wasn't too savory. I often get chocolate undertones with truffles, and had been joking with my pastry chef about doing a banana-truffle dessert and figured that would be the obvious choice.

BOSTON MACKEREL
As we move into Fall, I wanted to make a fish course that, as the second course would be an early transition, much like summer to fall and lighter into richer. The richness and bigger flavor profile of mackerel is something I think of more in the fall and winter. Needing the garnish to have some intensity but also brightness of flavor, the South of France is used for inspiration. A little sweetness with the carrots and orange, a touch of brine from the olive, and cumin-spiced socca tie the dish together.

GARBURE
Garbure, the classic cabbage and meat stew, is one of the first dishes I ordered when I went to France as a stagiaire in 1998. I always hesitate to explain garbure to people because it's a stew that is more of a knife and fork type dish. In the southwest of France where the duck is king, the more upscale versions generally include duck confit. In order to make our version a little lighter I use slices of duck breast with confit of cabbage and La Ratte potatoes which provide the steviness, and of course foie gras emulsion for richness and depth.

LOBSTER CASSOULET
I was once tasked with using Japanese adzuki beans to come up with a dish. The American in me said "Pork and Beans", the French in me said "Cassoulet". The fact that it is a Japanese bean drew me to Lobster Cassoulet. The lobster is poached in oil made with the roasted shells and herbs to give off a very savory depth in flavor. The beans are heated in stock flavored with bonito flakes, providing the depth and smokiness of a meat stock but much cleaner in flavor. It has all of the complexity of its western muse, but with a refinement and delicacy that is very Japanese to me.

KUROGE BEEF
Kuroge beef is special. It is one of those foods that you can do so much with and simultaneously need to make sure you don't ruin it. Frequently, with Kuroge I think of the sense of taste - sweet, sour, salty, bitter-fresh (umami) - and decide which accents to use. Moving into Fall, the use of potato, sunchokes, butternut squash, kale and persimmon are highlights for the dish.

CONCORD GRAPE ISPAHAN
Pierre Hermé is a giant in the modern pastry world and, some would say, singularly responsible for the resurgent popularity of macarons which he began to focus on while Pastry Chef at Ladurée in the 90s. One of his signature creations was inspired by the Iranian city of Isfahan, renowned for its gardens and roses. Titled 'Ispahan,' it featured flavors of raspberry, rose and lychee. I've drawn inspiration from Chef Hermé's approach to building flavor and creating pastries and pay homage to his signature creation here. My Ispahan replaces raspberry with autumn's concord grape, whose brightness marries nicely with the floral notes of the rose and lychee. A touch of cardamom nods at Iranian cuisine and accents the grape's tannins.

SAINT HONORÉ
I officially began my pastry career studying classic French technique at The French Culinary Institute in Manhattan. We studied the great canon of French desserts, including Gâteau St. Honoré, a choux-based cream tart named for the patron saint of bakers. In my inexperienced opinion, it was complicated to execute and seemed old-fashioned. I was sure it was the product of another era – the French version of a jello fruit salad. To my chagrin, I was assigned the cake as part of my graduation exam and even had to make them in miniature for display. Months later while apprenticing in France, I discovered the St. Honoré is still highly beloved in its native country. As my skill in and knowledge of pastry has grown, so has my appreciation of this classic gâteau.

— ERIC ZIEBOLD, Chef

— ANNE SPECKER, Pastry Chef

Notes. The figure displays an example of a restaurant menu. Prior work suggests that high-status restaurants tend to offer a high level of detail in their menus to convey a narrative that goes beyond a simple list of ingredients. The menu shown further exemplifies how menus can be used to provide details about ingredient sourcing or the story behind the creation of the dish itself.

menu reflects their new position (Rao et al. 2005; Gergaud et al. 2007, 2015). Changes in menus can be used by the newly recognized high-status actors as a simple, yet powerful, way to align their self-presentation with the perceived expectations of a status-conscious audience.

The Moderating Role of Prior Standing

We have argued that actors make changes in their self-presentation to conform to what they believe audiences expect from high-status players and to qualify as legitimate members of the elite. In doing so, we have conceived of newly recognized high-status actors as homogenous. Still, one could expect such changes to be particularly useful when audiences' perceptions are not perfectly aligned with the newly granted status position (Kovács and Sharkey 2014). This is consistent with arguments put forward by Gergaud et al. (2015) in their study of the effects of Michelin stars in New York City. According to the authors, when a restaurant increases its prices after being featured in Michelin, its chances of survival increase only when its *perceived* food quality (measured with consumer ratings) also goes up. In other words, producers' actions need to be aligned with audiences' perceptions. Our argument is that the standing of an actor *prior to* the shock will affect the extent to which the actor feels the need to make changes to their self-presentation.

Existing theories that link organizational status with actor behavior rest on several assumptions. One of these assumptions is the perceived sense of security that comes with a status position (Berkowitz and Macaulay 1961, Bowers and Prato 2018). Theory on middle-status conformity, for example, requires high-status actors to feel secure in their position before they feel free to deviate (Phillips and Zuckerman 2001, Durand and Kremp 2016). Applying this to our setting, we can expect that restaurants included in the Michelin Guide had different prior standing based on evaluations from prominent local critics. Michelin inspectors are undoubtedly the most prominent evaluators in the restaurant industry (Ferguson 2008), and they were clearly perceived as such when Michelin entered in Washington, DC (see Methods for a description). Yet, local critics from *The Washington Post* and *Washingtonian* magazine, among others, had been issuing reviews and ratings that arguably contributed to the standing of DC restaurants long before Michelin came to town. We would expect organizations that enjoyed high standing prior to a positive status shock to benefit from a heightened sense of security, in turn, receiving a positive status shock as an affirmation of an existing standing rather than as a change requiring adaptation. Thus, we predict that, in line with prior work, these organizations will feel less pressure to mark their newly acquired position (Kim and Jensen 2011, Durand and Kremp 2016) and will be less likely to modify their self-presentation:

Hypothesis 2. *Organizations with high standing prior to a positive status shock will be less likely to modify their self-presentation in response to that shock.*

Methods

Setting and Data

We test our theory in the context of fine dining, a popular context of enquiry for organization studies (Rao et al. 2003, 2005; Demetry 2013; Di Stefano et al. 2014; Kovács and Johnson 2014; Di Stefano et al. 2015). On May 31, 2016, Michael Ellis, director of the Michelin Guide, announced that the first edition of the Washington, DC, Michelin Guide would be published in the fall of that year.[4] According to Michelin, the new Guide would "put the city more firmly on the world stage of great gastronomic destinations." Press interviews released by prominent chefs, and our own interviews with food critics and restaurant managers in the weeks following the announcement, substantially confirmed Michelin's expectations.[5] "I expect it will change consumers' expectations (about the culinary scene in DC); the Michelin Guide is so highly revered" was the first comment we received from the owner of a midrange restaurant in downtown DC. Another informant explained, "When a new review (or award) comes out, we tend to have an upsurge of people who are dining with us because of that, and so of course, we respect that they have a particular expectation." Similarly, the manager of another restaurant commented, "It is a significant standard for dining and so for DC to be included for the first time is a big deal." With the Guide's publication on October 13, 2016, Washington, DC, became only the fourth U.S. city after New York, San Francisco, and Chicago to have a Michelin Guide. The publication was clearly expected to elevate the status of the city's dining scene, which, at the time, suffered from "an outdated reputation of offering only fusty steakhouses."[6]

Only 106 of the city's restaurants were ultimately treated by inclusion in the Michelin Guide, with 12 being awarded a coveted Michelin star. The release of the Guide drew a clear line between restaurants that were included in the Guide and those that were not included, dividing a field of potential contenders that would have previously appeared similar based on factors such as local ratings, price point, and cuisine style. We will refer to this second group of restaurants as those that were "at risk" of making it to the Guide, but were, in fact, excluded by Michelin inspectors. Focusing our attention only on restaurants in the DC area, however, may not suffice, because, to some extent, the entire city was treated by Michelin's entry.

To mitigate this threat to identification, we created a matched sample of restaurants in a city that was comparable in geography, size, and dining scene, but in which the Michelin Guide was not present. We explain our empirical strategy next.

Empirical Strategy

Given our interest in studying the effects of Michelin's entry on the behavior of restaurants included in the Guide, our empirical strategy relies on a difference-in-differences (DID) framework, in which we compare treated restaurants in the Guide with two meaningful control groups: (1) restaurants *within* DC that were at risk of entering and (2) restaurants *outside* DC that were located in a comparable city (Boston) where Michelin did not enter.[7] The rationale behind the use of two control groups is that arguably all DC restaurants were treated by the entry of Michelin. (That is, it could be said that restaurants at risk of entering were treated with exclusion from the Guide.) Also, we cannot exclude contamination effects due to competition. The use of the second control group allows us to more precisely link changes in restaurants' behavior to the status shock they experienced. For our analyses, we build on the classic DID estimator (Wooldridge 2010):

$$Y_{it} = \beta_0 + \beta_1 * d_t^{Post} + \beta_2 * d_i^{Treat} + \boldsymbol{\beta_3 * d_t^{Post} * d_i^{Treat}} + \alpha_i + \gamma_t + u_{it}, \quad (1)$$

in which Y_{it} is our dependent variable for restaurant i in year t, d_t^{Post} is a dummy variable indicating whether the observation occurs post-publication or pre-publication of the Guide, and d_i^{Treat} is a dummy variable indicating whether the restaurant is in the treated or control group. The term of interest in the above equation is the interaction between the two dummies for post-publication and treated (in bold). The coefficient (β_3) captures how restaurants in the treated group reacted to Michelin's entry compared with restaurants in the control group.

Control Group Within DC. Our first control group consists of DC restaurants that were excluded from the first edition of the Michelin Guide, despite being similar on a number of visible parameters to those that were included. To build this control group, we started with more than 700 restaurants that were excluded from the Guide and for which we had complete information (name, location, cuisine type, price range, ratings, reviews, and menus) before and after Michelin's entry. Next, we analyzed common features of restaurants included in the Guide and decided to keep only restaurants with the following features: (1) a Yelp rating equal to or above the lowest of all Yelp ratings of restaurants included in the Guide; (2) a price range equal to or above the restaurant with the lowest price range in the Guide; and (3) a cuisine type common to at least two other restaurants in the Guide. The resulting list of 143 restaurants composes our first control group.

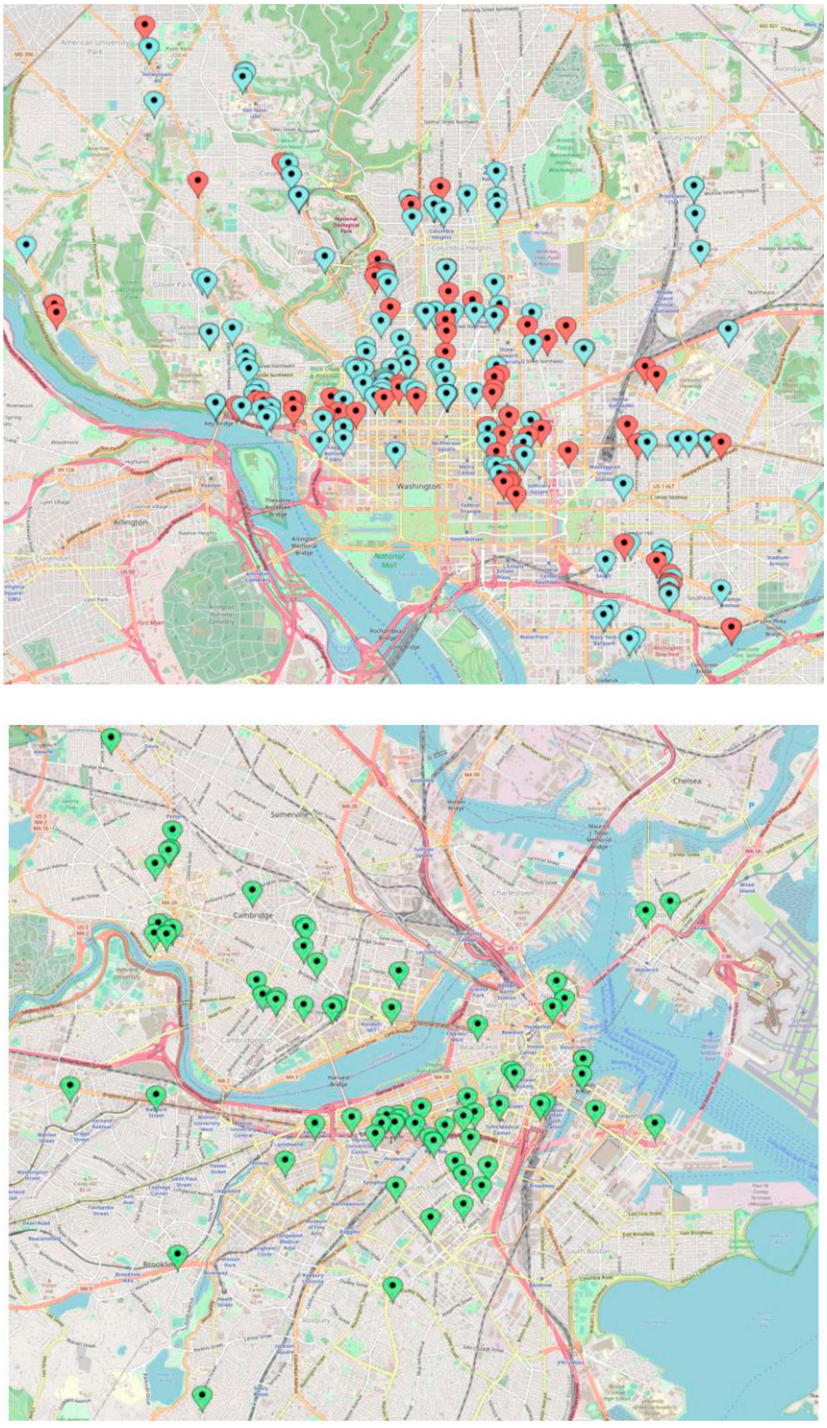
It is important to highlight that our objective with this control group was not to create an exact match to the 83 treated restaurants.[8] Although an exact match would have been empirically ideal, it would not have made sense from a practical standpoint, given that, with few exceptions,[9] all restaurants usually considered the best in town were actually included in the Guide. We, hence, opted for a more inclusive list that represented the set of all other DC restaurants meeting the minimum requirements for inclusion in the Guide.

Control Group Outside DC. We built our second control group by identifying restaurants located in a city that was comparable to DC in terms of geography and dining scene, but that was not covered by Michelin. The city of Boston proved to be the ideal candidate.[10] We identified control restaurants through a matched case-control approach based on the following set of pre-Guide covariates: (1) cuisine type, (2) price level, and (3) average Yelp rating. For each treated restaurant, we identified all exact matches based on cuisine type and price. This resulted in a set of potential matches, among which we picked the one whose average Yelp rating pre-Guide was within a ± 0.5 range of the rating of the original restaurant. If this procedure still resulted in more than one match, we randomly selected one. We report the complete list of restaurants in our treated and control groups in Online Appendix 1, while Figure 2 shows their exact location on the map.

As shown in Table 1, matching between the treated group and the control group outside DC (control 2) was very effective on all relevant dimensions, with the only difference being in restaurant age (higher for control). On the other hand, the comparison between the treated group and the control group within DC (control 1) revealed significant differences in the average Yelp rating and price level (lower for control). This finding can be explained by the fact that control 1 is not an exact match, but was, rather, designed to keep track of the behavior of all restaurants potentially at risk of inclusion in the Guide. In light of this finding, we suggest extreme caution in formulating conclusions that are not supported by a comparison with control 2.

Note that our identification strategy rests on the idea that some restaurants in Washington, DC, were treated with their inclusion in the Guide, whereas others—either in the same city (control 1) or in a

Figure 2. (Color online) Location of Treated and Control Restaurants



Notes. The upper map shows the location of restaurants in Washington, DC, with pins identifying both treated restaurants (color red online) and restaurants in control 1 (color blue online). The lower map shows the location of restaurants in Boston, with pins identifying restaurants in control 2. Two restaurants in control 1 (nos. 78 and 83; see Online Appendix 1) were included, despite being located outside Washington, DC, because of their frequent inclusion in local dining guides. These two restaurants are not visualized in the map due to scale constraints.

comparable city (control 2)—were not, and, hence, the control groups can act as a counterfactual to what we observe happening in the treatment group. For this approach to be credible, a series of conditions need to be satisfied, notably, the parallel trend assumption, as well as the absence of a contemporaneous event differentially affecting some restaurants or cities during our period of study. We will present evidence to check

Table 1. Summary Statistics for Treated and Control Samples

	Treated		Control 1			Control 2		
Variable	Mean	SD	Mean	SD	*p*-value	Mean	SD	*p*-value
Yelp rating (1–5)	3.948	0.032	3.661	0.027	0.000	3.924	0.035	0.608
Yelp price level (1–4)	2.614	0.074	2.147	0.031	0.000	2.639	0.074	0.819
Restaurant age (years)	7.157	0.422	7.825	0.307	0.196	8.711	0.437	0.012
Yelp reviewers experience	115.139	6.538	121.157	9.017	0.638	102.831	6.251	0.175
Local Yelp reviewers (%)	0.350	0.015	0.376	0.014	0.238	0.409	0.034	0.120

Notes. The figures in the table are from 2016, before the publication of the first edition of the Michelin Guide for Washington, DC. Yelp figures are computed on the previous 12 months. Yelp rating and Yelp price level were among the variables used to match restaurants. We report information about restaurant age, reviewer experience (measured as number of reviews published on Yelp), and proportion of local reviewers to compare across a broader range of characteristics.

for these crucial model assumptions after discussing our main results.

Variables and Measures

Our data collection began immediately after the announcement of the Guide's first Washington, DC, edition (May 31, 2016). In the time frame between the announcement and the actual publication of the Guide (October 13, 2016), while still ignorant about which restaurants would be included in the Guide, we collected information about restaurants in Washington, DC, and Boston from Yelp. Information for each restaurant included name, location, cuisine type, price range, ratings, reviews, and menus, when available. When menus were not available on Yelp, we searched restaurant websites. This procedure allowed us to compile a list of more than 1,500 restaurants located in Washington, DC, and Boston. Between June and September 2017 (approximately one year after the first data collection and before the publication of the second edition of the Guide), we conducted a new data collection on Yelp (and on restaurant websites when menus were not available through Yelp). We use the shock triggered by Michelin's entry to examine the behavior of restaurants that were included in the Guide vis-à-vis the two control groups, which we built following the procedure described in the previous section. We describe all variables and measures in Table 2 and report descriptive statistics and correlations in Table 3.

Our main independent variable is the interaction between two dummies, namely, *postpublication* (equal to one after the publication of the Guide and zero before) and *treated* (equal to one for treated restaurants and zero for control). We captured restaurants' reactions by looking at how restaurants modified attributes of their dinner menus. In order to determine which changes a restaurant would implement, we built on previous work in the areas of linguistics, taste, and culture by looking at the evolution of restaurant menus in the United States (Zwicky and Zwicky 1980, Liberman 2004, Lakoff 2006, Jurafsky 2014, Jurafsky et al. 2016). The study by Jurafsky et al. (2016), in particular, offers key insights on the characteristics of restaurant menus. The authors carefully analyzed the menus of 6,511 restaurants in seven U.S. cities (including Washington, DC) and the 591,980 dishes included in those menus. The results of this study, summarized in their James Beard finalist book and featured, among others, by *The New York Times*, *The Boston Globe*, and *The Financial Times*, offer a rich overview of the distinctive features and trends of restaurant menus. We leveraged this work to identify six relevant attributes in the menus in our sample.

The first two attributes we examined are associated with how menus look from a *descriptive* standpoint, in terms of the number of words used to describe menu items and explicit references to portion sizes. Prior work suggests that high-status restaurants tend to offer a high level of detail in their menus to convey a narrative that goes beyond a simple list of ingredients (as exemplified by the case displayed in Figure 1). We use *description length* to capture the level of detail provided in menus. The variable is measured as the number of words used in the menu, divided by number of dishes in the menu, to facilitate comparison across menus.[11] Moreover, according to prior work, high- and low-status restaurants differ from one another in that the latter are more concerned with giving an impression of abundance and, therefore, highlight the size of portions. Our second variable, *size description*, is a direct translation of Bourdieu's (1984) definition of plenty. In particular, we look at the number of words (divided by the number of dishes) used to characterize the size of portions, using the list compiled by Jurafsky (2014).

The next two attributes we examined are associated with how *authentic* menus look, as exemplified by the emphasis on mastery of culinary skills and the origin of ingredients. Prior work suggests that high-status restaurants tend to differ from low-status ones in terms of quality of raw materials and level of culinary skills used in the preparation of dishes (Rao et al. 2005). Our first variable, *craft authenticity*, captures the

Table 2. Variables and Measures

Variable	Measure	Operationalization
Independent variables		
Postpublication	Year of publication of first edition of the Michelin Guide for Washington, DC	Dummy (0, 1)
Treated	Restaurant included in first edition of the Michelin Guide for Washington, DC	Dummy (0, 1)
Dependent variables		
Description length	Length of dish description	Total number of words, divided by total number of dishes
Size description	Frequency of mentions to portion size (*big*, *bigger*, *biggest*, *bottomless*, *bountiful*, *colossal*, *endless*, *enormous*, *generous*, *generously*, *gigantic*, *ginormous*, *heaped*, *heaping*, *hearty*, *hefty*, *huge*, *largest*, *loaded*, *loads*, *lots*, *mammoth*, *massive*, *mega*, *oversized*, *overstuffed*, *piled*, *plentiful*, *plenty*, *refills*, *unlimited*, *and more*, *king sized*, *Texas sized*, *thick cut*, *tons of*, *with more*)	Number of related words, divided by total number of dishes
Craft authenticity	Frequency of mentions to cooking techniques (*sauté*, *fricassée*, *sous-vide*, *low-temperature*, *flambé*, *caramelizée*, *nappage*, *pasteurized*, *gelée*, *purée*, *confit*, *consommé*, *simmered*, *smothered*, *braised*)	Number of related words, divided by total number of dishes
Natural authenticity	Frequency of mentions to food origin (*natural*, *organic*, *farmhouse*, *wild caught*, *grass fed*, *local*, *market*, *farmed*, *free range*, *heirloom*, *ranch*)	Number of related words, divided by total number of dishes
Average price	Average price for a main dish (explicitly listed under main dishes or equivalent depending on cuisine type)	Average price of main dishes in the menu
Minimum price	Minimum price for a main dish (explicitly listed under main dishes or equivalent depending on cuisine type)	Minimum price of main dishes in the menu
Moderating variable		
Prior standing	Restaurant appears in any of the following in 2015 and/or 2016: (a) *Washington Post* Dining Guide; (b) 100 Very Best by the *Washingtonian*; (c) Rammy awards; or (d) James Beard Awards (national and mid-Atlantic region)	Dummy (0, 1)

Note. The table lists all variables employed in the analysis with their operationalization.

Table 3. Descriptive Statistics and Correlations

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7
1. *Description length*	13.464	4.940	3.320	34.890	1.000						
2. *Size description*	0.028	0.044	0.000	0.300	0.255	1.000					
3. *Craft authenticity*	0.086	0.094	0.000	0.600	0.306	−0.025	1.000				
4. *Natural authenticity*	0.057	0.088	0.000	0.550	0.136	0.078	0.172	1.000			
5. *Average price*	19.582	7.008	4.400	48.818	−0.115	0.095	0.131	0.321	1.000		
6. *Minimum price*	15.015	5.649	3.000	42.000	−0.095	0.084	0.119	0.305	0.905	1.000	
7. *Prior standing*	0.146	0.353	0.000	1.000	−0.111	0.001	−0.101	0.031	0.014	0.020	1.000

Note. The figures in the table are from 2016, before the publication of the first edition of the Michelin Guide for Washington, DC.

mastery of skills (Carroll and Wheaton 2009) by looking at the number of words (divided by the number of dishes) related to cooking techniques, using the list compiled by "The Professional Chef" from The Culinary Institute of America, one of the classic kitchen references for top U.S. chefs. Our second variable, *natural authenticity*, focuses on raw materials (Lakoff 2006) by measuring the number of words (divided by number of dishes) related to the provenance and origin of food, using the list compiled by Jurafsky (2014).[12]

The last two attributes we examined are associated with the *value* conveyed by menus, as signaled by prices. Prior work suggests that high-status actors can command higher prices (e.g., Podolny 1993 and Sands 2020) and use pricing to signal belonging (Askin and Bothner 2016).[13] To examine the pricing strategies of restaurants newly included in the Michelin Guide, while reducing the complexity associated with differences in menu structure and dish types across cuisines (e.g., a main course in a Korean restaurant corresponds to different menu entries, such as bibimbap, stew, grill, etc.; in an Italian restaurant, similarly, you have a first and/or a second course after the appetizer), we focused on main dishes only. Our first variable, *average price*, is the average of all dish prices

listed as "main dishes" (or equivalent) in the menu, where changes could potentially imply changes in the restaurant's operations (e.g., a newly awarded restaurant introducing more expensive ingredients). Our second variable, *minimum price*, is the minimum of all dish prices in the main dishes (or equivalent) section of the menu, where we would expect changes to mostly capture signaling behaviors (e.g., the newly awarded restaurant raising the bar to keep pace with the elite). Because some menus in our sample did not include price information, we include variables related to value attributes for 71 of the 83 treated restaurants (and their corresponding matches in control 2) and for 133 of the 143 restaurants in control 1.

Finally, we measured our moderating variable, *prior standing*, based on rankings and awards provided by the most prominent intermediaries before Michelin entered. Based on our understanding of the dining scene in the DC area, we identified three prominent local rankings and awards (*The Washington Post* Dining Guide, the *Washingtonian* 100 Very Best, and the *Rammy* awards by the Restaurant Association Metropolitan Washington). We also included the James Beard Awards presented by the eponymous foundation to recognize culinary professionals across the United States. A restaurant in our treated group received a *prior standing* score of one if it appeared at least once in any of these rankings in 2015 or 2016, and zero otherwise. This allowed us to identify a subgroup of 45 treated restaurants with high prior standing, while the remaining 38 had low prior standing.

Results

The Effects of Michelin's Entry on Restaurant Menus

We start by analyzing the main effect of the shock triggered by Michelin's entry on the behavior of restaurants, as captured by changes in their menus. To this end, we first ran our DID models to estimate the overall effect, then dove deeper to understand the sources of these changes both at the aggregate level and at the individual restaurant level. Table 4 reports the results of an ordinary least squares (OLS) regression with restaurant fixed effects and standard errors clustered at the restaurant level. Our variable of interest is the interaction term between *postpublication* and *treated*. We ran the analysis on all the restaurants that were included in the Guide and then distinguished between restaurants that were or were not awarded Michelin stars. Stars are an additional recognition awarded by Michelin to restaurants that offer a particularly good cuisine and are considered one of the top achievements in the career of a chef (Di Stefano et al. 2015). Because only eight of the 83 restaurants in our data set are starred, we do not report the results of a regression on such a small sample; we focus instead on the results for non-starred restaurants only. Following a middle-status conformity argument (Phillips and Zuckerman 2001) applied to the context of a rarefied top, one could argue that, mutatis mutandis, non-starred restaurants represent middle-status organizations that can still improve their status position. In this case, we should observe that these restaurants have a higher propensity to conform compared with the broader population, which includes the starred restaurants.

As shown in Table 4, after Michelin's entry, we observe a significant positive effect on the length of dish descriptions ($\beta = 1.404$, $p = 0.005$ for control 1; and $\beta = 1.404$, $p = 0.018$ for control 2), emphasis on craft authenticity ($\beta = 0.021$, $p = 0.013$; and $\beta = 0.019$, $p = 0.043$), and minimum prices charged for main dishes ($\beta = 0.777$, $p = 0.024$; and $\beta = 0.779$, $p = 0.059$) compared with restaurants in both control groups and independent of whether restaurants were awarded stars. These results are consistent with Hypothesis 1 and the idea that organizations experiencing a positive status shock will modify their self-presentation to conform with expectations associated with their newly acquired status. Interestingly, in the case of non-starred restaurants, we also observe a significant increase in emphasis on the origin of ingredients ($\beta = 0.016$, $p = 0.033$; and $\beta = 0.011$, $p = 0.100$) and a significant decrease in the emphasis on portion sizes (only compared with control 2: $\beta = -0.009$, $p = 0.037$). These results are consistent with the idea that restaurants that were included in the Michelin Guide, but did not make it to the top, were particularly insecure in their position and, hence, felt the need to better mark their newly acquired status.[14]

How Big Are the Effects? To better gauge the economic significance of these results, in Table 5, we compute effect sizes and decompose the overall DID effect into (a) the effect that Michelin's entry had on treated restaurants and (b) the effect that Michelin's entry had on control restaurants. The table produces a few interesting observations. First, across both control groups (control 1 and control 2) and both samples (all restaurants and non-starred restaurants only), Michelin's entry increased the difference between treated and control group restaurants by 10%–12% for the length of dish descriptions and 15%–24% for mentions of craft authenticity. Within the subgroup of non-starred restaurant, we also observe an increase of 18%–27% in mentions of natural authenticity and a 38% decrease in mentions of portion sizes, when comparing treated restaurants to those in control 2. As for prices, we detect a significant 5% increase in the difference in minimum prices between treated versus control restaurants in the entire sample, but not in the non-starred subgroup,

Table 4. Changes in Menu Features, Main Results

	All restaurants				Non-starred restaurants			
	Control 1		Control 2		Control 1		Control 2	
Variable	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Description length								
Postpublication	−0.877***	0.277	−0.877**	0.428	−0.877***	0.277	−0.751	0.457
Postpublication × treated	**1.404*** **	**0.491**	**1.404** **	**0.590**	**1.613*** **	**0.510**	**1.487** **	**0.627**
Constant	13.605***	0.115	12.982***	0.147	13.517***	0.117	12.753***	0.157
N	452		332		436		300	
F	5.853		2.947		6.486		2.825	
Adjusted R^2	0.043		0.030		0.051		0.030	
Size description								
Postpublication	0.007	0.007	0.001	0.003	0.007	0.007	0.006*	0.003
Postpublication × treated	−0.011	0.008	−0.006	0.005	−0.011	0.008	**−0.009** **	**0.004**
Constant	0.028***	0.002	0.027***	0.001	0.027***	0.002	0.024***	0.001
N	452		332		436		300	
F	1.204		0.77		1.183		2.393	
Adjusted R^2	0.004		0.004		0.003		0.024	
Craft authenticity								
Postpublication	−0.008**	0.004	−0.007	0.006	−0.008**	0.004	−0.003	0.005
Postpublication × treated	**0.021** **	**0.008**	**0.019** **	**0.010**	**0.018** **	**0.007**	**0.013***	**0.008**
Constant	0.085***	0.002	0.088***	0.002	0.086***	0.002	0.0087***	0.002
N	452		332		436		300	
F	3.482		2.142		3.179		1.481	
Adjusted R^2	0.027		0.021		0.024		0.016	
Natural authenticity								
Postpublication	−0.002	0.004	−0.002	0.005	−0.002	0.004	0.002	0.003
Postpublication × treated	0.012	0.007	0.012	0.008	**0.016** **	**0.007**	**0.011***	**0.007**
Constant	0.053***	0.002	0.068***	0.002	0.051***	0.002	0.059***	0.002
N	452		332		436		300	
F	1.497		1.458		2.658		2.711	
Adjusted R^2	0.010		0.014		0.021		0.044	
Average price								
Postpublication	0.385**	0.177	0.495***	0.185	0.385**	0.177	0.552***	0.168
Postpublication × treated	0.482	0.294	0.372	0.312	0.149	0.256	−0.018	0.250
Constant	18.753***	0.071	21.190***	0.075	18.702***	0.067	21.001***	0.0625
N	408		284		394		256	
F	9.185		10.350		6.553		9.549	
Adjusted R^2	0.077		0.131		0.048		0.123	
Minimum price								
Postpublication	0.249*	0.150	0.246	0.271	0.249*	0.150	0.383	0.244
Postpublication × treated	**0.777** **	**0.342**	**0.779***	**0.410**	0.326	0.293	0.192	0.351
Constant	14.483***	0.072	16.050***	0.102	14.493***	0.065	16.021***	0.088
N	408		284		394		256	
F	6.955		5.975		3.974		3.817	
Adjusted R^2	0.083		0.080		0.038		0.050	

Notes. The table reports results of an OLS regression with restaurant fixed effects and standard errors clustered at the restaurant level. The analyses are run on all the restaurants that were included in the Guide (all restaurants) and then on the subsample of restaurants that were not awarded Michelin stars (non-starred restaurants). Control 1 includes restaurants at risk of inclusion from Washington, DC; control 2 includes matched restaurants in Boston. Coef, coefficient.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

thus suggesting that the increase is driven by starred restaurants becoming less accessible.

The effects for *description length* and *minimum price* are easy to interpret. The former tells us how many words, on average, are used to describe a dish on the menu; the latter tells us how many dollars are charged for a main dish, on average or at a minimum. The changes related to *size description*, *craft authenticity*, and *natural authenticity*, on the other hand, are more difficult to put in context, as they refer to how many words related to portion sizes, cooking techniques, or ingredient provenance are used, on average, for describing a dish. To help with the interpretation, it may be useful to consider that these words are not very frequent: In 2016, restaurants in our sample used at most approximately three words related to *size description*, approximately five related to *craft authenticity*, and approximately three related to *natural authenticity*. This

Table 5. Changes in Menu Features, Effect Sizes

	All restaurants				Non-starred restaurants			
Variable	Mean 2016	Mean 2017	Diff, %	Effect size, %	Mean 2016	Mean 2017	Diff, %	Effect size, %
Description length								
Treated	12.885	13.413	4		12.552	13.288	6	
Control 1	14.023	13.147	−6	**10**	14.023	13.147	−6	**12**
Control 2	13.078	12.201	−7	**11**	12.954	12.203	−6	**12**
Size description								
Treated	0.027	0.022	−16		0.023	0.020	−16	
Control 1	0.029	0.036	25	41	0.029	0.036	25	41
Control 2	0.027	0.029	6	21	0.025	0.031	22	**38**
Craft authenticity								
Treated	0.087	0.100	14		0.089	0.099	11	
Control 1	0.084	0.075	−10	**24**	0.084	0.075	−10	**21**
Control 2	0.088	0.081	−8	**22**	0.085	0.081	−4	**15**
Natural authenticity								
Treated	0.068	0.078	15		0.063	0.077	22	
Control 1	0.045	0.043	−5	20	0.045	0.043	−5	**27**
Control 2	0.068	0.066	−3	18	0.055	0.057	4	**18**
Average price								
Treated	20.405	21.272	4		20.370	20.830	2	
Control 1	17.871	18.256	2	2	17.871	18.256	2	0
Control 2	21.971	22.466	2	2	21.572	22.124	3	0
Minimum price								
Treated	15.600	16.626	7		15.750	16.220	3	
Control 1	13.887	14.135	2	**5**	13.887	14.135	2	1
Control 2	16.500	16.747	1	**5**	16.290	16.672	2	1

Notes. Values for all variables are expressed in words per dish, except in the case of price variables, expressed in USD per dish. The analyses are run on all the restaurants that were included in the Guide (all restaurants) and then on the subsample of restaurants that were not awarded Michelin stars (non-starred restaurants). Control 1 includes restaurants at risk of inclusion from Washington, DC; control 2 includes matched restaurants in Boston. Figures in bold correspond to significant effects as per Table 4. Diff, difference.

implies that, when we talk of a 20%–40% variation, we are talking, at best, about a one-word change in the difference between two menus. This is a small, but noticeable, effect: adding even a single word such as "generous," "hearty," "sous-vide," "sauté," "organic," or "grass-fed" to a 12-word description (on average) has been shown to dramatically affect customers' perceptions (Wansink et al. 2002).[15] A second interesting observation that emerges from looking at Table 5 is that the effects we detect with our DID estimator come from treated restaurants moving against trends that are common to control restaurants across both control groups. This is the case for all variables except *minimum price*, where the trends we observe for treated restaurants are in line with those we observe for control restaurants, only stronger. We will come back to this evidence when discussing the assumptions behind our DID models.

Where Do the Effects Come From? Once we established that Michelin's entry had a significant effect on the difference between treated and control restaurants and assessed the size of this effect, we next explored the extent to which the patterns we identify are caused by the majority of restaurants in our sample moving in this direction or a few individual restaurants driving the effect. To this end: (a) We plotted all restaurants on scattered boxplots to examine how treated restaurants changed pre/post as compared with their matched counterparts; (b) we graphed the empirical Cumulative Distribution Function (eCDF) of the pre/post difference for treated and control restaurants; and (c) we plotted the pre/post behavior of individual restaurants using lollipop plots. Figure 3 reports results related to (a) and (b) for the significant effects detected in Table 4 for all restaurants (*description length*, *craft authenticity*, and *minimum price*), with the rest of the analyses being reported in Online Appendix 3. Graphs in Figure 3 show that most restaurants are moving in line with the significant effects we previously identified. For *description length*, we observe an upward shift in the entire distribution and a decrease in the number of outliers, with opposite trends for control restaurants. For *craft authenticity* and *minimum price*, the interquartile range shifts toward higher values, and the maximum goes up, with opposite (*craft authenticity*) or weaker (*minimum price*) trends for control restaurants. The overall patterns in the eCDF are in line with our expectations, despite few negligible areas of overlap between treated and control restaurants after the Guide's publication.

The Moderating Role of Prior Standing

We next studied the influence of prior standing on our main effect. To this end, we ran a split-sample analysis comparing treated restaurants, with high versus low prior standing, to all 143 restaurants in control 1 and to all 83 restaurants in control 2.[16] We then conducted post-estimation tests for the equality of coefficients across the two specifications (i.e., low and high prior standing), while clustering the standard errors at the restaurant level. Remember that our main results, as per Table 4, show that, compared with control restaurants, restaurants included in the Guide experienced a significant increase in *description length*, *craft authenticity*, and *minimum price*. Results from our split-sample analysis, shown in Table 6, seem to suggest that restaurants mark their newly acquired status positions in different ways, depending on their prior standing. In particular, restaurants with low prior standing are somewhat more likely to emphasize descriptive attributes: They exhibit higher levels of *description length* (control 1: $\beta = 1.764$, $p = 0.010$; control 2: $\beta = 1.764$, $p = 0.021$), even if the difference with high-prior-standing restaurants is not significant (control 1: $p = 0.243$; control 2: $p = 0.416$). Restaurants with high prior standing, on the other hand, are somewhat more likely to emphasize authenticity attributes: They exhibit higher levels of *craft authenticity* (control 1: $\beta = 0.029$, $p = 0.016$; control 2: $\beta = 0.028$, $p = 0.033$), even if the difference with low-prior-standing restaurants is, again, not significant (control 1: $p = 0.222$; control 2: $p = 0.172$). Restaurants with high prior standing are also more likely to emphasize value attributes: Their *minimum price* is higher (control 1: $\beta = 1.317$, $p = 0.005$; control 2: $\beta = 1.319$, $p = 0.013$), and significantly more so compared with restaurants with low prior standing (control 1: $p = 0.049$; control 2: $p = 0.049$).[17]

In Table 7, we compute effect sizes and decompose the overall DID effect into the effect that Michelin's entry had on treated restaurants with high prior standing, treated restaurants with low prior standing, and control restaurants. As shown in the table, the size of the effect of Michelin's entry is larger for low-prior-standing restaurants in the case of *description length* (13% versus 8%–9% for high prior standing) and for high-prior-standing restaurants in the case of *craft authenticity* (41%–43% versus 10%–12% for low prior standing) and *minimum price* (8%–9% versus 1% for low prior standing). Overall, we find some support for the intuition that prior standing matters in how organizations react to positive status shocks. However, contrary to our expectations, we find that prior standing may actually reinforce the need to modify some self-presentation attributes. In particular, our results suggest that restaurants with high prior standing focused on attributes aimed at signaling authenticity and value, whereas restaurants with low prior standing mostly acted on descriptive attributes.

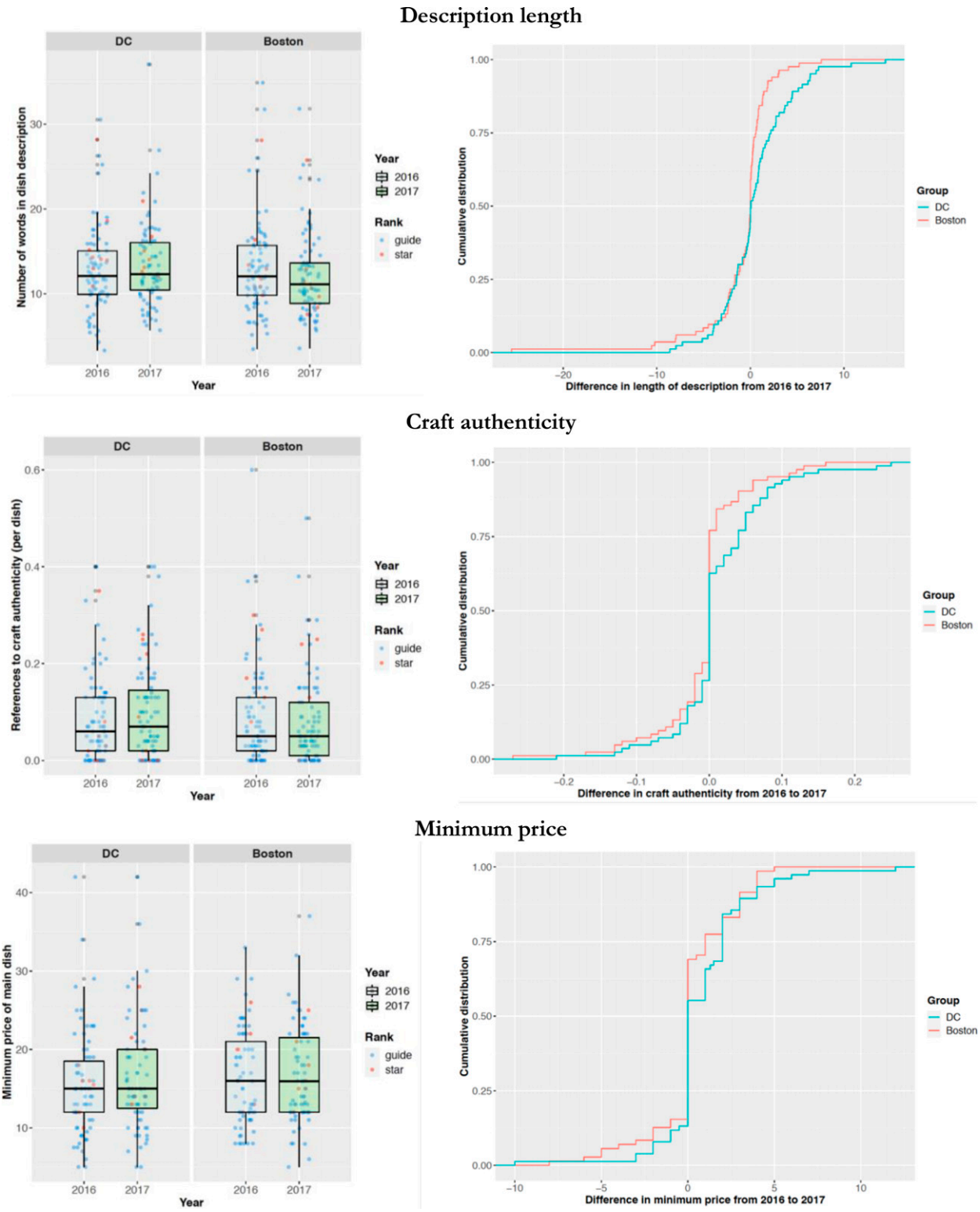
Robustness Checks for Model Assumptions

Our identification strategy rests on the idea that some restaurants in Washington, DC, were treated with inclusion in the Guide, whereas others—either in the same city (control 1) or in Boston (control 2)—were not and, as such, can act as a counterfactual to what we observe happening in the treatment group. For this approach to be credible, a series of conditions need to be satisfied.

Contemporaneous Events. A first important concern is whether another, contemporaneous event might have differentially affected some restaurants or cities during our study period. Given our empirical strategy of using two controls, one from Washington, DC, and one from Boston, and given that the comparison with both control groups yields similar results, for a contemporaneous event to drive the results, we would need to have either (i) a contemporaneous event affecting only the treated group; or (ii) a contemporaneous event affecting the two control groups jointly. Indeed, if an event were affecting only restaurants in Washington, DC, the control group from Boston should enable us to circumvent the problem, and vice versa. In other words, one could argue that if the comparison with both control groups yields similar results, these results are not an artifact of the control we use, but are more likely to be the product of an actual difference between treated and control restaurants. This is the reason why, despite our strong preference for using the control group from Boston—a city not directly affected by Michelin's entry—we show results from both controls.

Clearly, one may argue that Boston was also affected by the publication of the Guide in ways that accentuate the effects we observe. Our understanding, however, is that Michelin's entry in Washington was received with a certain degree of annoyance by the Boston culinary industry,[18] given the similarity between the culinary scenes of the two cities. We, hence, tried to understand whether the trends we observe among control restaurants in Washington, DC, and Boston are in line with broader industry trends. We address this question in Online Appendix 4, where we engage in a detailed examination of trends related to our outcome variables at the national level. Results from this qualitative examination, while purely descriptive in nature, are consistent with what we observe systematically in Table 5: an increased emphasis on leaner, shorter menus, with simpler dish descriptions. We discuss how the issue of portion sizes has been attracting a lot of attention, in particular, among casual-dining operators; that restaurants have tried to

Figure 3. (Color online) A Visual Inspection of Differences Across Treated and Control Restaurants



Notes. The figure shows (a) scattered boxplots (panels on the right); and (b) empirical Cumulative Distribution Function of the pre/post difference (panels on the left). Online Appendix 3 includes results for all six outcome variables for all restaurants and non-starred restaurants only.

address the related health concerns, but faced resistance among customers; and that in the years of our study, there seems to be a decline in the attention chefs paid to related topics. Our examination of the reports issued annually by the National Restaurant Association, which every year surveys around 1,300

Table 6. Changes in Menu Features, Prior Standing as a Moderator

	Control 1				Control 2			
	Prior standing				Prior standing			
	High		Low		High		Low	
Variable	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Description length								
Postpublication	−0.877***	0.277	−0.877***	0.277	−0.877**	0.428	−0.877**	0.428
Postpublication × treated	**1.101***	**0.599**	**1.764****	**0.679**	1.101	0.683	**1.764****	**0.755**
Constant	13.570***	0.123	13.970***	0.127	12.748***	0.167	13.295***	0.176
N	376		362		256		242	
F	5.087		6.020		2.185		3.112	
Adjusted R^2	0.045		0.057		0.028		0.042	
Size description								
Postpublication	0.007	0.007	0.007	0.007	0.001	0.003	0.001	0.003
Postpublication × treated	−0.013	0.009	−0.010	0.009	−0.007	0.006	−0.004	0.006
Constant	0.028***	0.003	0.028***	0.003	0.027***	0.001	0.026***	0.001
N	376		362		256		242	
F	1.102		0.664		0.667		0.232	
Adjusted R^2	0.003		0.002		0.004		0.004	
Craft authenticity								
Postpublication	−0.008**	0.004	−0.008**	0.004	−0.007	0.006	−0.007	0.006
Postpublication × treated	**0.029****	**0.012**	0.011	0.009	**0.028****	**0.013**	0.009	0.010
Constant	0.079***	0.002	0.090***	0.002	0.079***	0.003	0.097***	0.002
N	376		362		256		242	
F	3.667		1.997		2.325		0.663	
Adjusted R^2	0.041		0.017		0.035		0.004	
Natural authenticity								
Postpublication	−0.002	0.004	−0.002	0.004	−0.002	0.005	−0.002	0.005
Postpublication × treated	0.012	0.009	0.012	0.011	0.012	0.009	0.012	0.012
Constant	0.049***	0.002	0.051***	0.002	0.067***	0.002	0.070***	0.002
N	376		362		256		242	
F	1.181		0.594		1.141		0.557	
Adjusted R^2	0.006		0.003		0.010		0.004	
Average price								
Postpublication	0.385**	0.177	0.385**	0.177	0.495***	0.186	0.495***	0.186
Postpublication × treated	**0.915****	**0.415**	−0.017	0.293	**0.805***	**0.420**	−0.127	0.299
Constant	18.300***	0.080	18.513***	0.075	21.213***	0.089	21.695***	0.074
N	342		332		218		208	
F	8.358		3.611		9.500		4.781	
Adjusted R^2	0.096		0.033		0.172		0.078	
Minimum price								
Postpublication	0.249	0.150	0.249	0.150	0.246	0.272	0.246	0.272
Postpublication × treated	**1.317*****	**0.467**	0.154	0.421	**1.319****	**0.521**	0.157	0.479
Constant	14.190***	0.076	14.307***	0.072	16.064***	0.118	16.343***	0.112
N	342		332		218		208	
F	7.624		1.892		6.627		0.933	
Adjusted R^2	0.125		0.018		0.123		0.008	

Notes. The table reports results of an OLS regression with restaurant fixed effects and standard errors clustered at the restaurant level. We split treated restaurants according to whether they had high or low prior standing and compare them to the 143 restaurants at risk of inclusion from Washington, DC (control 1), and the 83 matched restaurants in Boston (control 2). Coef, coefficient.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

professional chefs to ask them about trends they expect to observe for the following year, shows a decreased emphasis on trends that can be associated with craft and natural authenticity. Finally, with respect to prices, we look at the increase in prices witnessed by U.S. urban consumers (Consumer Price Index for all Urban consumers) between the fall of 2016 and the fall of 2017. Overall, this overview seems to indicate that restaurants in both control groups were moving in line with national and regional trends, whereas restaurants in the treatment group were actively counteracting or emphasizing those dynamics.

A remaining doubt one may have is whether treated restaurants were responding to another event that may have affected treated restaurants only. This seems implausible, given that restaurants in control 1

Table 7. Changes in Menu Features with Prior Standing as a Moderator, Effect Sizes

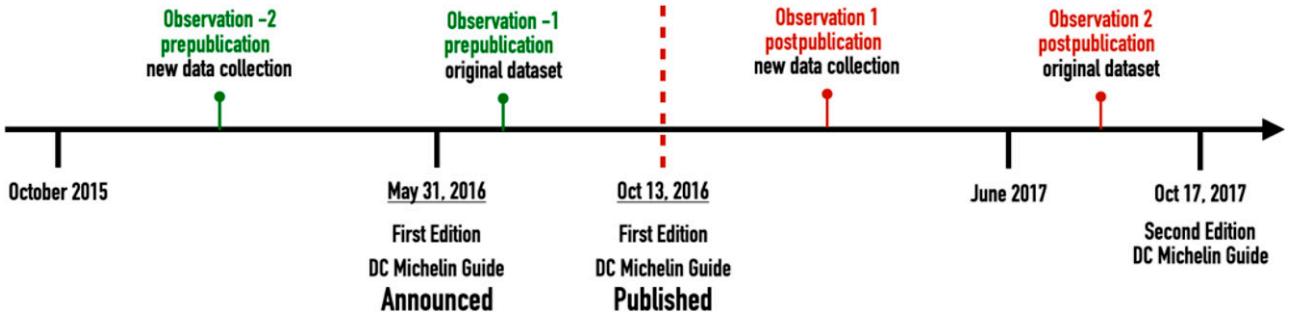
	High prior standing				Low prior standing			
Variable	Mean 2016	Mean 2017	Diff, %	Effect size, %	Mean 2016	Mean 2017	Diff, %	Effect size, %
Description length								
Treated	12.140	12.364	2		13.768	14.655	6	
Control 1	14.023	13.147	−6	**8**	14.023	13.147	−6	**13**
Control 2	13.078	12.201	−7	9	13.078	12.201	−7	**13**
Size description								
Treated	0.028	0.022	−20		0.025	0.022	−10	
Control 1	0.029	0.036	25	−45	0.029	0.036	25	−35
Control 2	0.027	0.029	6	−26	0.027	0.029	6	−16
Craft authenticity								
Treated	0.063	0.084	33		0.116	0.118	2	
Control 1	0.084	0.075	−10	**43**	0.084	0.075	−10	12
Control 2	0.088	0.081	−8	**41**	0.088	0.081	−8	10
Natural authenticity								
Treated	0.064	0.074	16		0.073	0.083	14	
Control 1	0.045	0.043	−5	21	0.045	0.043	−5	19
Control 2	0.068	0.066	−3	19	0.068	0.066	−3	17
Average price								
Treated	19.799	21.099	7		21.102	21.470	2	
Control 1	17.871	18.256	2	4	17.871	18.256	2	0
Control 2	21.971	22.466	2	4	21.971	22.466	2	−1
Minimum price								
Treated	15.250	16.816	10		16.004	16.407	3	
Control 1	13.887	14.135	2	**8**	13.887	14.135	2	1
Control 2	16.500	16.747	1	**9**	16.500	16.747	1	1

Notes. Values for all variables are expressed in words per dish, except in the case of price variables, expressed in USD per dish. We split treated restaurants according to whether they had high or low prior standing and compare them to the 143 restaurants at risk of inclusion from Washington, DC (control 1) and the 83 matched restaurants in Boston (control 2). Figures in bold correspond to significant effects as per Table 6. Diff, difference.

are similar to our treated restaurants for every aspect but inclusion in the Guide—hence, we find it improbable that another contemporaneous event, independent of Michelin's entry, would have affected only restaurants selected by Michelin. Still, we tried to qualitatively address this possibility by looking at other local rankings, in the attempt to understand whether there was any significant change in 2015 or 2016 that could have indicated a "targeted" additional shock to our treated restaurants. The analysis, reported in Online Appendix 4, is very descriptive, but shows a pattern of stability in other status rankings. This reassures us that there was no particular shakeout affecting the treated restaurants in the months preceding the Guide's publication.

Parallel Trends. A second relevant concern regards a critical assumption on which DID models rely—the parallel trend assumption—according to which the control group acts as a counterfactual by showing what would have happened to the treatment group had the treatment not been administered. From a qualitative standpoint, the results we discussed above suggest that our control restaurants were behaving in line with more general industry trends, whereas treated restaurants were departing from those trends. The question, hence, becomes: How were treated restaurant behaving before Michelin announced it was coming to town? This brings us to a quantitative examination of the parallel trends assumption. The complication with our data is that, once we learned in May 2016 that Michelin was going to be launched in Washington, DC, and started collecting menus, we found it challenging to retrieve menus from before the announcement. We, hence, decided to leverage web-archiving services, such as WebArchive, and transcribe photos of menus that had been published online by reviewers. This arduous procedure allowed us to retrieve two additional menus for 25 of the 83 treated restaurants in Washington, DC, and for 22 of the 83 control restaurants in Boston. Figure 4 shows the timing of data collection for this subsample of treated and control restaurants, while Table 8 compares them to the population of restaurants on which we ran our main analyses, showing no significant differences. Although the small N does not grant sufficient power for rigorous tests, examining these trends allows us to obtain some descriptive empirical evidence that may complement the qualitative evidence presented above and discussed in greater detail in Online Appendix 4.

Figure 4. (Color online) Timeline of Observations for Robustness Test of Parallel Trends Assumption



Note. The figure shows the timeline of observations for the subsample of treated (n = 25) and control 2 (n = 22) restaurants for which we can visually inspect pre/post trends, as per Figures 5–7.

Remember that our main results, as per Table 4, show that, compared with control restaurants, restaurants included in the Guide experienced a significant increase in *description length*, *craft authenticity*, and *minimum price*. In Figures 5–7, we focus on these three main outcome variables and compare treated and control restaurants in three different ways. First, we visually inspect the evolution of the differences between the subsample of treated and control restaurants. In Figure 5, we plot two periods before and two periods after the publication of the Guide, an event marked with a vertical line. In the case of this subsample of restaurants, the charts show general stability in differences between periods −2 and −1, followed by a significant increase in favor of treated restaurants in period 1. Two things are worth emphasizing here. First, the pre-Michelin observation we leverage in our main analyses is the one from period −1, which corresponds to the weeks immediately after the Guide's release was announced. The stability in differences between periods −2 and −1 should, hence, mitigate concerns about the presence of an announcement effect captured by our data. Second, the post-Michelin observation we leverage in our main analyses is the one from period 2. We had made this choice to account for seasonality and compare menus from similar periods in the year (summer 2016 versus summer 2017). However, it should be noted that period 2 falls immediately before the publication of the following edition of the Guide, when the ranking was arguably the most unstable. This may explain why our effects seem to peak in period 1. In light of this descriptive evidence, the estimates from our main analyses seem somewhat conservative. One could indeed argue that they capture the persistent, long-term effects of the status shock. Still, given the size of the subsample of restaurants on which these analyses are based, we do not feel comfortable generalizing these conclusions to the full population of restaurants.

Next, we look at from where the differences displayed in the previous graphs come, by separating the trends for treated and control restaurants. Figure 6 shows that, at least in this subsample, treated and control restaurants were moving in the same direction before the publication of the guide and then parted ways after the guide was released (vertical line). The patterns in the graphs are in line with what we observed when discussing variations in treated and control groups. For minimum prices, we do see treated restaurants from this subsample increase prices for a narrower time span compared with what we observe for the full population of treated restaurants in the paper. Last, we perform a leads and lags analysis, in which we examine the effect of treatment on the main outcome variables during the four periods. We set the pre-treatment period −1 as the reference value. Figure 7 shows the results of this analysis, which are consistent with what we observed in our graphical inspection of the differences. The parallel trends assumption seems not to be violated in pre-treatment periods, at least for the subsample of restaurants from which we can inspect the data, as the treatment effect is not significantly different in periods −2 and −1 for any of the three outcome variables. Once again, we see some evidence of a treatment effect that peaks after the Guide came out and seems to fade off over time, in anticipation of the next release in October 2017. If confirmed for the full population of restaurants, this evidence could suggest that the effects detected in the paper are smaller than those observed immediately following the Guide's publication. But, again, given the size of the subsample, we suggest caution when drawing conclusions. More generally, we recommend reading the evidence presented across the sets of figures as showing no suspicious violation of the parallel trends assumption, as opposed to showing support for it.

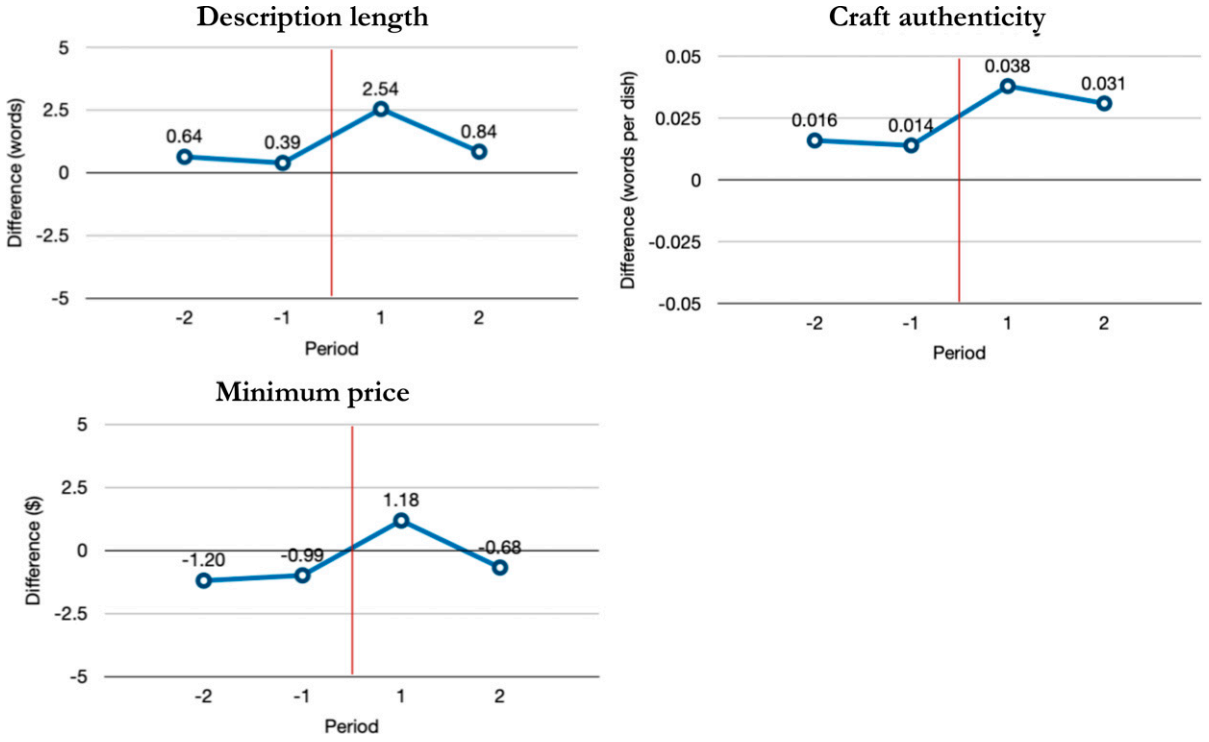
Synthetic Control. One last concern could be related to our choice of control groups. The presence of two controls should partially mitigate this concern, particularly in light of the trends we discussed above when commenting on the behavior of control restaurants.

Table 8. Summary Statistics for Robustness Test of Parallel Trends Assumption

			Subsample					Subsample		
	Treated		Treated			Control 2		Control 2		
Variable	Mean	SD	Mean	SD	*p*-value	Mean	SD	Mean	SD	*p*-value
Yelp rating (1–5)	3.957	0.040	3.928	0.056	0.692	3.938	0.042	3.883	0.066	0.498
Yelp price level (1–4)	2.621	0.095	2.600	0.115	0.899	2.639	0.084	2.636	0.155	0.986
Average restaurant age (years)	7.448	0.516	6.480	0.726	0.296	8.672	0.494	8.818	0.939	0.884
Share of starred restaurants	0.103	0.040	0.080	0.055	0.744	0.098	0.038	0.091	0.063	0.920

Notes. The figures in the table are from 2016, before the publication of the first edition of the Michelin Guide for Washington, DC. Yelp figures are computed on the previous 12 months. Yelp rating and Yelp price level were among the variables used to match restaurants from Boston to generate control 2. We report information about restaurant age and share of starred restaurants to compare across a broader range of characteristics.

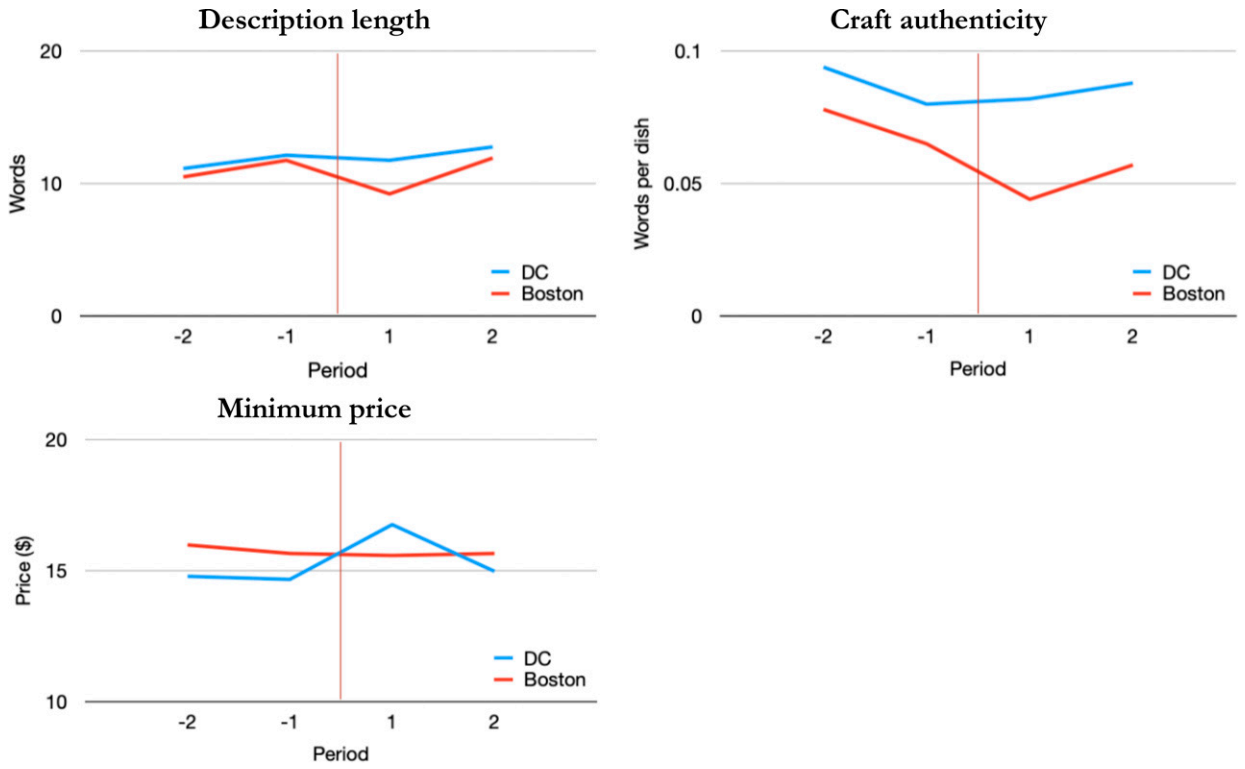
Figure 5. (Color online) Differences Between Treated and Control 2 Before and After the Guide's Publication



Notes. The figure shows the evolution of the differences between the subsample of treated (n = 25) and control 2 (n = 22) restaurants. We plot two periods before and two periods after the publication of the Guide (vertical line).

We, nevertheless, decided to include an additional robustness test using a synthetic control group. The method is based on the construction of a synthetic control unit that represents a weighted combination of many untreated cases (Abadie and Gardeazabal 2003, Abadie et al. 2010), with weights calculated to maximize the similarity between the synthetic control and the treatment unit in terms of prespecified matching variables. Synthetic controls offer a formal and more objective approach compared with traditional, manual selection of control cases, and they maximize the observable similarity with the treatment unit (Pierce et al. 2020). In our case, we constructed a synthetic control group using restaurants from both control 1 and control 2 and matching on pre-treatment values for cuisine type, price level, rating, and self-presentation attributes (i.e., *description length*, *size description*, *natural authenticity*, *craft authenticity*, *average price*, and *minimum price*). The estimated models based on 100,000 permutations yielded the same results from a comparison with our original control groups, as reported in Table 4. In particular, we observe a significant increase in *description length* (+8.6%, $p = 0.015$), *craft authenticity* (+24.4%, $p = 0.022$), and *minimum price* (+5.4%, $p = 0.015$). We graph these results in Figure 8, while Online Appendix 5 includes results

Figure 6. (Color online) Variations in Treated and Control 2 Before and After the Guide's Publication



Notes. The figure shows the trends for the subsample of treated (n = 25) and control 2 (n = 22) restaurants. We plot two periods before and two periods after the publication of the Guide (vertical line).

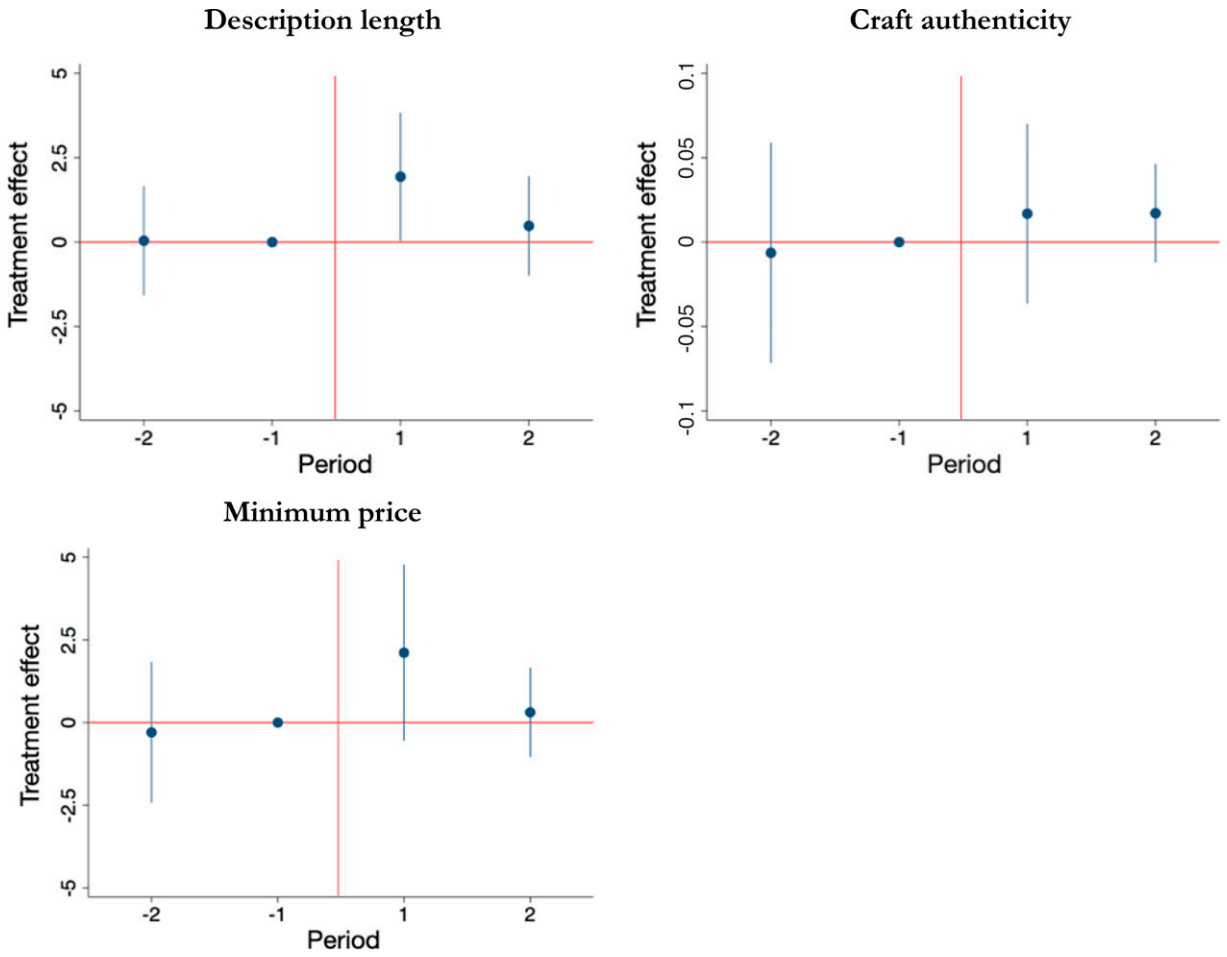
for all six outcome variables, both in the case of all restaurants and in the case of non-starred restaurants only.

Discussion

We are used to thinking of high-status actors as enjoying the great benefits that come from their position, without a worry in the world. High-status actors can command higher prices, face lower costs, have easier access to resources, and enjoy greater freedom to deviate from norms (Podolny 1993, Benjamin and Podolny 1999, Phillips and Zuckerman 2001, Sauder et al. 2012). But previous work also tells us that there is a dark side to the attribution of status: Status comes, but status can also go. And so, high-status actors may experience insecurity, feel the need to conform, and take actions to justify their position and show that they belong (Jensen and Roy 2008, Sauder and Espeland 2009, Phillips et al. 2013, Hahl and Zuckerman 2014, Kovács and Sharkey 2014, Hahl et al. 2017, Jourdan et al. 2017, Prato et al. 2019). In this paper, we exploited the exogenous shock produced by the Michelin Guide's entry to Washington, DC, in the fall of 2016. We illustrate how, following a status gain, organizations enacted a series of changes to their self-presentation, an effort to conform to what they believe audiences expect from high-status players.

Our results suggest that newly recognized high-status restaurants reacted to their new status position by acting on three sets of self-presentation attributes. They modified how their menus looked, by making their *descriptive* attributes consistent with the ethos of the elite. They emphasized their techniques and ingredients, to display the *authenticity* that characterizes elite players. And, finally, they adjusted pricing to signal awareness of the *value* they created for their customers. Results from our analyses suggest that all status-shocked restaurants acted on all sets of attributes, but that the tendency to act was stronger for organizations that did not occupy the top of the ranking—that is, restaurants that were not awarded Michelin stars. We also looked at how an organization's standing prior to the status shock affected their need to modify self-presentation attributes. Contrary to our expectations, our results suggest that restaurants with high prior standing, which should have been less concerned about showing their worth, emphasized attributes that channeled authenticity and value—a tendency we explain in light of their being potentially subject to the denigrating tendencies described by Hahl and colleagues (Hahl and Zuckerman 2014, Hahl et al. 2017). Actors with low prior standing, on the other hand, acted on descriptive attributes that

Figure 7. (Color online) Treatment Effect Estimates Before and After the Guide's Publication

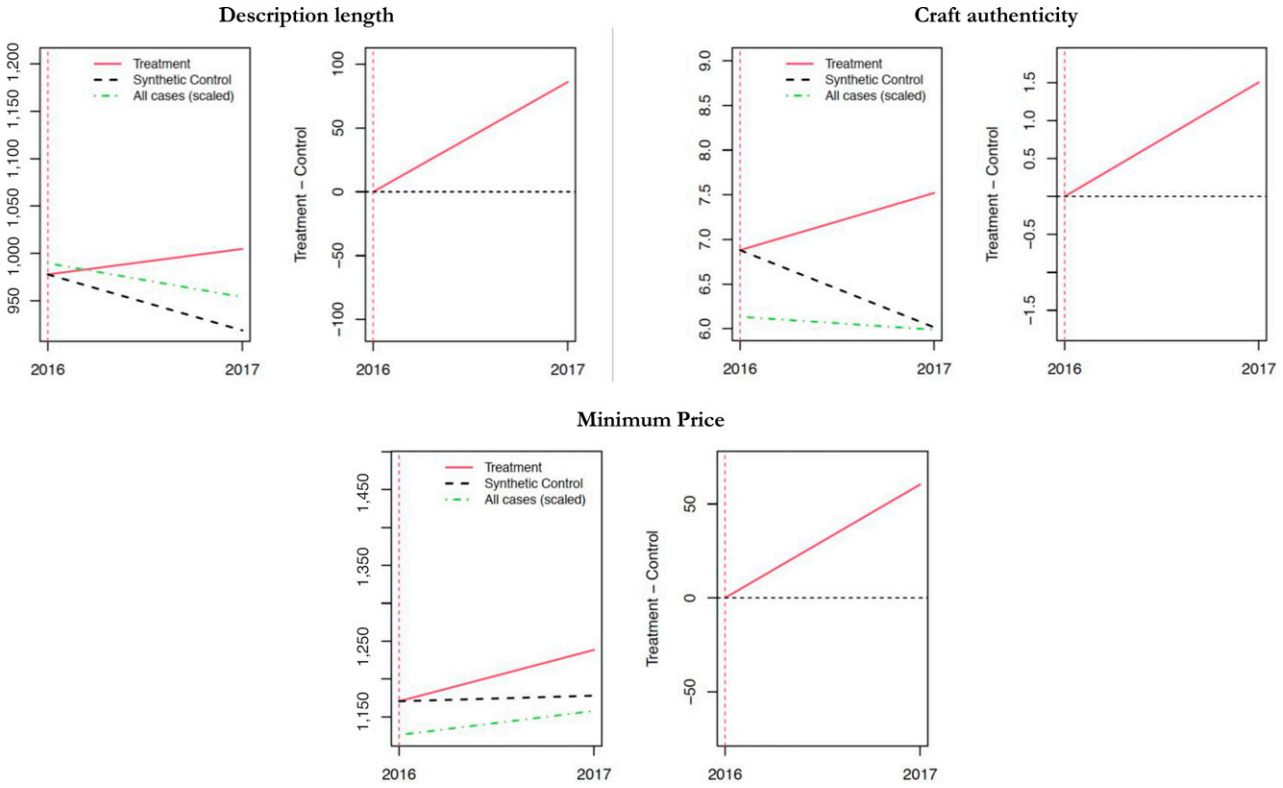


Notes. The figure reports the results of a leads and lags analysis, in which we examine the effect of treatment on the main outcome variables for the subsample of treated (n = 25) and control 2 (n = 22) restaurants. We plot two periods before and two periods after the publication of the Guide (vertical line) and set pre-treatment period −1 as the reference value. Circles indicate treatment coefficient estimates, with confidence bands at 95%.

signaled an ability to "fit the mold" and their belonging among the elite (Askin and Bothner 2016).

Our theory is about modifications to self-presentation attributes and does not necessarily imply that status-shocked restaurants made operational changes. However, we have reasons to believe that, at least in some cases, changes in self-presentation could reflect material changes in operations. Intuitively, the extent to which a change in presentation can also reflect a change in operations varies depending on the type of menu attributes we examine. For instance, one could argue that while a change in the length of a description does not imply changes in operations, removing references to portion sizes could potentially reflect a choice to limit the amount of food served per dish. Similarly, a change in authenticity attributes could potentially reflect an actual operational change in the cooking techniques used and, hence, the tools needed in the kitchen or the ingredients sourced. Finally, our intuition with respect to value attributes is that while changes in minimum prices mostly act as a signaling device, average prices may potentially capture operational changes. Results from the analyses above show significant changes in *description length* and *minimum price*, which are the least likely to imply changes in operations. We also have no evidence of a significant change in *average price*, which could have reflected the need to adapt pricing to cover for expensive operational changes. On the other hand, we do report significant changes in *craft authenticity*, and in the case of non-starred restaurants, *size description* and *natural authenticity*—all changes that could potentially reflect changes in a restaurant's operations. In light of this intuition, our findings about the moderating role of prior standing could be suggestive of another fundamental difference in the behavior of status-shocked restaurants, depending on their prior standing. The finding that restaurants with high prior standing mostly emphasized authenticity

Figure 8. (Color online) Synthetic Control Estimates of Treatment Effects



Notes. We construct a synthetic control group using restaurants from both control 1 and control 2 and matching on pre-treatment values for cuisine type, price level, rating, and self-presentation attributes. The estimated models are based on 100,000 permutations. For each variable, the panels on the left compare treated and control groups, while panels on the right show changes from the pre-Michelin level for treated restaurants only. Values on the vertical axes should be divided by 100. Online Appendix 5 includes results for all six outcome variables, both in the case of all restaurants and in the case of non-starred restaurants only.

and value attributes could suggest that, in their case, the Michelin designation triggered operational changes. This seems not to be the case for restaurants with low prior standing, which mostly acted on descriptive attributes that did not necessarily imply operational changes and could be easily manipulated to signal belonging among the elite.

Unfortunately, our data do not allow us to further disentangle this interesting link between changes in self-presentation and changes in operations. Based on prior work (e.g., Rao et al. 2003, 2005), our own expertise, and interviews conducted for this study, our intuition is that the mere inclusion in the Guide does not require restaurants to make costly investments to "raise their game." However, for restaurants whose position in the ranking is more prominent, material changes may indeed be required for self-presentation changes to be credible. This may explain why restaurants with high prior standing were more likely to change attributes that could imply a change in operations. Similarly, chefs from Michelin-starred restaurants explained to us how their customers expected "Easter eggs" (i.e., an amuse bouche before the starter or petit fours and chocolate pralines with coffee). An accomplished chef compared two colleagues who had been recently awarded their second star and explained to us how one chef, located in a rural village, could have used the star as an opportunity to grow his business, while the other chef, located in the center of a major city, would have been "forced" to make costly investments that would have substantially shrunk his margins. One of the interviewees quoted in Sands (2020) similarly mentioned how the chefs of a newly starred restaurant sought better and better ingredients, with a disastrous effect on profitability, because of their focus on being "the Michelin star" restaurant. Consistent with this intuition, the very few starred restaurants in our sample raised minimum and average prices well above their non-starred counterparts (respectively, +36% and +19% versus +3% and +2%). Future work could further explore this conjecture.

From a theoretical standpoint, our findings speak to two areas of broad interest. First, we contribute to a better understanding of how organizations react to status changes. We show that high-status actors do not simply exploit the opportunities that status provides, but enact changes to align their operations and

identity to the ethos of the elite—a representation that gets reinforced as actors with newly acquired status positions implement the corresponding changes (Goffman 1959, Jourdan et al. 2017). By providing evidence of how producers' perception of status alters and directs their behavior, we offer a perspective that is complementary to the traditional emphasis on how audiences perceive high-status producers (and how the latter accrue rents from audiences' perceptions). In this respect, we find it telling that establishments with high prior standing also engaged in substantial modifications of their self-presentation attributes. Future research could further investigate how producers' perceptions of their own identity and group membership influence their behavior.

Second, we contribute to research on status and conformity by disentangling the sources and types of conformity behaviors that newly awarded high-status actors deploy. By suggesting that status insecurity may drive high-status actors to conform to what they believe audiences expect from high-status players, we refine the dominant idea that high-status actors are less likely to conform to what is normal or observable in the industry (Phillips and Zuckerman 2001). By showing that the high-status group conforms in order to be perceived as a worthy member of the elite, we go beyond the traditional view of conformity as passive imitation (Philippe and Durand 2011, Bromley and Powell 2012, Carlos and Lewis 2018) and introduce a notion of *aspirational* conformity. By emphasizing the complex interplay between self-presentation and operational changes, we also contribute to recent work on the strategic use of conformity (Kim and Jensen 2011, Durand and Kremp 2016). We believe future research could further unpack these dynamics and provide robust empirical evidence on the operational implications of aspirational conformity.

From an empirical standpoint, the use of a DID approach with multiple control groups enables us to more precisely link changes in restaurants' behavior to the status shock they experienced following the introduction of a new, influential status hierarchy. In doing so, we overcome the identification issues that may be associated with examining changes within existing status hierarchies without a clearly stipulated counterfactual and/or control population (Azoulay et al. 2013). By providing real-world evidence of actors' behavior, we also complement recent empirical work conducted in the laboratory (Hahl and Zuckerman 2014, Hahl et al. 2017). Notwithstanding these advantages, the paper is not without limitations. Our analysis is restricted to a single city and based on two observations per restaurant (one *pre-* and one *post*-treatment). This means that our sample size and the number of observations from which we draw inferences is relatively small. Although we adopted several measures to achieve a convincing identification strategy, replicating these results in other geographical areas with larger samples would substantiate and add validity to our results. Second, we examined the introduction of a status ranking produced by the most prominent evaluator in our industry of reference. Washington, DC, was indeed only the fourth city in the United States to be acknowledged by Michelin as worthy of their attention. Such exclusivity clearly exacerbated insecurity pressures associated with the establishment of the new status hierarchy, as all restaurants included in the Guide were admitted for the first time to a ranking that allowed them to join the elite of the industry. Third, we focus on an industry characterized by uncertainty in the assessment of quality (Sharkey and Kovács 2018). The higher uncertainty that surrounds the assessment of quality in experience goods, like a restaurant meal, compared with physical goods may further exacerbate the insecurity experienced by actors following a positive status shock.

Future research could lead to a better understanding of how restaurants react to the rapidly evolving landscape of status evaluations. Nowadays, the evaluations provided by Michelin or prominent local critics coexist with customer evaluations from food bloggers, influencers, and ordinary customers contributing to Google, OpenTable, TripAdvisor, or Yelp. Another interesting extension of our work would involve its replication in other settings. Although an obvious choice would be to replicate these results in industries that have been frequently investigated by status scholars in the past, we believe these results have a broader appeal and generalizability. Rankings and ratings generate status ladders that impact every firm in any industry, no matter whether based on performance excellence or normative criteria, such as environmental protection or fair human treatment (Chatterji and Toffel 2010). When extending this research to other industries, it may be worth considering how positive status shocks affect the audience of the awarded actor. In some cases, changes may be driven by the need to appeal to different audiences rather than please one single critical audience (Kovács and Sharkey 2014). Finally, a natural development of this study would examine the performance implications of the changes we observe. Our data do now allow us to tackle this point, but we would expect to observe a positive effect on performance, driven by a reduction in the dissonance between the market identity of the restaurant and the expectations of customers (Wang et al. 2016). Future studies could test such an effect and identify the associated scope conditions, mechanisms, and moderators.

Acknowledgments

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Endnotes

[1] See, for instance: https://www.theguardian.com/food/2020/jan/27/michelin-launches-2020-guide-controversy-bocuse-auberge-du-pont-de-collonges-third-star (restaurants); https://www.economist.com/leaders/2007/02/22/losing-their-vrroooom (carmakers); https://www.economist.com/international/2018/05/19/how-global-university-rankings-are-changing-higher-education (universities); https://www.theatlantic.com/health/archive/2019/10/the-power-of-momentum/601063/ (athletes).

[2] See: https://www.nytimes.com/2009/12/23/dining/23menus.html; https://www.finedininglovers.com/article/menu-engineering-art-and-science-perfect-menu; https://www.bbc.com/future/article/20171120-the-secret-tricks-hidden-inside-restaurant-menus.

[3] See, for instance, the following article from 2006, in which the president of the Culinary Institute of America shared that menu engineering was being taught to all CIA students: https://www.nytimes.com/2006/10/21/dining/21plate.html.

[4] See: https://michelinmedia.com/Michelin-guide-dc/.

[5] We conducted phone interviews with three restaurant managers and one email interview with a prominent food critic in the period between the announcement and the publication of the guide.

[6] See: https://www.washingtonpost.com/news/food/wp/2016/10/13/washington-gets-its-first-michelin-starred-restaurants-today/.

[7] An alternative empirical approach could have entailed the use of a regression discontinuity design. This was not feasible in our context, as we did not have information about subjects that nearly missed inclusion in the guide. Out of curiosity, we tried to identify a set of control restaurants that could have expected to be included in the guide based on their price level, cuisine type, Yelp rating, and local critical acclaim. This led us to single out 20 restaurants that were ultimately not included in the guide. Descriptively, we observed no difference in behavior between these 20 and other restaurants in the control group.

[8] The 2017 edition of the Michelin Guide featured 106 restaurants, 12 of which were awarded stars. One restaurant was closed within one year from the publication of the guide. We were able to obtain accurate information for the years 2016 and 2017 for a total of 83 restaurants (eight with stars and 75 without stars), which constituted our treated group.

[9] See: https://www.washingtonpost.com/lifestyle/food/what-Michelin-gets-wrong-about-dcs-dining-scene–starting-with-rasika/2016/10/13/3fb750de-90c0-11e6-9c52-0b10449e33c4_story.html?utm_term=.edb9d879502e.

[10] Washington and Boston, in 2016, had a comparable population (675,254 versus 678,430 (U.S. Census Bureau)) and a comparable number (1,312 versus 1,209 (Yelp)) of medium- and high-end restaurants (average meal price above $10).

[11] One anonymous reviewer correctly pointed out that our results could be driven by a decrease in the number of dishes, because our dependent variables are calculated "per dish." To rule out this possibility, we ran our model using number of dishes as a dependent variable and found no significant change from 2016 to 2017. We also replicated all analyses using the raw word count for *description length*, *size description*, *craft authenticity*, and *natural authenticity*. Results are in line with those presented in the paper.

[12] In the classification of authenticity by Carroll and Wheaton (2009), natural authenticity could be interpreted as part of what they describe as craft authenticity or, alternatively, as moral authenticity, to the extent that restaurants want to signal ethical behavior. However, these classifications are not fixed or universally adopted. Dutton (2003), for instance, associates natural authenticity with nominal authenticity. We, hence, chose to adapt existing classifications to our empirical context. Following Rao et al. (2005), we distinguish between natural and craft authenticity to represent the dichotomy between raw materials and cooking techniques.

[13] We are thankful to the editorial team for inspiring us to include this additional dimension of analysis.

[14] Given the size of our sample, and related concerns about power, we conducted ex post power computations, as per Online Appendix 2. Results suggest that our power is within reasonable ranges, but we do tend to be slightly underpowered (~60%–70%) in the case of non-starred restaurants. The values are still above the averages reported by Cashen and Geiger (2004); we, nevertheless, suggest some caution in drawing inferences from our results for non-starred restaurants, given the higher risk of type II errors.

[15] In their study on the effect of names of menu items on customers' perceptions, Wansink et al. (2002) found that adding one or two evocative words to the names of two items in the menu of the faculty cafeteria at the University of Illinois generated a 27% increase in the sales of those items and benefited the overall attitude toward both the food and the restaurant. The experimenter manipulated a total of six menu items by adding the words in italics: *Traditional Cajun* Red Beans with Rice; *Succulent Italian* Seafood Filet; *Tender* Grilled Chicken; *Home-style* Chicken Parmesan; *Satin* Chocolate Pudding; and *Grandma's* Zucchini Cookies.

[16] We considered the alternative of adding prior standing as a moderator in our Equation (1) through a three-way interaction. We ultimately decided against this empirical strategy, however, for two reasons. First, in the case of Washington, DC, there is high overlap between *treated* and *prior standing*, whereas only 11 out of the 143 control restaurants had high prior standing. Such an unbalanced distribution would have made the three-way interaction uninformative. Second, we attempted to collect a measure of prior standing for the matched restaurants in control 2, but soon realized that the evaluations available for Boston were not directly comparable with those available for Washington, DC. The rankings published by *The Washington Post* and the *Washingtonian* are very consistent with our notion of prior standing. The former identifies the top 10 and top 50 restaurants in DC; the latter ranks the top 100. The evaluations provided by *The Boston Globe* and *Boston Magazine*, on the other hand, reward restaurants that are trending for specific features (such as healthy lunch, new arrival, etc.), thus failing to provide an overall evaluation that ranks top restaurants and sets them apart.

[17] Results from ex post power computations, reported in Online Appendix 2, suggest that our power is within reasonable ranges,

but relatively lower (~60–70%) only for *craft authenticity* and *minimum price* (control 2 only) in the case of restaurants with low prior standing. The values are above the averages reported by Cashen and Geiger (2004), but still suggest caution in drawing inferences.

[18] See https://www.bostonglobe.com/lifestyle/food-dining/2016/10/10/getting-its-first-michelin-restaurant-guide-why-not-boston/NT1eXE8L30OKlaM8BldpCI/story.html.

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Online Appendix for "Michelin is coming to town: Organizational responses to status shocks"

Saverio Dave Favaron, Giada Di Stefano, Rodolphe Durand

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APPENDIX 1.

Details about restaurants in treated and control groups (Control 1 and Control 2).

Table A1 lists all restaurants in the treated and control groups. For each restaurant, we provide details about location, cuisine type, price level and average rating according to Yelp, and year of opening. The information provided in the table was retrieved in the Summer of 2016, before the publication of the Michelin Guide. The symbol * in the Group column indicates that the restaurant received a star (if treated) or is matched with a starred one (if control).

Table A1. Summary information about restaurants in treated and control groups

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Treated	1	1789 Restaurant	1226 36th St NW	Washington D.C. 20007	American (Traditional)	$$$$	4.20	2005
Treated	2	2 Amys Neapolitan Pizzeria	3715 Macomb St NW	Washington D.C. 20016	Pizza	$$	3.75	2005
Treated	3	Acadiana	901 New York Ave NW	Washington D.C. 20001	Cajun/Creole	$$$	4.25	2006
Treated	4	Al Tiramisu	2014 P St NW	Washington D.C. 20036	Italian	$$$	3.96	2006
Treated	5	Ambar	523 8th St SE	Washington D.C. 20003	Modern European	$$	4.29	2013
Treated	6	ANXO Cidery & Pintxos Bar	300 Florida Ave NW	Washington D.C. 20001	Basque	$$	3.53	2016
Treated	7	Bidwell	1309 5th St NE	Washington D.C. 20002	American (New)	$$	3.75	2014
Treated	8	BlackSalt	4883 MacArthur Blvd NW	Washington D.C. 20007	Seafood	$$$	4.08	2006
Treated*	9	Blue Duck Tavern	1201 24th St NW	Washington D.C. 20037	American (Traditional)	$$$	4.20	2006
Treated	10	Boqueria	1837 M St NW	Washington D.C. 20036	Tapas Bars	$$$	3.94	2012
Treated	11	Bourbon Steak	2800 Pennsylvania Avenue NW	Washington D.C. 20007	Steakhouses	$$$$	4.10	2007
Treated	12	Cava Mezze	527 8th St SE	Washington D.C. 20003	Tapas/Small Plates	$$	4.04	2009
Treated	13	Chercher Ethiopian Restaurant	1334 9th St NW	Washington D.C. 20001	Ethiopian	$$	4.48	2012
Treated	14	Convivial	801 O St NW	Washington D.C. 20001	American (New)	$$	4.15	2015
Treated	15	Daikaya Ramen Shop	705 6th St NW	Washington D.C. 20001	Ramen	$$	3.87	2013
Treated	16	Das Ethiopian	1201 28th St NW	Washington D.C. 20007	Ethiopian	$$	3.89	2011
Treated	17	Del Campo	777 I St NW	Washington D.C. 20001	Peruvian	$$$	3.67	2013
Treated	18	DGS Delicatessen	1317 Connecticut Ave NW	Washington D.C. 20036	Delis	$$	3.56	2012
Treated	19	District Commons	2200 Pennsylvania Avenue NW	Washington D.C. 20037	Beer Bar	$$	3.46	2011
Treated	20	Doi Moi	1800 14th St NW	Washington D.C. 20009	Vietnamese	$$	3.42	2013
Treated	21	Due South	301 Water St SE	Washington D.C. 20003	Southern	$$	3.70	2015
Treated	22	Eatbar	415 8th St SE	Washington D.C. 20003	Bars	$$	4.39	2016
Treated	23	Espita Mezcaleria	1250 9th St NW	Washington D.C. 20001	Mexican	$$	3.69	2016
Treated	24	Estadio	1520 14th St NW	Washington D.C. 20005	Spanish	$$$	4.00	2010
Treated	25	Ethiopic	401 H St NE	Washington D.C. 20002	Ethiopian	$$	4.02	2009
Treated*	26	Fiola	601 Pennsylvania Ave NW	Washington D.C. 20004	Italian	$$$$	4.07	2011
Treated	27	Garrison	524 8th St SE	Washington D.C. 20003	American (New)	$$$	3.60	2015
Treated	28	Ghibellina	1610 14th St NW	Washington D.C. 20009	Italian	$$	3.80	2013
Treated	29	Hank's Oyster Bar	633 Pennsylvania Ave. SE	Washington D.C. 20003	Seafood	$$	3.84	2006
Treated	30	Indigo	243 K St NE	Washington D.C. 20002	Indian	$$	4.25	2013

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Treated	31	Indique	3512 Connecticut Ave NW	Washington D.C. 20008	Indian	$$	3.79	2005
Treated	32	Iron Gate	1734 N St NW	Washington D.C. 20036	American (New)	$$$	3.91	2013
Treated	33	Izakaya Seki	1117 V St NW	Washington D.C. 20009	Japanese	$$$	4.06	2012
Treated	34	Jack Rose Dining Saloon	2007 18th St NW	Washington D.C. 20009	Bars	$$	3.58	2011
Treated	35	Jaleo	480 7th St NW	Washington D.C. 20004	Spanish	$$$	3.65	2005
Treated	36	Kafe Leopold	3315 Cady's Alley NW	Washington D.C. 20007	American (New)	$$	3.69	2006
Treated	37	Kapnos	2201 14th St NW	Washington D.C. 20009	Greek	$$$	4.50	2013
Treated*	38	Kinship	1015 7th St NW	Washington D.C. 20001	American (New)	$$$$	4.20	2015
Treated	39	Kyirisan	1924 8th St NW	Washington D.C. 20001	French	$$$	4.13	2016
Treated	40	La Chaumière	2813 M St NW	Washington D.C. 20007	French	$$$	3.65	2006
Treated	41	Lapis	1847 Columbia Rd NW	Washington D.C. 20009	Afghan	$$	4.18	2015
Treated	42	Le Chat Noir	4907 Wisconsin Ave NW	Washington D.C. 20016	French	$$	3.60	2005
Treated	43	Le Diplomate	1601 14th St NW	Washington D.C. 20009	Brasseries	$$$	4.21	2013
Treated	44	Little Serow	1511 17th St NW	Washington D.C. 20036	Thai	$$$	4.14	2011
Treated	45	Lupo Verde	1401 T St NW	Washington D.C. 20009	Italian	$$$	3.63	2014
Treated	46	Maketto	1351 H St NE	Washington D.C. 20002	Cafes	$$	4.04	2015
Treated	47	Makoto Restaurant	4822 MacArthur Blvd NW	Washington D.C. 20007	Japanese	$$$$	4.28	2006
Treated	48	Mandu	453 K St NW	Washington D.C. 20001	Korean	$$	3.62	2006
Treated	49	Marcel's by Robert Wiedmaier	2401 Pennsylvania Ave NW	Washington D.C. 20037	French	$$$$	4.27	2006
Treated*	50	Masseria	1340 4th St NE	Washington D.C. 20002	Italian	$$$$	4.00	2015
Treated	51	Mintwood Place	1813 Columbia Rd NW	Washington D.C. 20009	American (New)	$$$	3.89	2012
Treated	52	Momofuku CCDC	1090 I St NW	Washington D.C. 20001	American (New)	$$	3.50	2015
Treated	53	Nazca Mochica	1633 P St NW	Washington D.C. 20036	Peruvian	$$	3.99	2015
Treated	54	Obelisk	2029 P St NW	Washington D.C. 20036	Italian	$$$$	4.23	2006
Treated	55	Old Glory BBQ	3139 M St NW	Washington D.C. 20007	Barbeque	$$	3.09	2006
Treated	56	Osteria Morini	301 Water St SE	Washington D.C. 20003	Italian	$$$	4.00	2013
Treated	57	Ottoman Taverna	425 I St NW	Washington D.C. 20001	Mediterranean	$$$	4.25	2016
Treated	58	Oyamel	401 7th St NW	Washington D.C. 20004	Mexican	$$	3.63	2006
Treated	59	Pearl Dive	1612 14th St NW	Washington D.C. 20009	Seafood	$$	4.09	2011
Treated*	60	Plume	1200 16th St NW	Washington D.C. 20036	American (Traditional)	$$$$	4.00	2009
Treated	61	Proof Restaurant	775 G St. NW	Washington D.C. 20001	American (New)	$$$	3.48	2007
Treated	62	Purple Patch	3155 Mt Pleasant St NW	Washington D.C. 20010	Filipino	$$	4.26	2015
Treated	63	Rasika	633 D St NW	Washington D.C. 20004	Indian	$$$	4.31	2006
Treated	64	RIS	2275 L St NW	Washington D.C. 20037	American (New)	$$$	3.70	2009
Treated	65	Roofers Union	2446 18th St NW	Washington D.C. 20009	Bars	$$	3.43	2014
Treated*	66	Rose's Luxury	717 8th St SE	Washington D.C. 20003	American (New)	$$$	4.49	2013
Treated	67	The Royal	501 Florida Ave NW	Washington D.C. 20001	Coffee & Tea	$$	4.10	2015
Treated	68	Sakuramen	2441 18th St NW	Washington D.C. 20009	Asian Fusion	$$	4.04	2012
Treated	69	Soi 38	2101 L St NW	Washington D.C. 20037	Thai	$$	4.00	2014
Treated	70	Sonoma Restaurant & Wine Bar	223 Pennsylvania Ave. SE	Washington D.C. 20003	American (New)	$$$	3.44	2006

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Treated	71	Tabard Inn Restaurant	1739 N St NW	Washington D.C. 20036	American (Traditional)	$$	3.86	2006
Treated*	72	Tail Up Goat	1827 Adams Mill Rd NW	Washington D.C. 20009	Cocktail Bars	$$$	4.37	2016
Treated*	73	The Dabney	122 Blagden Alley NW	Washington D.C. 20001	American (New)	$$$	4.22	2015
Treated	74	The Diner	2453 18th St NW	Washington D.C. 20009	Diners	$$	3.63	2006
Treated	75	The Partisan	709 D St NW	Washington D.C. 20004	American (New)	$$	3.93	2014
Treated	76	The Red Hen	1822 1st St NW	Washington D.C. 20001	Italian	$$$	4.16	2013
Treated	77	The Source	1835 14th St NW	Washington D.C. 20009	Asian Fusion	$$$	3.83	2007
Treated	78	The Sovereign	1206 Wisconsin Ave NW	Washington D.C. 20007	Belgian	$$	4.09	2016
Treated	79	Thip Khao	3462 14th St NW	Washington D.C. 20010	Laotian	$$	4.34	2014
Treated	80	Tico D.C.	1926 14th St NW	Washington D.C. 20009	Mexican	$$	3.99	2014
Treated	81	Toki Underground	1234 H St NE	Washington D.C. 20002	Ramen	$$	4.05	2011
Treated	82	Tosca	1234 H St NE	Washington D.C. 20002	Italian	$$$	4.11	2006
Treated	83	Zaytinya	701 9th St NW	Washington D.C. 20001	Greek	$$$	4.16	2005
Control 1	1	7th Hill Pizza Palisades	4885 MacArthur Blvd NW	Washington D.C. 20007	American (New)	$$	3.78	2015
Control 1	2	Archipelago	1201 U St NW	Washington D.C. 20009	Bars	$$	3.72	2016
Control 1	3	Bambu	5101 MacArthur Blvd NW	Washington D.C. 20016	Thai	$$	3.18	2006
Control 1	4	Banana Cafe & Piano Bar	500 8th St SE	Washington D.C. 20003	Cuban	$$	3.38	2006
Control 1	5	Bangkok Thai Dining	2016 P St NW	Washington D.C. 20036	Thai	$$	3.12	2009
Control 1	6	Beacon Bar and Grill	1615 Rhode Island Ave NW	Washington D.C. 20036	Bars	$$	3.38	2006
Control 1	7	Birch & Barley	1337 14th St NW	Washington D.C. 20005	American (New)	$$	3.95	2009
Control 1	8	Blue 44 Restaurant & Bar	5507 Connecticut Ave NW	Washington D.C. 20015	American (New)	$$	3.90	2011
Control 1	9	Brookland's Finest	3126 12th St NE	Washington D.C. 20017	American (New)	$$	4.04	2014
Control 1	10	Bua Thai Cuisine	1635 P St NW	Washington D.C. 20036	Thai	$$	3.59	2006
Control 1	11	Café Bonaparte	1522 Wisconsin Ave NW	Washington D.C. 20007	French	$$	3.69	2006
Control 1	12	Café Citron	1343 Connecticut Ave NW	Washington D.C. 20036	Latin American	$$	3.41	2004
Control 1	13	Chez Billy Sud	1039 31st St NW	Washington D.C. 20007	French	$$$	3.89	2014
Control 1	14	ChurchKey	1337 14th St NW Fl 2	Washington D.C. 20005	American (New)	$$	3.90	2009
Control 1	15	Commissary	1443 P St NW	Washington D.C. 20005	American (New)	$$	3.66	2008
Control 1	16	Daily Grill	1310 Wisconsin Ave NW	Washington D.C. 20007	American (Traditional)	$$	3.37	2007
Control 1	17	Degrees Bistro	3100 South St NW	Washington D.C. 20007	American (New)	$$$	3.67	2006
Control 1	18	Devon & Blakely	2200 Pennsylvania Avenue NW	Washington D.C. 20037	Breakfast & Brunch	$$	3.44	2011
Control 1	19	Donburi	2438 18th NW	Washington D.C. 20009	Japanese	$$	4.21	2013
Control 1	20	Duke's Grocery	1513 17th St NW	Washington D.C. 20036	Pubs	$$	4.08	2013
Control 1	21	Dukem Ethiopian Restaurant	1114-1118 U St NW	Washington D.C. 20009	Ethiopian	$$	3.45	2005
Control 1	22	EatsPlace	3607 Georgia Ave NW	Washington D.C. 20010	American (New)	$$	3.74	2014
Control 1	23	Esencias Panameñas Restaurant	3322 Georgia Ave NW	Washington D.C. 20010	Latin American	$$	3.77	2015
Control 1	24	Firefly	1310 New Hampshire Ave NW	Washington D.C. 20036	American (New)	$$	3.65	2006
Control 1	25	Floriana	1602 17th St NW	Washington D.C. 20009	Italian	$$	3.84	2006
Control 1	26	GCDC Grilled Cheese Bar	1730 Pennsylvania Ave NW	Washington D.C. 20006	American (Traditional)	$$	3.46	2014
Control 1	27	Gloria's Pupuseria	3411 14th St NW	Washington D.C. 20009	Latin American	$	3.87	2008

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Control 1	28	Granville Moore's	1238 H St NE	Washington D.C. 20002	American (New)	$$	3.93	2007
Control 1	29	il Canale	1065 31st St NW	Washington D.C. 20007	Italian	$$	4.05	2010
Control 1	30	Ivy City Smokehouse Tavern	1356 Okie St NE	Washington D.C. 20002	Seafood	$$	4.22	2015
Control 1	31	Jake's American Grille	5018 Connecticut Ave NW	Washington D.C. 20008	American (New)	$$	3.18	2011
Control 1	32	Jardenea	2430 Pennsylvania Ave NW	Washington D.C. 20037	American (New)	$$	4.08	2012
Control 1	33	Johnny Pistolas	2333 18th St NW	Washington D.C. 20009	Mexican	$$	3.34	2014
Control 1	34	Kintaro	1039 33rd St NW	Washington D.C. 20007	Sushi Bars	$$	3.38	2013
Control 1	35	Kotobuki	4822 MacArthur Blvd NW	Washington D.C. 20007	Sushi Bars	$$	3.93	2006
Control 1	36	Kruba D.C. Thai & Sushi	301 Tingey St SE	Washington D.C. 20003	Sushi Bars	$$	3.19	2012
Control 1	37	Kyoto Japanese Restaurant	201 Massachusetts Ave NE	Washington D.C. 20002	Japanese	$$	3.41	2006
Control 1	38	La Lomita	1330 Pennsylvania Ave SE	Washington D.C. 20003	Tex-Mex	$$	3.41	2006
Control 1	39	La Lomita Dos	308 Pennsylvania Ave SE	Washington D.C. 20003	Mexican	$$	3.39	2006
Control 1	40	Lalibela Restaurant	1415 14th St NW	Washington D.C. 20005	Ethiopian	$$	3.71	2006
Control 1	41	Lavagna	539 8th St SE	Washington D.C. 20003	Italian	$$	3.78	2011
Control 1	42	Le Grenier	502 H St NE	Washington D.C. 20002	French	$$	3.87	2012
Control 1	43	Logan Tavern	1423 P St NW	Washington D.C. 20005	Bars	$$	3.57	2006
Control 1	44	Los Cuates	1564 Wisconsin Ave NW	Washington D.C. 20007	Mexican	$$	3.23	2008
Control 1	45	Mai Thai	1200 19th St NW	Washington D.C. 20036	Thai	$$	3.55	2006
Control 1	46	Market Lunch	225 7th St SE	Washington D.C. 20003	American (New)	$$	4.10	2006
Control 1	47	Marx Café	3203 Mt Pleasant St NW	Washington D.C. 20010	Bars	$$	3.34	2006
Control 1	48	Meridian Pint	3400 11th St NW	Washington D.C. 20010	Bars	$$	3.71	2010
Control 1	49	Montmartre	327 7th St SE	Washington D.C. 20003	French	$$	3.98	2006
Control 1	50	Nage	1600 Rhode Island Ave NW	Washington D.C. 20036	American (New)	$$	3.37	2006
Control 1	51	Notti Bianche	824 New Hampshire Ave NW	Washington D.C. 20037	Italian	$$$	3.44	2006
Control 1	52	Old Engine 12 Restaurant	1626 N Capitol St NW	Washington D.C. 20002	American (New)	$$	3.44	2014
Control 1	53	Paolo's Ristorante	1303 Wisconsin Ave NW	Washington D.C. 20007	Italian	$$	3.24	2006
Control 1	54	Peacock Café	3251 Prospect St NW	Washington D.C. 20007	Wine Bars	$$	3.58	2006
Control 1	55	Pho 14	1436 Park Rd NW	Washington D.C. 20010	Vietnamese	$$	3.60	2013
Control 1	56	Pho Viet & Grille	1639 Wisconsin Ave NW	Washington D.C. 20007	Vietnamese	$$	3.61	2013
Control 1	57	Queen of Sheba Ethiopian Restaurant	1503 9th St NW	Washington D.C. 20001	Ethiopian	$$	3.83	2007
Control 1	58	Radiator	1430 Rhode Island Ave NW	Washington D.C. 20005	Tapas/Small Plates	$$	3.88	2016
Control 1	59	Rosa Mexicano	575 7th St NW	Washington D.C. 20004	Mexican	$$	3.29	2006
Control 1	60	Royal Thai Cuisine & Bar	507 H St NW	Washington D.C. 20001	Thai	$$	3.33	2009
Control 1	61	Satay Club	4654 Wisconsin Ave NW	Washington D.C. 20016	Sushi Bars	$$	3.55	2008
Control 1	62	Scion Restaurant	2100 P St NW	Washington D.C. 20037	American (New)	$$	3.54	2009
Control 1	63	Selam Restaurant	1524 U St NW	Washington D.C. 20009	African	$$	4.17	2007
Control 1	64	Seventh Hill	327 7th St SE	Washington D.C. 20003	Pizza	$$	4.01	2009
Control 1	65	Smith Public Trust	3514 12th St NE	Washington D.C. 20017	American (New)	$$	3.94	2014
Control 1	66	Sprig and Sprout	2317 Wisconsin Ave NW	Washington D.C. 20007	Vietnamese	$$	4.00	2012
Control 1	67	Surfside Taco Stand	1800 N St NW	Washington D.C. 20036	Tex-Mex	$$	3.79	2015

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Control 1	68	Tenley Bar & Grill	4611 41st St NW	Washington D.C. 20016	Bars	$$	3.62	2015
Control 1	69	Thai Tanic Restaurant	1326 14th St NW Ste A	Washington D.C. 20005	Thai	$$	3.47	2006
Control 1	70	The Arsenal at Bluejacket	300 Tingey St SE	Washington D.C. 20003	Bars	$$	3.47	2014
Control 1	71	The Heights Taproom	3115 14th St NW	Washington D.C. 20010	American (New)	$$	3.46	2007
Control 1	72	The Riggsby	1731 New Hampshire Ave NW	Washington D.C. 20009	American (Traditional)	$$	4.05	2015
Control 1	73	The Ugly Mug	723 8th St SE	Washington D.C. 20003	American (Traditional)	$$	3.12	2006
Control 1	74	Tono Sushi	2605 Connecticut Ave NW	Washington D.C. 20008	Sushi Bars	$$	3.42	2006
Control 1	75	Tortilla Coast	400 1st St SE	Washington D.C. 20003	Tex-Mex	$$	3.29	2006
Control 1	76	Vapiano Chinatown	623 H St NW Ste 625	Washington D.C. 20001	Italian	$$	3.51	2009
Control 1	77	Hazel	808 V St NW	Washington D.C. 20001	American (New)	$$$	3.49	2016
Control 1	78	Clarity	442 Maple Ave E	Vienna VA 22180	American (New)	$$$	3.76	2015
Control 1	79	nopa Kitchen + Bar	800 F St NW	Washington D.C. 20004	American (New)	$$$	3.96	2013
Control 1	80	Centrolina	974 Palmer Alley NW	Washington D.C. 20001	Italian	$$$	3.98	2015
Control 1	81	Alta Strada City Vista	465 K St NW	Washington D.C. 20001	Italian	$$	4.01	2016
Control 1	82	Bantam King	501 G St NW	Washington D.C. 20001	Ramen	$$	4.11	2016
Control 1	83	Field & Main Restaurant	8369 West Main St	Marshall VA 20115	American (Traditional)	$$$	3.99	2016
Control 1	84	Volt	950 New York Ave NW	Washington D.C. 20001	American (New)	$$$$	4.01	2008
Control 1	85	Al Crostino	1926 9th St NW	Washington D.C. 20001	Italian	$$	3.74	2014
Control 1	86	Appioo African Bar & Grill	1924 9th St NW	Washington D.C. 20001	Bars	$$	3.63	2014
Control 1	87	Arcuri	2400 Wisconsin Ave NW	Washington D.C. 20007	American (New)	$$	3.86	2013
Control 1	88	Baan Thai	1326 14th St NW Fl 2	Washington D.C. 20005	Sushi Bars	$$	3.61	2010
Control 1	89	Barcelona Wine Bar	1622 14th St NW	Washington D.C. 20005	Tapas/Small Plates	$$	4.08	2013
Control 1	90	Beefsteak	800 22nd St NW	Washington D.C. 20052	Fast Food	$$	3.37	2015
Control 1	91	Ben's Next Door	1211 U St NW	Washington D.C. 20009	Bars	$$	3.59	2009
Control 1	92	Big Chair Coffee & Wine Bar	2122 M. Luther King Jr Ave SE	Washington D.C. 20020	American	$$	3.27	2010
Control 1	93	Bistrot Lepic & Wine Bar	1736 Wisconsin Ave NW	Washington D.C. 20007	French	$$$	3.90	2006
Control 1	94	BKK Cookshop	1700 New Jersey Ave NW	Washington D.C. 20001	Thai	$$	4.08	2015
Control 1	95	Bodega	3116 M St NW	Washington D.C. 20007	Tapas Bars	$$	3.45	2008
Control 1	96	Buck's Fishing & Camping	5031 Connecticut Ave NW	Washington D.C. 20008	American (Traditional)	$$$	3.27	2007
Control 1	97	Cafe Deluxe	2201 M St NW	Washington D.C. 20037	American (New)	$$	3.27	2014
Control 1	98	Cafe Milano	3251 Prospect St NW	Washington D.C. 20007	Italian	$$$	3.34	2005
Control 1	99	Carmine's Italian Restaurant	425 7th St NW	Washington D.C. 20004	Italian	$$	3.30	2010
Control 1	100	Cedar Restaurant	822 E St NW	Washington D.C. 20004	American (New)	$$$	3.77	2009
Control 1	101	Ching Ching CHA	1063 Wisconsin Ave NW	Washington D.C. 20007	Tea Rooms	$$	4.28	2006
Control 1	102	Chupacabra Latin Kitchen & Taqueria	822 H St NE	Washington D.C. 20002	Latin American	$$	3.68	2013
Control 1	103	Clyde's of Georgetown	3236 M St NW	Washington D.C. 20007	American (Traditional)	$$	3.83	2005
Control 1	104	Darlington House	1610 20th St NW	Washington D.C. 20009	Italian	$$	3.18	2008
Control 1	105	D.C. Harvest	517 H St NE	Washington D.C. 20002	American (New)	$$	3.65	2014
Control 1	106	District Kitchen	2606 Connecticut Ave NW	Washington D.C. 20008	American (New)	$$	3.45	2012
Control 1	107	El Rey	919 U St NW	Washington D.C. 20001	Mexican	$$	3.27	2014

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Control 1	108	Etto	1541 14th St NW	Washington D.C. 20005	Bars	$$	3.78	2013
Control 1	109	Flavio Restaurant	1073 31st St NW	Washington D.C. 20007	Italian	$$	4.44	2016
Control 1	110	Giovanni's Trattu	1823 Jefferson Pl NW	Washington D.C. 20036	Italian	$$	3.80	2007
Control 1	111	Gordon Biersch Brewery Restaurant	900 F St NW	Washington D.C. 20004	Bars	$$	3.13	2006
Control 1	112	Hayde's Restaurant	3102 Mount Pleasant St NW	Washington D.C. 20010	Mexican	$$	3.43	2006
Control 1	113	I-Thai Restaurant & Sushi Bar	3003 M St NW	Washington D.C. 20007	Thai	$$	3.95	2014
Control 1	114	Italian Pizza Kitchen	4483 Connecticut Ave NW	Washington D.C. 20008	Pizza	$$	3.16	2007
Control 1	115	Ivy City SmokeHouse Tavern	1356 Okie St NE	Washington D.C. 20002	Seafood	$$	4.22	2015
Control 1	116	JoJo Restaurant and Bar	1518 U St NW	Washington D.C. 20009	Jazz & Blues	$$	4.10	2006
Control 1	117	Justin's Café	1025 1st St SE	Washington D.C. 20003	American (New)	$$	3.46	2010
Control 1	118	Liberty Tree	1016 H St NE	Washington D.C. 20002	American (Traditional)	$$	3.65	2010
Control 1	119	Madhatter	1319 Connecticut Ave NW	Washington D.C. 20036	Bars	$$	3.20	2006
Control 1	120	Menomale Pizza Napoletana	2711 12th St NE	Washington D.C. 20018	Bars	$$	4.26	2012
Control 1	121	Otello	1329 Connecticut Ave NW	Washington D.C. 20036	Italian	$$	3.78	2006
Control 1	122	Paragon Thai Restaurant	3507 Connecticut Ave NW	Washington D.C. 20008	Thai	$$	3.44	2008
Control 1	123	Pho 14	1436 Park Rd NW	Washington D.C. 20010	Vietnamese	$$	3.61	2012
Control 1	124	Scarlet Oak	909 New Jersey Ave SE	Washington D.C. 20003	American (New)	$$	3.87	2015
Control 1	125	Sette Osteria	1666 Connecticut Ave NW	Washington D.C. 20009	Italian	$$	3.47	2015
Control 1	126	Smallfry	3212 Georgia Ave NW	Washington D.C. 20010	Seafood	$$	4.24	2015
Control 1	127	Smith Public Trust	3514 12th St NE	Washington D.C. 20017	American (New)	$$	3.94	2014
Control 1	128	Smoke & Barrel	2471 18th St NW	Washington D.C. 20009	Bars	$$	3.62	2011
Control 1	129	Spices Asian Restaurant	3333-A Connecticut Ave NW	Washington D.C. 20008	Sushi Bars	$$	3.65	2005
Control 1	130	Taqueria Nacional	1409 T St NW	Washington D.C. 20009	Mexican	$$	3.28	2013
Control 1	131	Teak Wood	1323 14th St NW	Washington D.C. 20005	Thai	$$	3.55	2010
Control 1	132	Teddy & The Bully Bar	1200 19th St NW	Washington D.C. 20036	American (New)	$$	3.53	2013
Control 1	133	Tesoro	4400 Connecticut Ave NW	Washington D.C. 20008	Italian	$$	3.18	2006
Control 1	134	Thai Pad	4481 Connecticut Ave NW	Washington D.C. 20008	Thai	$$	4.20	2015
Control 1	135	The Black Squirrel	2427 18th St NW	Washington D.C. 20009	Bars	$$	3.53	2008
Control 1	136	The Fainting Goat	1330 U St NW	Washington D.C. 20009	American (New)	$$	3.81	2013
Control 1	137	The Italians Kitchen	2608 Connecticut Ave NW	Washington D.C. 20008	Pizza	$$	3.73	2015
Control 1	138	The Pig	1320 14th St NW	Washington D.C. 20005	American (Traditional)	$$	3.97	2012
Control 1	139	The Pub & The People	1648 N Capitol St NW	Washington D.C. 20002	American (New)	$$	4.15	2015
Control 1	140	The Tombs	1226 36th St NW	Washington D.C. 20007	American (New)	$$	3.72	2006
Control 1	141	Tortino Restaurant	1228 11th St NW	Washington D.C. 20001	Italian	$$	4.13	2011
Control 1	142	Unum D.C.	2917 M St NW	Washington D.C. 20007	American (New)	$$$	4.05	2012
Control 1	143	Urbana	2121 P St NW	Washington D.C. 20037	Italian	$$	3.69	2006
Control 2	1	49 Social	49 Temple Pl	Boston MA 02111	American (New)	$$$	3.20	2011
Control 2*	2	Alden & Harlow	40 Brattle St	Cambridge MA 02138	American (Traditional)	$$$	3.98	2014
Control 2	3	Anh Hong	291 Adams St	Dorchester MA 02122	Vietnamese	$$	3.83	2007
Control 2	4	Antico Forno	93 Salem St	Boston MA 02113	Italian	$$	3.58	2005

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Control 2	5	Area Four	500 Technology Sq	Cambridge MA 02139	Pizza	$$	3.93	2011
Control 2	6	Ashmont Grill	555 Talbot Ave	Dorchester MA 02124	American (Traditional)	$$	3.71	2005
Control 2	7	Asmara Restaurant	739 Massachusetts Ave	Cambridge MA 02139	Ethiopian	$$	3.66	2005
Control 2	8	Atlantic Fish	761 Boylston St	Boston MA 02116	Seafood	$$$	4.11	2005
Control 2	9	Banyan Bar + Refuge	553 Tremont St	Boston MA 02116	Asian Fusion	$$	3.48	2015
Control 2*	10	Bergamot	118 Beacon St	Somerville MA 02143	American (New)	$$$	4.00	2010
Control 2	11	Bistro du Midi	272 Boylston St	Boston MA 02116	French	$$$	3.93	2009
Control 2	12	Blue Nile Restaurant	389 Centre St	Jamaica Plain MA 02130	Ethiopian	$$	4.26	2011
Control 2	13	Bricco	241 Hanover St	Boston MA 02113	Wine Bars	$$$	3.93	2006
Control 2	14	Bristol Restaurant and Bar	200 Boylston St Four Seasons	Boston MA 02116	American (New)	$$$	3.55	2005
Control 2	15	Brown Sugar Café	1033 Commonwealth Ave	Boston MA 02215	Thai	$$	3.99	2005
Control 2	16	Brownstone	111 Dartmouth St	Boston MA 02116	Bars	$$	3.44	2006
Control 2	17	Catalyst Restaurant	300 Technology Sq	Cambridge MA 02139	American (New)	$$$	3.62	2011
Control 2	18	Cuchi Cuchi	795 Main St	Cambridge MA 02139	Tapas/Small Plates	$$$	4.15	2005
Control 2	19	Da Vinci	162 Columbus Ave	Boston MA 02116	Italian	$$$	4.26	2008
Control 2	20	Del Frisco's Double Eagle Steakhouse	250 Northern Ave Ste 200	Boston MA 02210	Seafood	$$$$	3.66	2011
Control 2	21	Desfina Restaurant	202 3rd St	Cambridge MA 02141	Greek	$$	3.86	2006
Control 2	22	Deuxave	371 Commonwealth Ave	Boston MA 02115	American (New)	$$$	4.19	2010
Control 2*	23	Erbaluce	69 Church St	Boston MA 02116	Italian	$$$	4.50	2008
Control 2	24	Estragon	700 Harrison Ave	Boston MA 02118	Tapas Bars	$$	3.74	2008
Control 2	25	Ganko Ittetsu Ramen	318 Harvard St Unit 3	Brookline MA 02446	Ramen	$$	3.91	2015
Control 2	26	Gaslight	560 Harrison Ave	Boston MA 02118	French	$$	3.92	2007
Control 2	27	Giulia	1682 Massachusetts Ave	Cambridge MA 02138	Italian	$$$	4.43	2012
Control 2	28	Greek Corner Restaurant	2366 Massachusetts Ave	Cambridge MA 02140	Greek	$$	4.05	2005
Control 2	29	Green Street	280 Green St	Cambridge MA 02139	Bars	$$	3.89	2006
Control 2	30	Henrietta's Table	1 Bennett St	Cambridge MA 02138	American (New)	$$$	3.59	2005
Control 2	31	Island Creek Oyster Bar	500 Commonwealth Ave	Boston MA 02215	Seafood	$$$	4.50	2010
Control 2	32	James Hook & Co	15-17 Northern Ave	Boston MA 02110	Seafood	$$	4.22	2007
Control 2	33	Jm Curley	21 Temple Pl	Boston MA 02111	American (New)	$$	3.95	2011
Control 2	34	KAVA neo-taverna	315 Shawmut Ave	Boston MA 02118	Greek	$$$	4.33	2016
Control 2	35	Kelley Square Pub	84 Bennington St East	Boston MA 02128	Pubs	$$	3.96	2008
Control 2*	36	L'Espalier	774 Boylston St	Boston MA 02199	French	$$$$	4.24	2005
Control 2	37	La Voile	261 Newbury St	Boston MA 02116	French	$$$	4.06	2007
Control 2	38	Les Zygomates	129 South St	Boston MA 02111	French	$$$	3.76	2005
Control 2	39	Little Donkey	505 Massachusetts Ave	Cambridge MA 02139	Tapas/Small Plates	$$$	3.87	2016
Control 2	40	Lolita Cocina & Tequila Bar	271 Dartmouth St	Boston MA 02116	Mexican	$$	3.90	2010
Control 2	41	Lord Hobo	92 Hampshire St	Cambridge MA 02139	Bars	$$	3.49	2009
Control 2	42	Ma Maison	272 Cambridge St	Boston MA 02114	French	$$	4.15	2015
Control 2	43	Mamaleh's Delicatessen	15 Hampshire St One Kendall Sq	Cambridge MA 02139	Delis	$$	3.89	2016
Control 2	44	Mamma Maria	3 N Square	Boston MA 02113	Italian	$$$	4.06	2005

Group		Restaurant	Address		Cuisine	Price	Rating	Opening
Control 2	45	Masa	439 Tremont St	Boston MA 02116	Latin American	$$	3.60	2005
Control 2	46	Menton	354 Congress St	Boston MA 02210	French	$$$$	4.33	2010
Control 2*	47	Meritage Restaurant	70 Rowes Wharf	Boston MA 02110	American (New)	$$$$	3.93	2005
Control 2	48	Mi Pueblito Restaurant	333 Border St	Boston MA 02128	Mexican	$$	4.42	2006
Control 2	49	Montien Thai Restaurant	63 Stuart St	Boston MA 02116	Thai	$$	3.35	2005
Control 2	50	Night Market	75 Winthrop St	Cambridge MA 02138	Asian Fusion	$$	3.78	2014
Control 2	51	O Ya	9 East St Pl	Boston MA 02111	Japanese	$$$$	4.44	2007
Control 2	52	Oishii Boston	1166 Washington St	Boston MA 02118	Sushi Bars	$$$$	3.85	2006
Control 2	53	Oleana Restaurant	134 Hampshire St	Cambridge MA 02139	Mediterranean	$$$	4.32	2004
Control 2	54	Piattini	226 Newbury St	Boston MA 02116	Italian	$$	3.90	2005
Control 2	55	Pon Thai Bistro	213 Washington St	Brookline MA 02445	Thai	$$	4.03	2014
Control 2	56	Porter Café	1723 Centre St West	Roxbury MA 02132	Bars	$$	4.52	2011
Control 2*	57	Puritan & Company	1166 Cambridge St	Cambridge MA 02139	American (New)	$$$	4.02	2012
Control 2	58	Red Lantern	39 Stanhope St	Boston MA 02116	Asian Fusion	$$$	3.56	2011
Control 2	59	Rowes Wharf Sea Grille	70 Rowes Wharf	Boston MA 02110	Seafood	$$$	3.34	2007
Control 2	60	Rox Diner	1881 Center St West	Roxbury MA 02132	Diners	$$	4.04	2007
Control 2	61	Select Oyster Bar	50 Gloucester St	Boston MA 02115	Seafood	$$$	3.62	2015
Control 2	62	Shanti Restaurant	7 Broad Canal Way	Cambridge MA 02142	Indian	$$	3.46	2016
Control 2	63	Shepard	1 Shepard St	Cambridge MA 02138	American (New)	$$$	3.48	2015
Control 2*	64	Sorellina	1 Huntington Ave	Boston MA 02116	Italian	$$$$	4.18	2006
Control 2	65	SRV Boston	569 Columbus Ave	Boston MA 02118	Italian	$$$	4.50	2016
Control 2	66	Strip By Strega	64 Arlington St	Boston MA 02116	American (Traditional)	$$$$	3.76	2015
Control 2	67	Suya Joint All African Cuisine	185 Dudley St	Roxbury MA 02119	African	$$	4.07	2016
Control 2	68	Tango Restaurant	464 Massachusetts Ave	Arlington MA 02474	Latin American	$$$	3.76	2005
Control 2	69	Taqueria El Carrizal	254 Brighton Ave	Allston MA 02134	Latin American	$$	3.99	2008
Control 2	70	Temazcal Tequila Cantina	250 Northern Ave	Boston MA 02210	Mexican	$$$	2.93	2011
Control 2	71	Temple Bar	1688 Massachusetts Ave	Cambridge MA 02138	American (New)	$$	3.70	2005
Control 2*	72	Ten Tables	597 Centre St	Jamaica Plain MA 02130	American (New)	$$$	4.24	2005
Control 2	73	The Abbey	1755 Massachusetts Ave	Cambridge MA 02140	American (New)	$$	3.93	2014
Control 2	74	The Blue Room	1 Kendall Sq	Cambridge MA 02139	Mediterranean	$$$	3.65	2004
Control 2	75	The Capital Grille	900 Boylston St	Boston MA 02115	Steakhouses	$$$$	4.37	2005
Control 2	76	The Hourly Oyster House	15 Dunster St	Cambridge MA 02138	Seafood	$$	3.98	2016
Control 2	77	The Salty Pig	130 Dartmouth St	Boston MA 02116	American (New)	$$	4.04	2011
Control 2	78	Tiger Mama	1363 Boylston St	Boston MA 02215	Thai	$$$	3.59	2015
Control 2	79	Tikki Masala	3706 Washington St	Jamaica Plain MA 02130	Indian	$$	4.16	2014
Control 2	80	Toro	1704 Washington St	Boston MA 02118	Tapas Bars	$$$	4.21	2006
Control 2	81	Tupelo	1193 Cambridge St	Cambridge MA 02139	Southern	$$	4.02	2009
Control 2	82	Viale	502 Massachusetts Ave	Cambridge MA 02139	Italian	$$$	3.95	2014
Control 2	83	Woori	9 Medford St	Arlington MA 02474	Korean	$$	3.98	2014

APPENDIX 2.

Power analysis

To conduct power calculations, we used the Stata package PCPANEL (Burlig, Preonas and Woerman 2017). The program allows computations for difference-in-differences designs, accommodates arbitrary serial correlation in the outcome variable, and directly estimates the correlation structure of datasets in memory.

In particular, the program computes statistical power based on the minimum detectable effect. The use of the minimum detectable effect has been recommended for ex-post power computations, since it depends only on the estimated standard error, and not on the (noisier) point estimate of the treatment effect.[1]

In practical terms, to compute ex-post power for our DID model, we ran the following line of code in Stata:

pc_dd_analytic, n(*N*) mde(*MDE*) p(*P*) depvar(*DEPVAR*) i(*ID*) t(*YEAR*) if(case==*CASE*) pre(*PERIODS*) post(*PERIODS*)

where:

- *N* is the number of restaurants in treated and control groups. In our case *N* is equal to 226 if we use Control 1 (83 treated + 143 control) and 166 if we use Control 2 (83 treated + 83 control). N is lower in the case of our price variables (71 treated, 133 Control 1, 71 Control 2), because some menus in our sample did not include price information;
- *MDE* corresponds to the minimum detectable effect, equal to 2.8 times the estimated SE (see: Ioannidis, Stanley and Doucouliagos 2017);
- *P* is the proportion of treated restaurants. In our case P is equal to 0.37 (=83/226) if we use Control 1 and 0.50 (=83/166) if we use Control 2;
- *DEPVAR* identifies the outcome variable, in our case: description length, size description, natural authenticity, craft authenticity, average price, and minimum price;
- *ID* identifies our restaurants;
- *YEAR* identifies the year in which the menu was published;
- *CASE* identifies the relevant comparison set for treated restaurants in either Control 1 or Control 2;
- *PERIODS* indicates the number of periods before and after treatment, in our case 1 and 1.

We report the results of this analysis and the inputs we used (from Table 4 in the paper) in Table A2 below. In the table, we distinguish between all restaurants and *non-starred* restaurants only.

Table A2. Statistical power (computed ex-post), regression analyses from Table 4

		All restaurants					*Non-starred* restaurants				
		N	$N_{Treated}$	Coef	SE	Power	N	$N_{Treated}$	Coef	SE	Power
Description length	Control 1	226	83	1.404***	0.490	80%	218	75	1.613***	0.510	81%
	Control 2	166	83	1.404**	0.590	78%	150	75	1.487**	0.627	79%
Size description	Control 1	226	83	-0.011	0.008	65%	218	75	-0.011	0.008	63%
	Control 2	166	83	-0.006	0.005	81%	150	75	-0.009**	0.004	57%
Craft authenticity	Control 1	226	83	0.021**	0.008	81%	218	75	0.018**	0.007	67%
	Control 2	166	83	0.019**	0.096	79%	150	75	0.013*	0.008	59%
Natural authenticity	Control 1	226	83	0.012	0.007	77%	218	75	0.016**	0.007	74%
	Control 2	166	83	0.012	0.008	80%	150	75	0.011*	0.007	64%
Average price	Control 1	204	71	0.482	0.294	79%	197	64	0.149	0.256	66%
	Control 2	142	71	0.372	0.300	80%	128	64	-0.018	0.250	60%
Minimum price	Control 1	204	71	0.777**	0.342	87%	197	64	0.326	0.293	72%
	Control 2	142	71	0.779**	0.410	79%	128	64	0.192	0.351	61%

[1] https://blogs.worldbank.org/impactevaluations/why-ex-post-power-using-estimated-effect-sizes-bad-ex-post-mde-not

We replicated the same analysis also for the estimations reported in Table 6 in the paper. In Table A3 below we distinguish treated restaurants based on whether they had high or low prior standing.

Table A3. Statistical power (computed ex-post), regression analyses from Table 6

		High prior standing					Low prior standing				
		N	NTreated	Coef	SE	Power	N	NTreated	Coef	SE	Power
Description Length	Control 1	188	45	1.101*	0.599	79%	181	38	1.764**	0.679	84%
	Control 2	128	45	1.101	0.683	76%	121	38	1.764**	0.755	79%
Size Description	Control 1	188	45	-0.013	0.009	56%	181	38	-0.010	0.009	51%
	Control 2	128	45	-0.007	0.006	82%	121	38	-0.004	0.006	77%
Craft Authenticity	Control 1	188	45	0.029**	0.012	93%	181	38	0.011	0.009	67%
	Control 2	128	45	0.028**	0.013	87%	121	38	0.009	0.010	62%
Natural Authenticity	Control 1	188	45	0.012	0.010	32%	181	38	0.012	0.011	90%
	Control 2	128	45	0.012	0.009	74%	121	38	0.012	0.012	91%
Average Price	Control 1	181	38	0.915**	0.415	88%	176	33	-0.017	0.293	56%
	Control 2	121	38	0.805*	0.420	91%	116	33	-0.127	0.299	61%
Minimum Price	Control 1	181	38	1.317***	0.467	92%	176	33	0.154	0.421	83%
	Control 2	121	38	1.319**	0.521	85%	116	33	0.187	0.439	67%

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APPENDIX 3.

Analysis of pre/post changes at the individual restaurant level

We report scattered boxplots in Figure A1 and lollipop plots in Figure A2.

For scattered boxplots, we have commented on the ones marked with an asterisk * in the paper (cf. Figure 3). Here, we find it interesting to comment on those related to the two outcome variables for which we only look at the comparison among non-starred restaurants, namely *size description* and *natural authenticity*. In the case of *size description*, we observe the IQ range shrinking, the maximum decreasing, no increase in the number of outliers, and opposite trends for control restaurants. In the case of *natural authenticity*, we observe an increase of the IQ range towards higher values, with the maximum going up, no increase in the number of outliers, and control restaurants moving in the same direction but to a smaller extent.

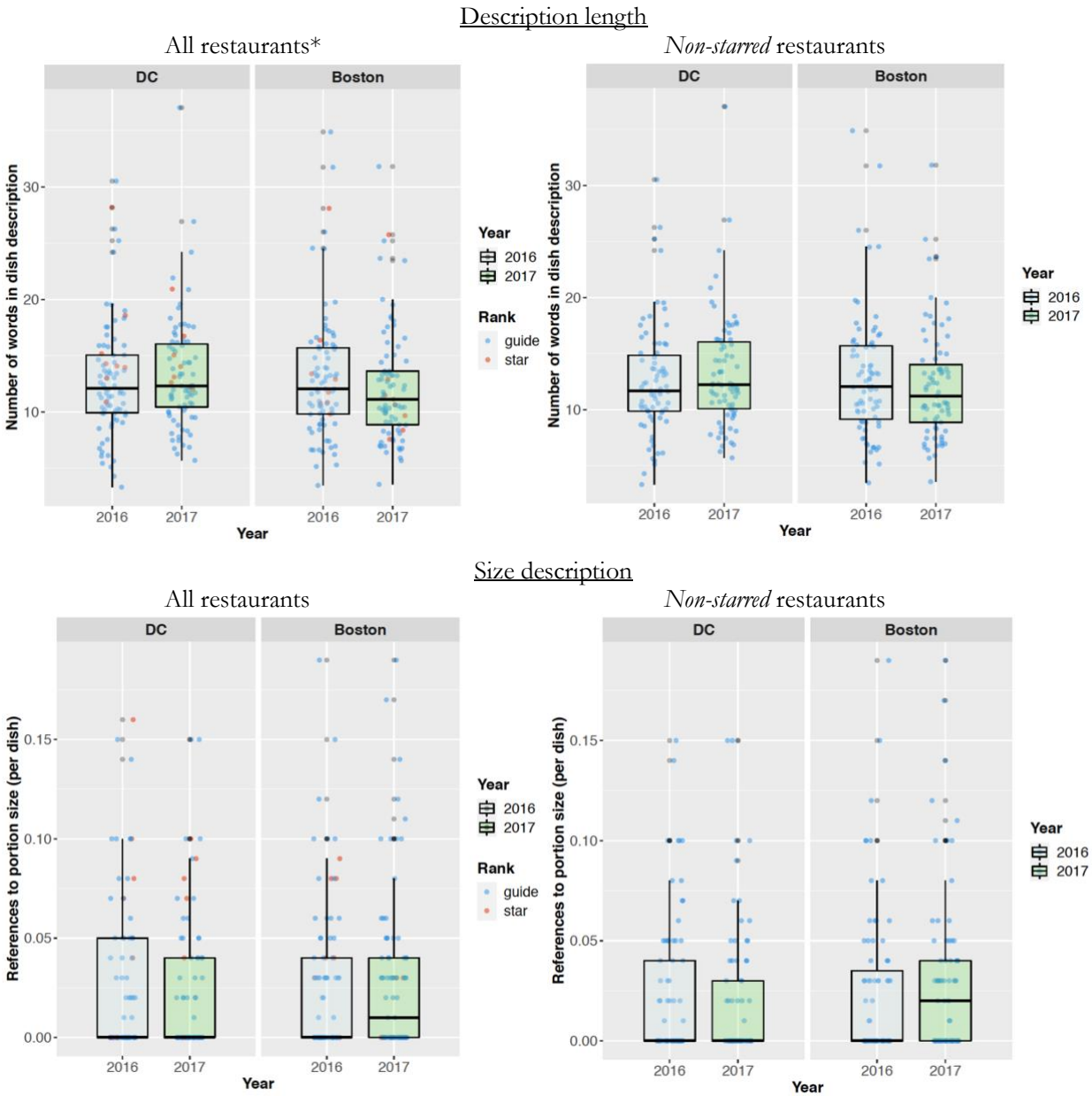
As for lollipop plots, what is interesting about them is that they allow us to go at the restaurant level and the direction in which each restaurant changed from 2016 (green dot) to 2017 (red dot). To make reading the figures easier, Table A4 below reports the number of restaurants for which, during our window of observation, our outcome variables increase, decrease, remain stable, or stay at 0.

Table A4. Individual observations per change in outcome variables

		All restaurants				*Non-starred* restaurants			
		Increase	Decrease	Stable	Stable at 0	Increase	Decrease	Stable	Stable at 0
Description length	Treated	**42**	37	4	n.a.	40	31	4	n.a.
	Control 2	34	**39**	10	n.a.	32	34	9	n.a.
Size description	Treated	14	15	14	40	12	**13**	12	38
	Control 2	21	11	18	33	**21**	6	17	31
Craft authenticity	Treated	**31**	22	16	14	28	20	15	12
	Control 2	19	**27**	24	13	17	22	24	12
Natural authenticity	Treated	24	21	15	23	**23**	18	14	20
	Control 2	20	17	20	26	**18**	**13**	**19**	**25**
Average price	Treated	41	12	22	n.a.	34	12	22	n.a.
	Control 2	31	15	25	n.a.	29	11	24	n.a.
Minimum price	Treated	**34**	10	31	n.a.	27	10	31	n.a.
	Control 2	**22**	11	38	n.a.	20	8	36	n.a.

In line with what we discuss in the paper, we see (cells in dark grey) that the majority of treated restaurants increased description length (51% of restaurants, 53% of those changing), craft authenticity (37%, 58% of those changing), and minimum price (45%, 77% of those changing), and a good number of non-starred treated restaurants decrease size description (17%, 52% of those changing) and increase natural authenticity (31%, 56% of those changing). At the same time, the majority of control restaurants display trends consistent with our overall findings for all outcome variables (cells in light grey), with a decrease in description length (47%, 53% of those changing) and craft authenticity (33%, 59% of those changing), a more moderate increase in minimum price compared to treated restaurants (31%, 67% of those changing), and an increase in size description (28%, 78% of those changing). The behavior of the control group is less clear with respect to natural authenticity, with most of the restaurants not changing (59%), some increasing (24%), and some decreasing (17%).

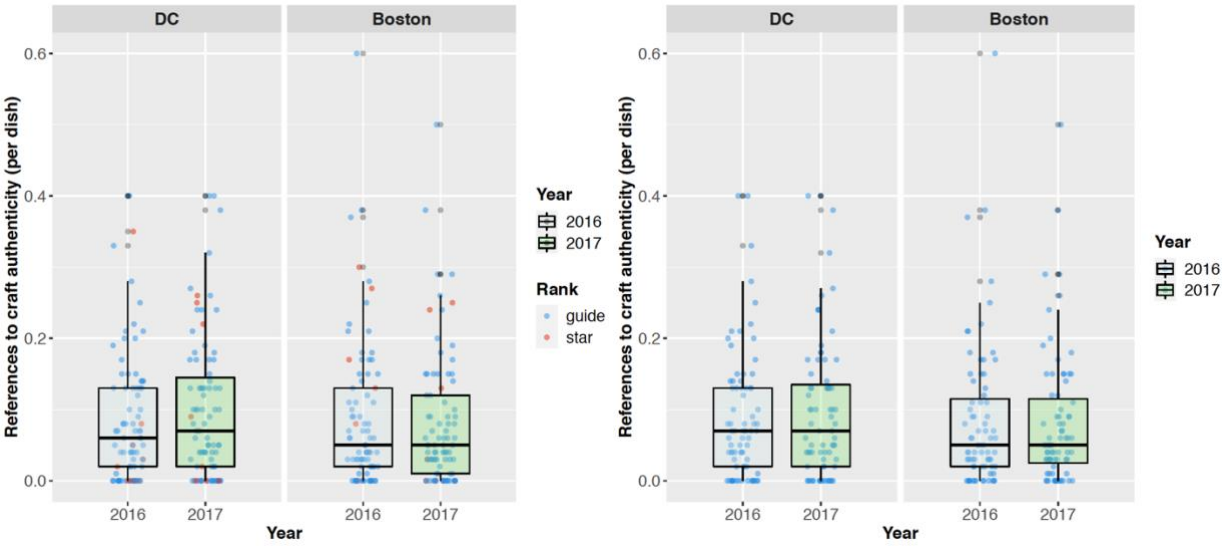
Figure A1. Scattered boxplots



Note: Graphs reported in the paper (cf. Figure 3) are marked with an asterisk *

Craft authenticity

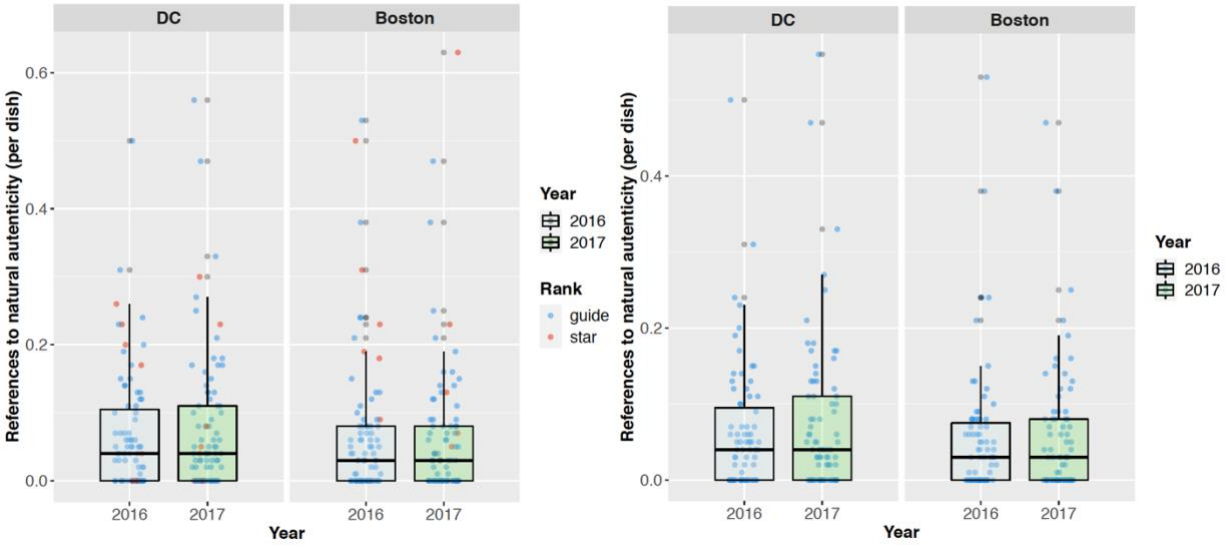
All restaurants*



Non-starred restaurants

Natural authenticity

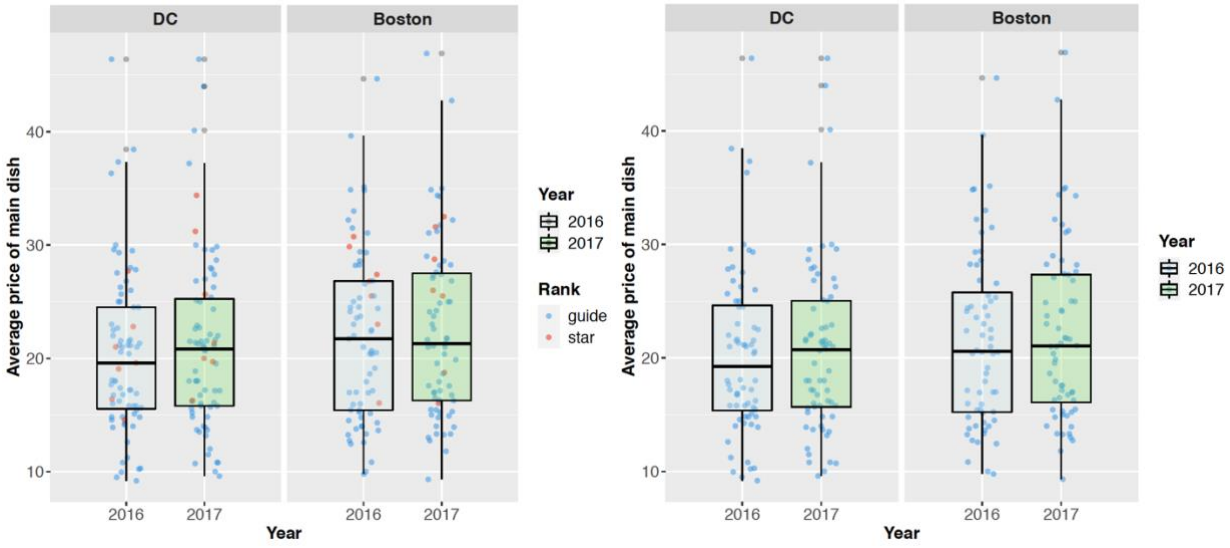
All restaurants



Non-starred restaurants

Average price

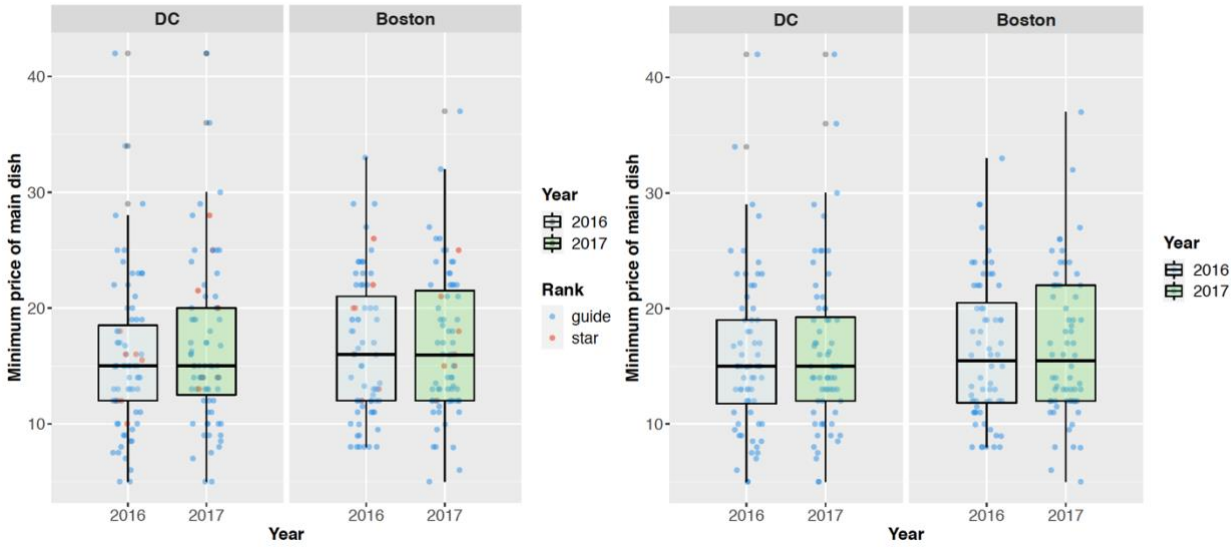
All restaurants



Non-starred restaurants

Minimum price

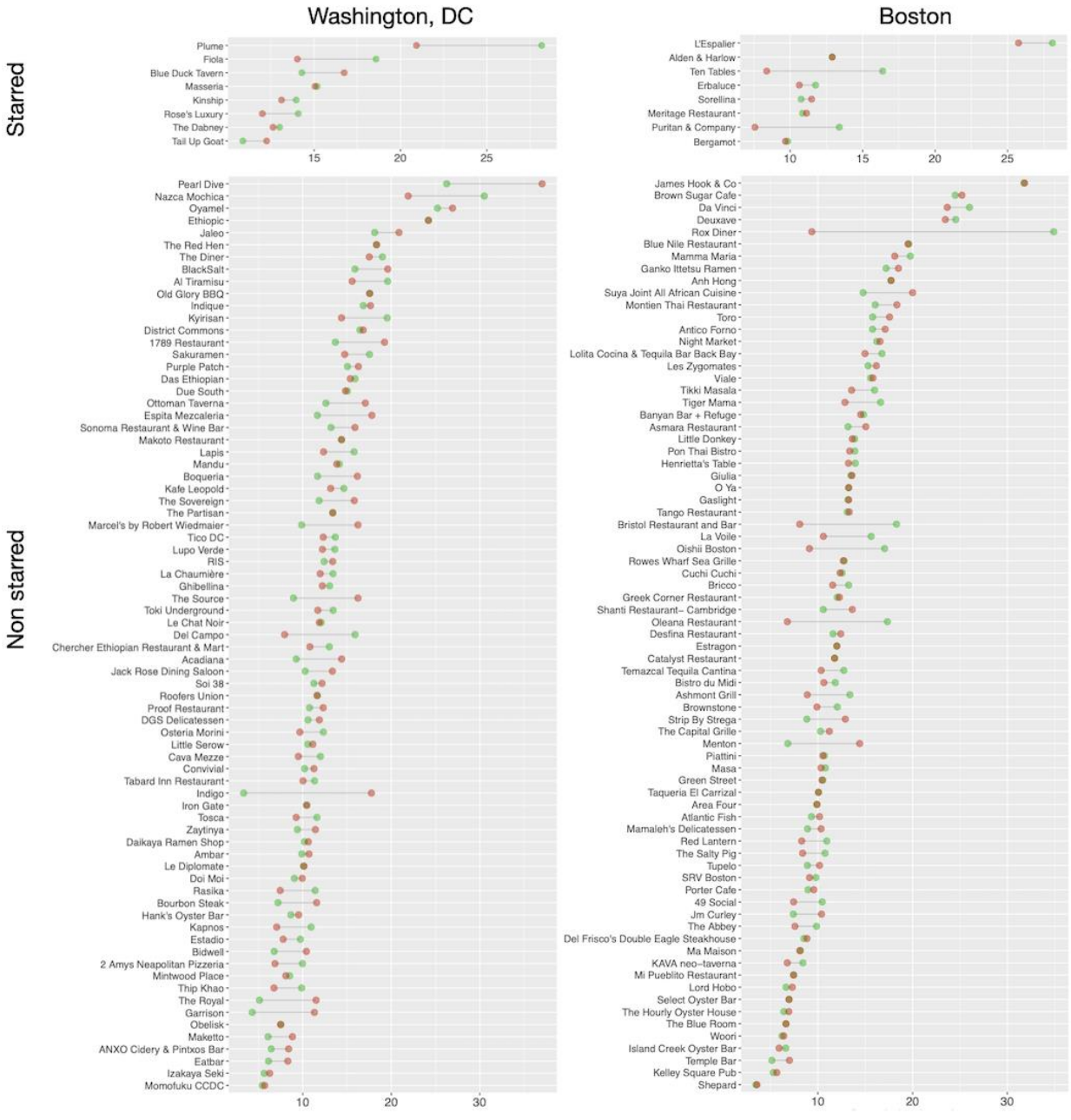
All restaurants*



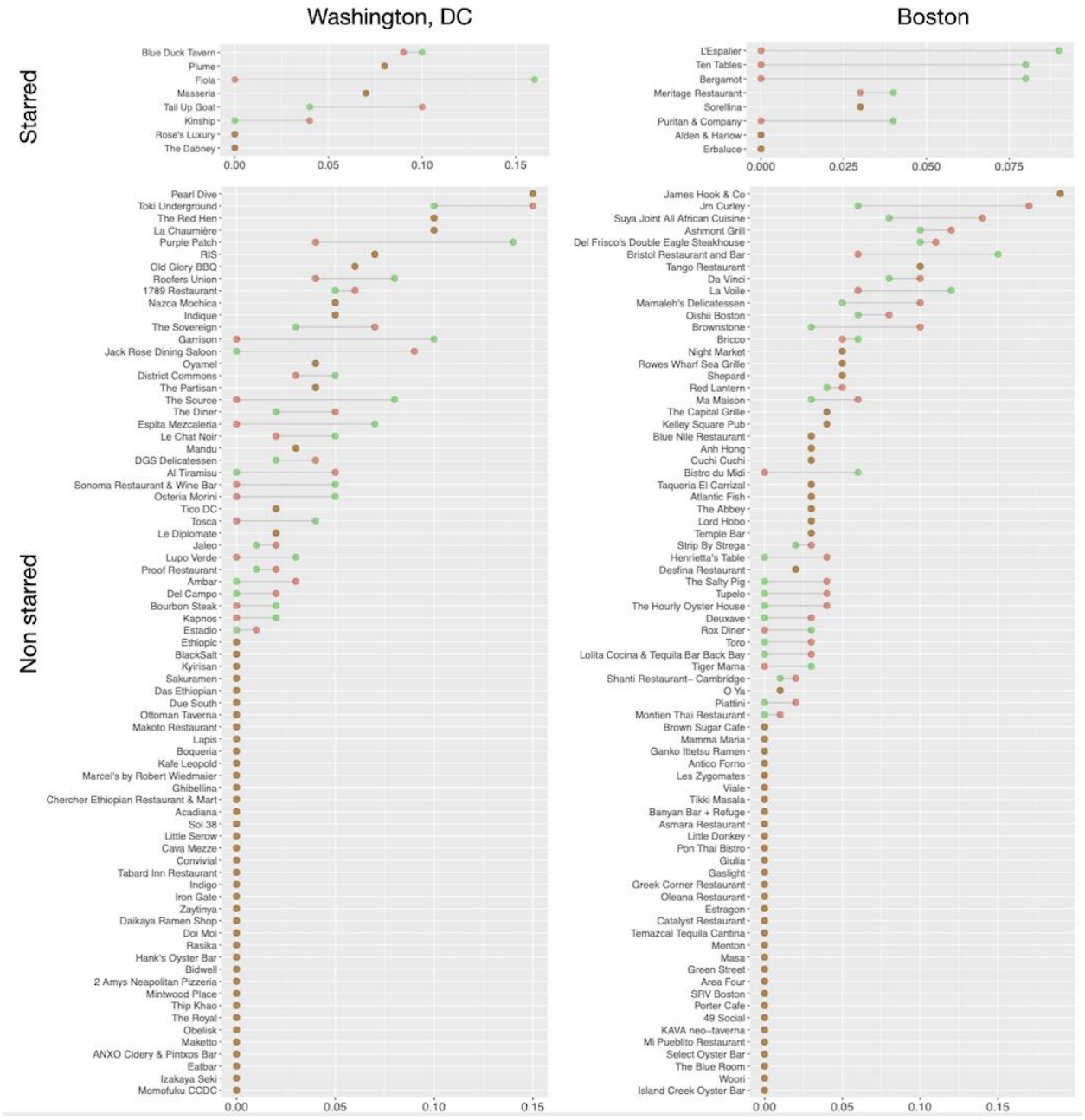
Non-starred restaurants

Figure A2. Lollipop plots

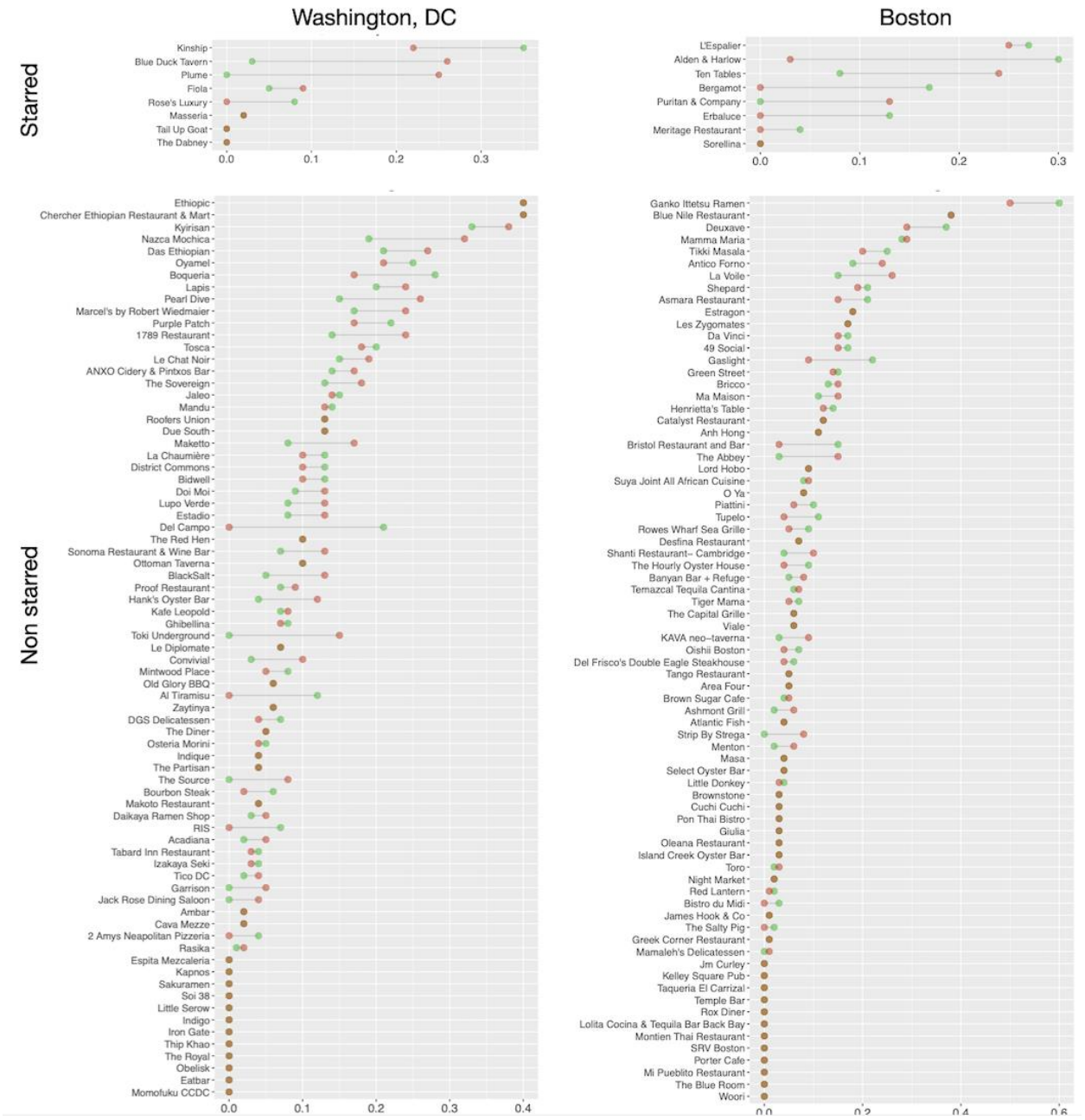
Description length



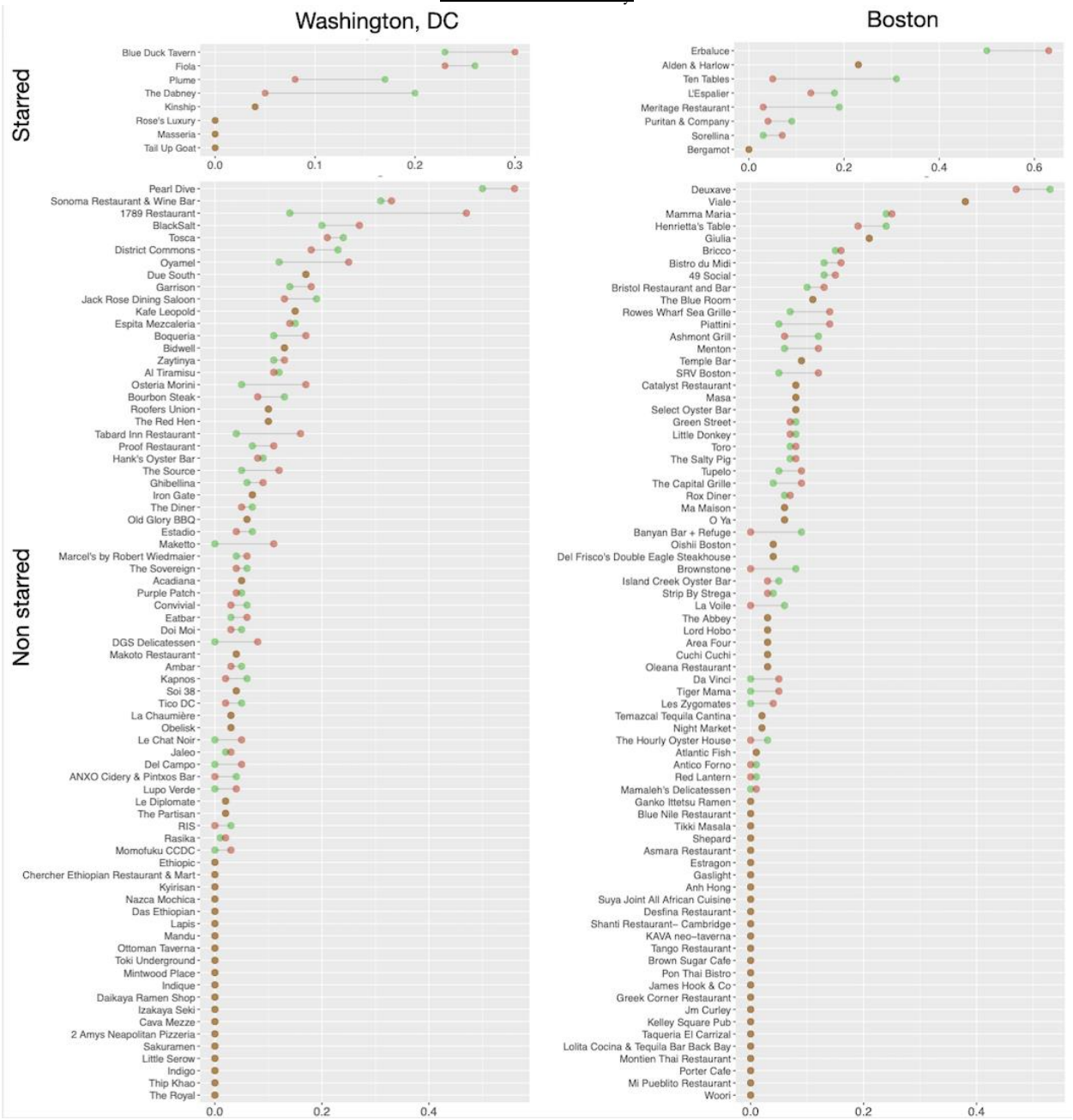
Size description



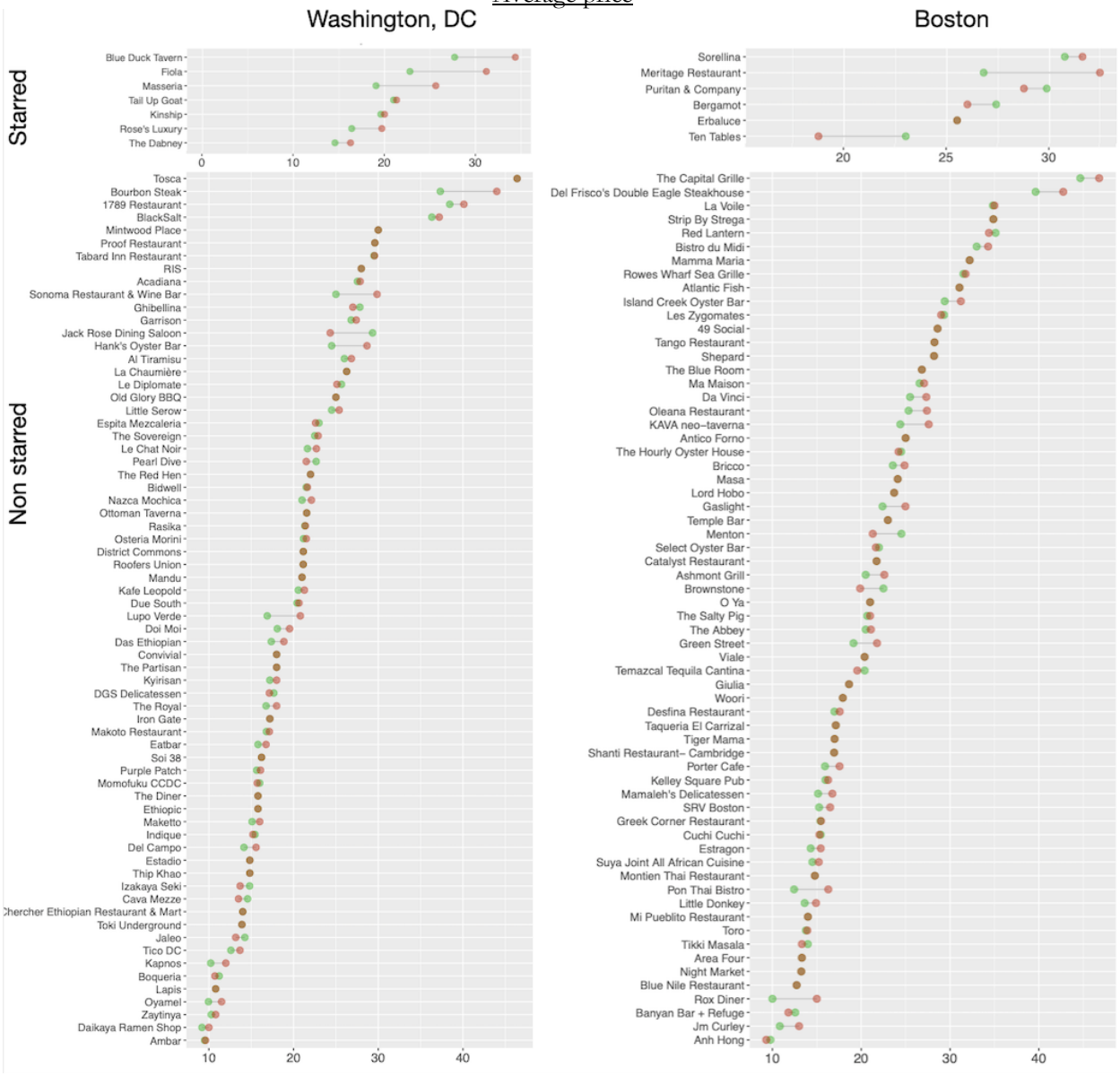
Craft authenticity



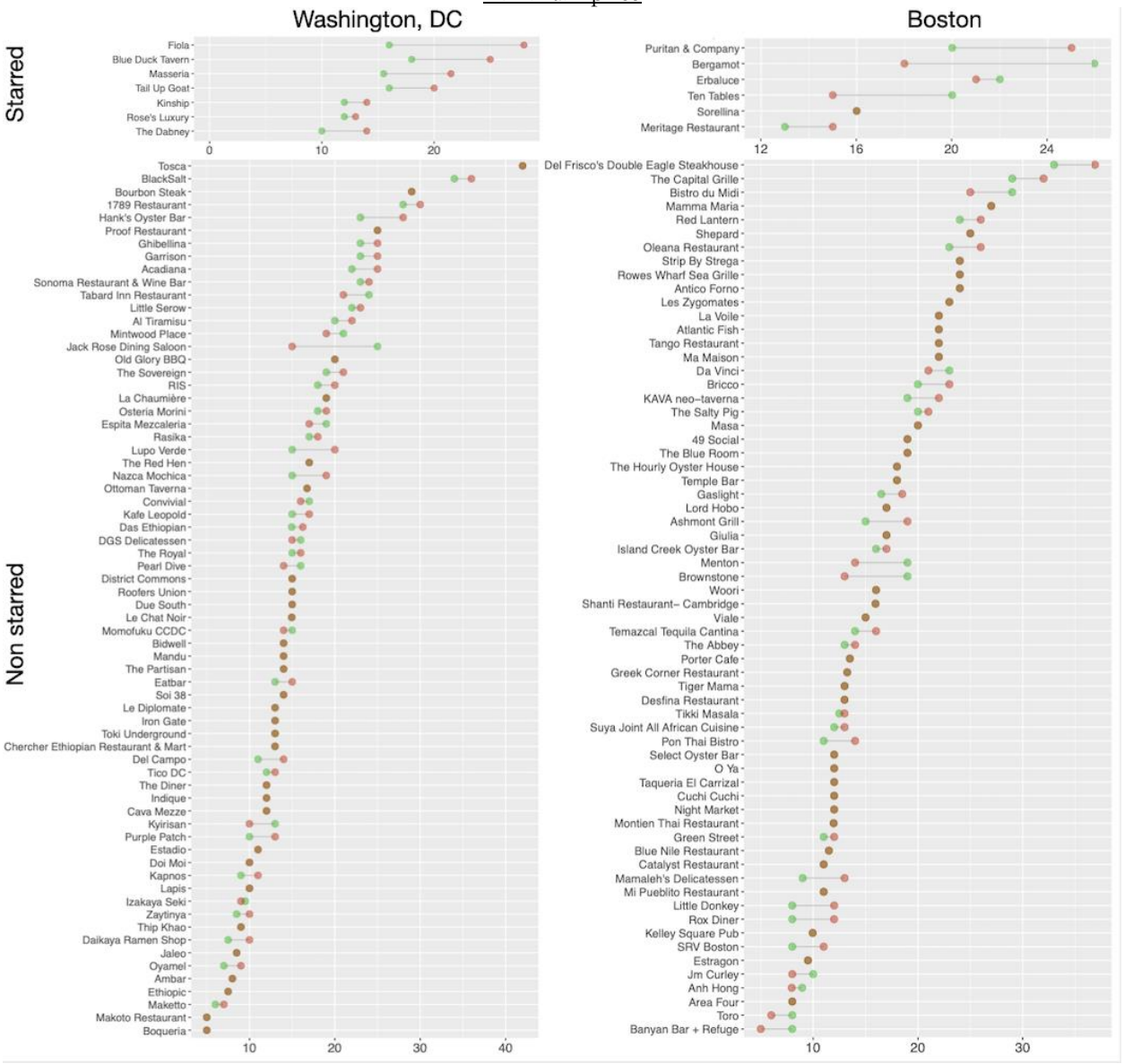
Natural authenticity



Average price



Minimum price



APPENDIX 4.

Qualitative analysis of broader trends in the U.S. restaurant industry

In this appendix, we address the question: *Are the trends we observe among control restaurants in Washington D.C. and Boston in line with trends we observe at the industry level in the United States?* In Table 5 in the paper, we have shown that most of the effects we detect come from treated restaurants moving against the trend that is common to control restaurants across both control groups. This is the case for all variables except for minimum price, where the trends we observe for treated restaurants are in line with those we observe in both control groups, only stronger. Detecting these trends for restaurants in our control groups gives us a benchmark to investigate whether the effects we detect are specific to restaurants in our control groups or related to broader trends we witness in the industry. In other words, are treated restaurants moving against a specific, city-related trend, or are they counteracting a more generalized tendency? This is what we address next by examining all of the significant variations individually.

First, with respect to description length, we have seen that the difference in the number of words used to describe dishes increased by ~10%, with treated restaurants increasing by ~4%/6% and control restaurants decreasing by ~6%/7%. The trend in the industry during the years of our study had been towards simplification of menus. Shorter menus simplify operations and increase quality (Goldreich and Halaburda 2013). They serve customers better by making their choice process smoother,[2] and can be used as strategic tools by restaurants to better showcase their identity and direct attention toward the most profitable items.[3] In the context of this stronger emphasis on leaner, shorter menus, dish descriptions also appeared to be simplifying. Advice shared with restaurants from specialized consultants suggested using descriptive labels (*grandma's* zucchini cookies or *satin* chocolate pudding) sparingly to draw attention to a few items without overloading customers,[4] and keeping descriptions short.[5] This is consistent with research by Wansink and colleagues, who argued that: "if descriptive menu-item labels are used sparingly and appropriately, they may be able to improve sales and post-consumption attitudes of both the food and the restaurant." (Wansink et al. 2001: 68). This descriptive evidence seems in line with an overall tendency towards "less is more" when engineering menus, with higher quality restaurants having more leeway to move in the opposite direction – which is consistent with the patterns we observe among restaurants in our sample.

For craft and natural authenticity, we see that treated restaurants move in the opposite direction compared to control restaurants in both cities: the number of words related to cooking technique and the provenance of food increased for treated restaurants (only non-starred ones in the case of natural authenticity) while decreasing for control restaurants. To gather additional evidence of the extent to which the trends we identify among control restaurants are part of a broader national trend, we examined culinary trends in the years of our study. In particular, we looked at the reports issued annually by the National Restaurant Association, which every year surveys around 1,300 professional chefs to ask them about trends they expect to observe for the following year. We noticed different interesting patterns by looking at the reports issued for 2015, 2016, and 2017.[6] In particular, the following are worth mentioning:

1. We went through the list of food trends— i.e., trends voted as "hot" by at least 10% of respondents (198 in 2015, 192 in 2016, 119 in 2017)—and counted mentions of words associated with craft and

[2] https://www.washingtonpost.com/news/wonk/wp/2014/09/18/americans-are-tired-of-long-restaurant-menus/.
[3] https://restaurantengine.com/shorter-restaurant-menus-gaining-popularity/; https://aaronallen.com/blog/restaurant-menu-design-mistakes. As a side note, this is a strong trend also nowadays given the pandemic and the increased need to streamline operations. See, for instance: https://edition.cnn.com/2020/06/23/business/restaurant-menus-shrinking/index.html; https://thehustle.co/meet-the-menu-engineers-helping-restaurants-retool-during-the-pandemic/.
[4] https://www.menucoverdepot.com/resource-center/articles/how-to-write-menu-descriptions/.
[5] https://www.posist.com/restaurant-times/resources/menu-descriptions.html.
[6] 2015: https://www.restaurant.org/downloads/pdfs/research/whatshot/whatshot2015-results;
2016: https://www.restaurant.org/downloads/pdfs/research/whatshot/whatshot2016;
2017: https://www.restaurant.org/downloads/pdfs/research/whatshot/what-s-hot-2017-final.

natural authenticity using the same lists we employ in the paper.[7] Given the scarcity of mentions of techniques, we also went through the lists manually and counted any mention of the cooking technique used to prepare the food listed in the trends (e.g., frying, pickling, fermenting, molecular gastronomy, liquid nitrogen, smoking, steaming, etc.). Data show a decreased emphasis on both types of authenticity:

	2015	2016	2017
Craft authenticity	1	2	1
Additional techniques	15	9	5
Total techniques	16	11	6
Natural authenticity	14	12	4

2. We examined the lists of "top trends by category." There is a separate "preparation methods" category, which arguably refers to craft authenticity as it displays the cooking techniques that were trending, in this case in 2015 and 2016. This category does not appear in the 2017 report. In the category "produce", we see a decreasing emphasis on words related to natural authenticity (in bold):

2015	2016	2017
1. **Locally grown** produce	1. **Locally grown** produce	1. **Heirloom** fruits and vegetables
2. **Heirloom** apples	2. **Heirloom** apples	2. Unusual/uncommon herbs
3. Unusual/uncommon herbs	3. **Organic** produce	3. Hybrid fruits/vegetables
4. **Organic** produce	4. Unusual/uncommon herbs	4. Exotic fruits
5. Exotic fruits	5. Exotic fruits	5. Dark greens

3. Finally, we looked at the lists of "trends heating up" (up 5% or more) and "trends cooling down" (down 5% or more), and identified no mention of any words associated with craft authenticity across all years, while for words associated with natural authenticity, we see:
   a. *Free-range*, *grass-fed*, *hyper-local* and *locally produced* appear among the trends heating up in 2015 and 2016
   b. *Locally sourced* appears among the trends cooling down in 2017.

While we are aware that this is purely descriptive evidence, we find it interesting to observe that it is consistent with what we observe more systematically in Table 5: a decreased emphasis on craft and natural authenticity among restaurants in our control groups between 2016 and 2017.

With respect to portion size, we observe that, in the case of non-starred restaurants, the number of words related to the size of portions significantly decreased for treated restaurants while increasing for control restaurants. The topic of portion sizes has been at the center of a heated debate since the beginning of the 2000s—think about the 2004 release of the documentary film "Super Size Me", and the shocking 2012 New York City campaign "Cut your portions. Cut your risk" and related controversy.[8] The debate mostly involved casual-dining and fast-food establishments, where customers seemed to resist attempts to reduce portion sizes.[9] Still, with large portion sizes identified as a public health risk, restaurant owners have been called to action,[10] and most of the conversation moved to the identification of strategies to reduce serving sizes without disappointing customers.[11] This explains, for instance, the trend of serving small plates meant to be shared, or *grazing*.[12] These concepts have started to generate some push-back more recently,[13] to the point that

[7] As reported in Table 2, the list includes the following: (1) craft authenticity: *sautée, fricassée, sous-vide, low-temperature, flambé, caramelizée, nappage, pasteurized, gelée, purée, confit, consommé, simmered, smothered, braised*; and (2) natural authenticity: *natural, organic, farmhouse, wild caught, grass fed, local, market, farmed, free range, heirloom, ranch*.
[8] https://www.nytimes.com/2012/02/06/nyregion/some-say-new-york-city-health-ads-should-inspire-not-scare.html?_r=1&emc=eta1.
[9] https://www.fsrmagazine.com/big-year-small-portions.
[10] https://pubmed.ncbi.nlm.nih.gov/23079182/.
[11] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5080663/.
[12] https://restaurantengine.com/trends-restaurant-menu-design/.
[13] https://www.nytimes.com/2018/03/21/style/food-sharing-small-plates.html.

while small plates have definitely been a trend in the last decade,[14] more recently they seem to have been surpassed by a revival of more traditional menus.[15]

Reports from the National Restaurant Association also show evidence of a relatively reduced emphasis on topics related to reduced food portions among the top culinary themes/all concept trends in the years of our study, as shown by the percentage of respondents according to which the following three portion-related themes/trends were "hot" in 2015, 2016, and 2017:

	2015	2016	2017
Food waste reduction	70%	67%	67%
Grazing (e.g., small plate sharing/snacking instead of traditional meals)	62%	64%	60%
Small plate menus/restaurant concepts	63%	59%	55%

Overall, while it is not possible to clearly identify precise patterns related to portion sizes in the overall industry, this brief overview shows that portion sizes have been attracting attention since 2004, in particular among casual-dining operators; that restaurants have tried to address the related health concerns, but faced resistance among customers; and that in the years of our study there seems to be a decline in the attention chefs paid to related topics. This is consistent with what we observe more systematically in Table 5, which is control restaurants going back to emphasizing large portions[16] while treated restaurants were de-emphasizing them, in line with the typical image of the Michelin restaurant.[17]

Finally, with respect to prices, the increase we observe for our restaurants (~2%) is in line with the increase in prices witnessed by U.S. urban consumers (Consumer Price Index for all Urban consumers, CPI-U) between the fall of 2016 and the fall of 2017, in the expenditure category "food away from home," and subcategory "full-service meals and snacks", as well as across categories for the metro areas (CBSA) of our control cities.[18]

U.S. city average, by expenditure category	Oct. 16-17
All items	2.0
Food	1.3
Food away from home	2.3
Full-service meals and snacks	2.4
Limited-service meals and snacks	2.6
Food at employee sites and schools	-0.2
Food from vending machines and mobile vendors	1.9
Other food away from home	1.5

Selected areas, all items index	Sep. 16-17	Nov. 16-17
U.S. city average	2.2	2.2
Boston-Brockton-Nashua, MA-NH-ME-CT	2.7	2.9
Washington-Baltimore, D.C.-MD-VA-WV	1.7	1.6

These numbers support the intuition that control restaurants are moving in line with more general trends, while treated restaurants are increasing prices more substantially. More generally, this overview of trends in the industry during the years of our study reassures us that restaurants in both control groups were moving in line with national and regional trends, while restaurants in the treatment group were actively counteracting or emphasizing those dynamics.

A remaining doubt one may have is whether treated restaurants were responding to another event that affected the 83 treated restaurants only, and not the other 143 (Control 1) or 83 (Control 2). This seems implausible, but it is not impossible. For our peace of mind, we hence went a step further and looked at how other prestigious local rankings were evaluating our treated restaurants before the Michelin publication. In particular, we gathered information on two local rankings: the 100 Very Best D.C. Restaurants (published since 1968 by *Washingtonian* magazine in February of each year)[19] and the ~20 Rammy awards (presented since 1982 by the Restaurant Association Metropolitan Washington, the local regional trade association for

[14] https://www.nytimes.com/2019/12/17/dining/restaurant-trends-pete-wells.html.
[15] https://www.nytimes.com/2019/05/16/t-magazine/the-end-of-sharing-food.html.
[16] https://www.washingtonpost.com/lifestyle/food/in-an-era-of-excessive-food-waste-a-plea-to-restaurants-cut-down-your-portions/2019/03/25/724c7d94-3e01-11e9-9361-301ffb5bd5e6_story.html.
[17] https://www.quora.com/If-you-go-to-a-Michelin-star-restaurant-would-you-go-on-an-empty-stomach.
[18] https://www.bls.gov/cpi/tables/supplemental-files/home.htm.
[19] https://www.washingtonian.com/2020/01/27/a-look-back-at-washingtonians-100-very-best-restaurants-over-the-years/.

restaurants in June each year).[20] In particular, we looked at how many D.C. restaurants that made it to these lists in 2015 and 2016 would later be included in the Michelin Guide in October 2016. We were interested in understanding whether there was any significant change between 2015 and 2016 that could have indicated a "targeted" additional shock to our treated restaurants. This does not seem to be the case as the numbers are very stable between the two years. In the *Washingtonian* 100 Very Best, we see 33 future Michelin restaurants included in 2015 and 36 in 2016. As for the Rammy's, we have 9 future Michelin restaurants included in both years. This analysis is again very descriptive, but it reassures us about the absence of any particular shakeout affecting the treated restaurants in the months preceding the Guide's publication.

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Wansink B, Painter J, van Ittersum K (2001) Descriptive menu labels' effect on sale. *Cornell Hotel and Restaurant Admin. Quart.* 42: 68–72.

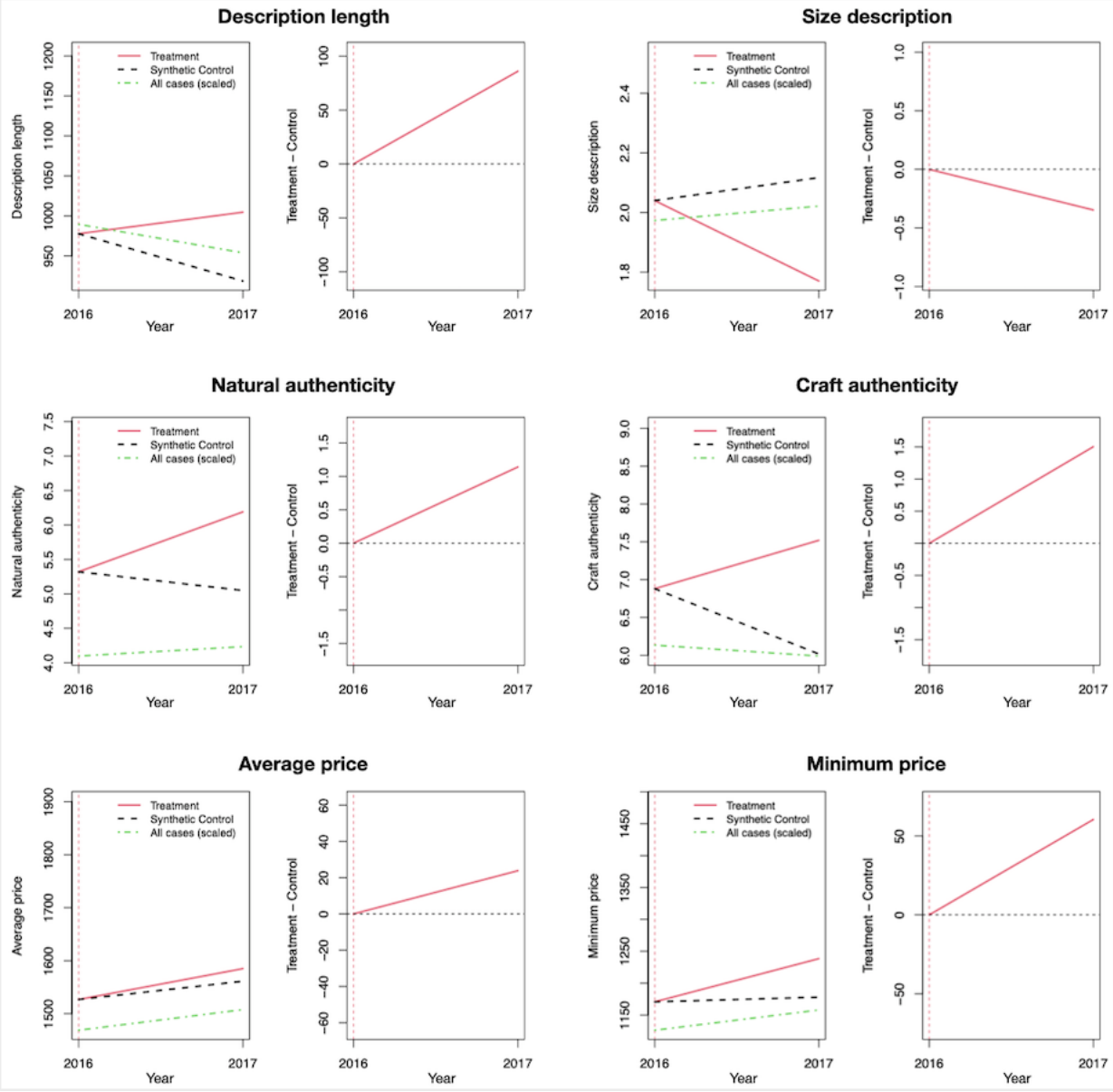
[20] https://www.therammys.org/.

APPENDIX 5.

Synthetic control estimates of treatment effects

The figures show results from synthetic control models for all of our six outcome variables, first for all restaurants and then for non-starred restaurants only. For each variable, the panels on the left compare treated and control groups, while those on the right show the changes from the pre-Michelin level for treated restaurants only. The synthetic control groups for each outcome variable are built from all restaurants in Washington D.C. and Boston not included in the Michelin Guide. Values on the vertical axes should be divided by 100.

<u>All restaurants</u>



Non-starred restaurants