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Impact of Menu Labeling Act upon the market value of foodservice firms

9

10 **Abstract**

11 The Menu Labeling Act (MLA), which requires restaurants to provide customers with nutritional
12 information, has encountered implementation difficulties for more than eight years, owing to the
13 imposition of administrative costs on restaurant firms. By investigating the market value of 46
14 restaurant firms that publicly trade in the U.S., this research analyzes the impact of MLA-related
15 announcements on the market value of foodservice firms. Announcements associated with
16 restrictions tend to reduce restaurant market value by 0.29% per day (market value is defined as
17 the number of shares times the share price), whereas announcements related to flexibility
18 increase such market value by 0.80%. The final guideline and compliance date announced by the
19 Food and Drug Administration (FDA) has provoked significant negative effects on restaurant
20 market value. Meanwhile, the congress' proposed opposition act has elicited great positive
21 effects. This study provides important implications for policymakers and practitioners in the food
22 service industry.

23

24

25 **Keywords:**

26 Menu labeling; Nutritional information; Menu Labeling Act; Restaurant; Firm value

27 INTRODUCTION

28 The Patient Protection and Affordable Care Act (PPACA, also known as Obamacare) of
29 2010 received considerable attention from proponents and opponents when it was signed into
30 law by former President Obama on March 23, 2010. Section 4205 requires retail food
31 establishments and vending machines with 20 or more branches or locations to provide
32 customers with calorie information for standard items on menus and upon request, offer
33 additional nutritional information to customers in a written statement, known as the Menu
34 Labeling Act (MLA). Supporters believe that this regulation can provide customers with
35 information that promotes healthy menu choices, thereby improving a healthy eating
36 environment while reducing healthcare costs. However, detractors view the MLA as another
37 instance of governmental overreach with, for example, a consequential increase in costs. Thus,
38 the MLA has become one of the top issues confronting the restaurant industry. Eight years after
39 the president’s signing of the law, the final implementation occurred on May 7, 2018 (a detailed
40 series of the MLA milestones appear in the later section).

41 Menu labeling implementation has become one of the controversial topics with public
42 health implications in the U.S. Debate on menu labeling has gained attention from politicians,
43 industry stakeholders, and scholars. Owing to the significance of this issue, several studies have
44 examined the effects of menu labeling on restaurant customers. Previous research reveals fairly
45 mixed findings on the effect of menu labeling on calorie reduction (e.g., significant effect:
46 Auchincloss et al., 2013; Kim, Tang, Meusel, & Gupta., 2018; Wei & Miao, 2013; insignificant
47 effect: Dumanovsky, Huang, Bassett, & Silver, 2010; Finkelstein, Strombotne, Chan, & Krieger,
48 2011). Certain studies have argued that menu labeling is important, given that the provision of
49 nutritional information can increase customers’ willingness to use the information (Fakih,

50 Assaker, Assaf & Hallak, 2016; Kim, Ham, Yang, & Choi, 2013, 2013; Kim & Ham, 2017).
51 Although these studies have explored how menu labeling disclosure affects customers' behavior
52 and attitude, few research has investigated how MLA influences the restaurant industry (e.g.,
53 Kim & Ham, 2016). However, none of these studies has examined the economic effects of the
54 MLA on the restaurant industry despite the critical debate over the menu labeling delay for over
55 eight years.

56 The analysis of the effects of the MLA-related events (announcements) during these eight
57 years of deferment on businesses is relevant. Such an analysis can provide clues about
58 restaurants' future performance and can therefore assess government-level decisions' suitability.
59 However, no research has explored this question yet, whereas a significant number of studies
60 have considered the effect of the law on customers' behavior. Accordingly, the present study
61 aims to analyze the impact of the MLA's chronological events on restaurant market value.

62 The impact of the MLA on restaurant market value is analyzed on the basis of the
63 announcements made by the government. Exclusively for the restaurant industry, this analysis
64 uses firm value, which examines the *Congressional Record* to identify informational events, thus
65 providing investors with value-relevant information about the MLA's content and the possibility
66 of its enactment.

67 The present study also employs event study as the methodology to access the impact of
68 MLA on the market value of restaurant firms. Event study methodology is suitable because it
69 allows for a better isolation of the effects of the analyzed legislation than using backward-
70 looking measures, including accounting-based metrics. McWilliams and Siegel (1997) indicated
71 that stock returns reflect the present value of all future cash flows and critical information, which
72 poses an impact on the share price, while showing an unbiased estimate of true performance. In

73 hospitality literature, considerable research has examined stock performance by using event
74 study methodology (e.g., Borde, Byrd, & Atkinson, 1999; Nicolau, 2002; Chen, Jang, & Kim,
75 2007). In the restaurant industry, impacts of food safety events on food-related firms (Seo, Jang,
76 Miao, Almanza, & Behnke, 2013; Seo, Jang, Almanza, Miao, & Behnke, 2014) and bankruptcy
77 of restaurant companies (Kwansa & Parsa, 1991) have been investigated using event study
78 methodology. Particularly, this methodology has been used to examine the impact of regulatory
79 change. For example, several studies have investigated the impact of smoking bans on hospitality
80 firms (Tomlin, 2009), the effect of the Travel Promotion Act on hotel firms (Johnson, Singh, &
81 Ma, 2015), the influence of the Unfair Internet Gambling Enforcement Act on the gaming
82 industry (Johnson, Singh, & Zhou, 2015), and the impact of the Food Safety Modernization Act
83 on restaurant firms (Johnson, 2018).

84 No research has investigated whether MLA-related events impact the market value of
85 restaurant firms' equity. The lack of research on the financial impact of MLA events has
86 motivated the present study, which contributes to literature by expanding the understanding of
87 the consequences of the events surrounding MLA and by providing empirical evidence of its
88 impact on restaurant firms.

89

90 LITERATURE REVIEW

91 Public Health Issue and Restaurant Food Consumption

92 Obesity is a current major public health concern, and its growing prevalence exhibits a
93 correlation with the rise in consumption of food-away-from-home (Drichoutis, Nayga, &
94 Lazaridis, 2012). The occurrence of obesity likely increases due to unhealthy dietary behavior,
95 which is promoted by substantial and continuous increase in restaurant dining (Kant, Whitley, &

96 Graubard, 2015; Zick, Wake, & Reeves, 2010). In 1997, food-away-from-home accounted for
97 over 45% of the total annual food expenditures, increasing from 27% in 1962 and rising to
98 50.1% by 2014 (U.S. Department of Agriculture Economic Research Service, 2018). The
99 prevalence of obesity among U.S. adults was 39.8% in 2015–2016 (Hales et al., 2017), whereas
100 the estimate of U.S. monetary costs for obesity-related health care range from \$147 to \$210
101 billion annually (Cawley & Meyerhoefer, 2012). Consequently, the restaurant industry has
102 become the target of recent regulations intended to encourage obesity reduction by providing
103 relevant nutritional information and creating awareness at points-of-purchase (U.S. Food and
104 Drug Administration, 2017). The government assumes that regulations mandating menu labeling
105 are effective informational tools to encourage customers’ informed choice among various
106 alternatives (Kim et al., 2018).

107

108 Effect of Menu Labeling on Customer Behavior

109 Menu labeling, which has been implemented by the government and industry, addresses
110 controversial topics with public health implications; similarly, scholars expose an ongoing debate
111 on whether menu labeling is an effective information channel to assist consumers’ informed
112 choices. The provision of MLA affects customers’ attitude and perception (Burton & Creyer,
113 2004; Kim et al., 2013). Several studies have supported the regulation by revealing that the
114 provision of MLA helps people reduce caloric consumption (Auchincloss et al., 2013; Brissette,
115 Lowenfels, Noble, & Spicer, 2013; Burton, Howlett, & Tangari, 2009; Dowray et al., 2013).

116 By contrast, certain studies have found an insignificant impact of menu labeling on
117 customers’ purchase decision (e.g., Dumanovsky et al., 2010; Finkelstein et al., 2011; for a meta-
118 analytic review, see Long, Tobias, Cradock, Batchelder, & Gortmaker, 2015). However, Kim et

119 al. (2018) argued that these mixed results may be generated due to ineffective menu labeling
120 formats. A simple display of menu labeling cannot guarantee meeting healthy eating goals
121 (Bialkova et al., 2014), and many consumers are unaware of the meaning of number of calories
122 and its association to daily calorie intake (Blumenthal & Volpp, 2010). Kim et al. (2018) further
123 confirmed that effective formats of menu labeling may help customers in grasping food
124 information, which helps them select healthy items.

125 In addition to the effect of menu labeling on customers, the provision of MLA affects the
126 restaurant industry. Customers perceive menu labeling as a corporate social responsibility
127 initiative, which increases customer trust and improves brand image by reducing information
128 asymmetry between customers and the company (Kim & Ham, 2016). Gatta (2015) emphasized
129 the roles of governments and companies in food reformulation toward a healthy eating
130 environment. Furthermore, Kim et al. (2013) claimed that MLA appears to encourage restaurants
131 to reformulate menus.

132

133 Menu Labeling Initiative

134 The Nutrition Labeling and Education Act (NLEA), which was first issued in 1993, came
135 into effect in 1994 through the U.S. Food and Drug Administration (U.S. FDA, 1995). The act
136 requires nutritional labeling on packaged foods and stipulates that all nutrient content (e.g., “high
137 fiber,” “low fat,” etc.) and health claims should meet the U.S. FDA regulations (U.S. FDA,
138 2004). The impact of food labeling has revolutionized the nutritional information available to
139 consumers. Research indicates that users of food labels commonly exhibit better dietary quality,
140 based on high intakes of fruits and vegetables and low intakes of calories and fat, than non-users
141 of food labels (Kreuter, Brennan, & Scharff, 1997; Kristal et al., 1998). However, the extent to

142 which the NLEA should include restaurants has been a matter of considerable debate in Congress
143 due to the opposition of the restaurant industry. Thus, exempting food served in restaurants from
144 the NLEA disregards the requirement to provide nutritional information, unless a restaurant
145 claims nutrient content or health benefit of a food or a meal.

146 In 1996, the U.S. FDA enacted regulations that applied the NLEA to restaurants by
147 mandating restaurants with 30 or more employees upon request. Doing so provides specific
148 nutritional labeling for menu items that claim food's nutritional content or health benefit. The
149 Code of Federal Register Title 21 (U.S. FDA, 2013) stated that this legislation intends to increase
150 American consumers' awareness of the relationship between diet and health. A similar proposal
151 appeared in Nestle (2002), the Center for Science in the Public Interest (CSPI) (2003), and Porter
152 and Earl (1990). In 2003, the U.S. FDA instituted the Obesity Working Group (OWG) to afford
153 evidence-based recommendations for the prevention of overweight and obesity. The OWG
154 published "Counting Calories," a 2004 report targeting the restaurant industry and its impact on
155 obesity. The report recommended the U.S. FDA to be further proactive and to include restaurants
156 in labeling requirements (U.S. FDA/CFSAN, 2004). Restaurants must be responsible for
157 assisting customers' informed decision by supplying all information about menu items.
158 Consequently, the Menu Education and Labeling Act of 2003, an extension of the NLEA,
159 proposes that chain restaurants should provide nutritional labeling for all foods and drinks sold,
160 including disclosure of calories, carbohydrate, saturated fat, trans fat, and sodium contained in
161 recipes (Jacobson, 2004).

162 Legislatures have similarly introduced local and state provisions for menu labeling
163 (Pomeranz & Brownell, 2008). For example, the New York City Board of Health introduced a
164 campaign in 2007 to curtail obesity; they proposed and adopted a provision that major fast-food

165 chains should display calorie information on menus. This rule applied to any restaurant that has
166 at least 15 branches operating throughout the country (New York City Department of Health and
167 Mental Hygiene, 2011). Introduced in 2009, the PPACA, which embraces the MLA, was passed
168 into law in 2010. The U.S. FDA (2014) reported that approximately 231,200 establishments
169 under 1,070 chains are subject to the federal MLA. This number only accounts for chain retail
170 food establishments in economic census surveys (NPD Group, 2010), which are assigned by the
171 U.S. Census Bureau to belong under NAICS 7221, 7222, and 7224.

172 Similar to the U.S. policies, the menu labeling initiative has spread worldwide. For
173 example, the European Union, Australia, Korea, and other countries have established policies
174 similar to those of the U.S. (Kim et al., 2016). Evidently, interest in promoting mandatory
175 nutrition labeling for restaurants has gained visibility in the global perspective. The trend has
176 elicited attention from many government departments, policy agencies, and public health
177 advocates in several countries. The regulations have also introduced new roles to assist
178 customers' informed choice through mandatory nutritional labeling regulations.

179

180 Benefits of the Menu Labeling Act

181 Proponents' support for the MLA has stemmed from its available, direct, and accessible
182 benefits that promote informed and healthy choices among customers. Public statements
183 supporting the MLA are abundant, and supporters believe that this law is one of the most
184 effective tools to combat America's obesity epidemic. For example, supporters believe that the
185 MLA can help improve the knowledge of individuals on health and can help address the
186 prevalence of obesity in the U.S. With the proposed bill, Senator Harkin mentioned, "for nearly
187 20 years, consumers have benefitted from nutrition labels on packaged foods, but have remained

188 in the dark about the nutritional quality of their restaurant meals.” Therefore, regulations are
189 expected to enable customers to clearly see the nutritional benefits of restaurants’ menu options.
190 The U.S. FDA (2014) estimated that the MLA’s final rule can generate benefits to society (total
191 U.S. population) over the next 20 years with \$9.22 billion under a 3% discount rate.

192 As a leading proponent of the MLA, CSPI actively advocates the legislation, and many
193 proponents vigorously support it to ensure success. With these efforts, a number of restaurant
194 chains, including McDonald’s, Panera Bread, and Starbucks, have instituted efforts to fulfill the
195 MLA’s requirements at the national level and to implement related state and local policies.
196 Therefore, the MLA has introduced a new transparency among chain restaurants and has
197 promoted ongoing trends in chain restaurants to provide healthy options as a means of attracting
198 customers.

199

200 Challenges of the Menu Labeling Act

201 Although the MLA may help reduce obesity rate by changing individuals’ behavior, this
202 law has encountered difficulties and has taken over eight years to be fully implemented.
203 Disagreement about the MLA’s initiatives has not been settled. Opponents have argued against
204 this policy due to its financial burdens, negative legal consequences, and liabilities for businesses
205 (Shelton et al., 2016; Thomas, 2016). The financial burdens for businesses can generate from
206 costs of nutrition analysis, menu replacement, employee training, and legal review. Furthermore,
207 MLA may negatively affect customers. As restaurant menus frequently change and their food
208 production remains fundamentally human-based, an inherent inaccuracy may consequently occur
209 in the reported nutritional values. False information (Din, Zahari, Othman, & Abas, 2012) or
210 limited flexibility of menus (Mah et al., 2013) may lead to customer dissatisfaction. Customers

211 may show different attitudes toward menu labeling disclosure in special dining occasions (Boo,
212 Chan, Fatimah, 2008), given that they may ignore caloric content concerns in exchange for
213 indulgence (Kim et al., 2018). In the final regulatory impact analysis, the U.S. FDA (2014)
214 reported that MLA implementation creates high costs for the food service industry. They also
215 estimated that the mean initial cost of complying with the MLA requirements is \$388.43 million,
216 with a mean recurring cost of \$55.13 million. This report indicates that meeting the MLA
217 requirements can lead to costs for the industry and customers alike.

218 In general, opponents perceive the excessive government regulation through the MLA as
219 burdensome. They contend that the regulation should be reduced in scope. This debate is not
220 only a matter in the U.S. The British Hospitality Association has also expressed concern for the
221 menu labeling schemes of the U.K. Food Standards Agency, which is similar to the MLA of the
222 U.S.; the British Hospitality Association perceives this scheme to “result in huge costs for the
223 industry with little benefit” (Paskin, 2009).

224

225 Key Milestones in the Development and Passage of the Menu Labeling Act

226 After several court challenges, industry pushbacks, and lawsuits, the provision for the
227 nutritional information of menu items has become mandatory eight years after the passage of the
228 national MLA included in the PPACA. Table 1 presents a chronological list of key milestones in
229 the development and passage of MLA. These milestones are listed as 14 events in the present
230 study. The announcement of each event has elicited either a positive or negative impact on the
231 industry. When the passage is perceived as a burden to the industry, the industry may view it as a
232 restriction. The industry should welcome a passage when the latter gives the former the
233 flexibility to adapt to the law; this flexibility reflects the amount of time that the industry

234 provides for its firms to adapt to the law. Any indication that the law can be implemented later
235 than the initially intended date is beneficial to firms because they can have a long period of
236 adjustment in compliance with the law requirements. Therefore, we label a positive event as
237 *flexibility* (Events 4, 5, 6, 9, and 13 that reflect elements such as delays, extensions, or exclusions
238 of certain types of restaurants), whereas a negative event is considered a *restriction* (Events 1, 2,
239 3, 7, 8, 10, 11, 12, and 14 that show the irreversible steps toward law application). The lower
240 panel of Table 1 indicates the groups of positive and negative impacts with the general
241 arguments that support the expected effect of each group of events.

242 PPACA initially appeared in H.R. 3590 and was sponsored by Representative Charles B.
243 Rangel on September 17, 2009. This law was passed in the House of Representatives on October
244 8, 2009.

245 *Event 1 (Restriction 1)*: On December 24, 2009, H.R. 3590, which showed a high
246 possibility of becoming a law, was finally passed to the Senate. The industry expressed concerns
247 on this issue.

248 *Event 2 (Restriction 2)*: The federal statute became a law by the 111th United States
249 Congress (2009–2010) and was signed by President Obama on March 23, 2010. Section 4205 of
250 the statute, known as MLA, aims to provide consumers with calorie information (total calories)
251 for standard items on menus and offer additional nutritional information (fat, saturated fat,
252 cholesterol, sodium, total carbohydrates, sugar, fiber, and protein) to customers in a written
253 statement upon request.

254 *Event 3 (Restriction 3)*: The U.S. FDA introduced the proposed rule on March 28, 2011
255 that afterward, generated innumerable questions from stakeholders, thereby causing great

256 concern and confusion. Then, the U.S. FDA took four years to prepare the condensed and
257 comprehensive guidance to allow restaurants to prepare in compliance with the regulations.

258 *Event 4 (Flexibility 1):* As the debates prompted controversy for the rule and compliance
259 date released by the U.S. FDA for the PPACA, opponents' bill included the revision of the
260 nutritional information provision for chain restaurants and retail food establishments.
261 Representative Cathy McMorris Rodgers at the 114th Congress (2015–2016) introduced the
262 counter-proposal, Common Sense Nutrition Disclosure Act of 2015 (CSNDA: H.R. 2017). This
263 bill called for a clear path to exclude convenience and grocery stores from the regulations,
264 thereby easing compliance (April 23, 2015).

265 *Event 5 (Flexibility 2):* On July 9, 2015, the U.S. FDA extended the compliance date for
266 the final rule to December 1, 2016, from December 1, 2015, on 80 Federal Register 39675,
267 which provided additional time for compliance.

268 *Event 6 (Flexibility 3):* While the Obama Administration officially opposed H.R. 2017,
269 the bill was passed in the House on February 12, 2016, despite the MLA already being passed.
270 The opposing party argued that the MLA was fundamentally impractical and unnecessarily
271 expensive because it potentially allowed restaurants to decide how calorie information is
272 displayed – whole standard menu item or number of servings as determined by the firm and
273 number of calories per serving, or the number of calories per common unit.

274 *Event 7 (Restriction 4):* On March 9, 2016, the U.S. FDA postponed the compliance date
275 again by releasing a statement that the deadline for compliance with menu labeling would no
276 longer be December 1, 2016. The U.S. FDA did not announce a specific date because timing
277 depended upon the release of the final version of the guidelines, causing further confusion

278 among businesses on when they would be executing upon the MLA. Note that while there was a
279 specified deadline in event 5, there was no specified deadline in this event 7.

280 *Event 8 (Restriction 5):* On May 5, 2016, the U.S. FDA finally published a notification
281 that the MLA enforcement would begin a year after, May 5, 2017, which gave tight schedules to
282 restaurants.

283 *Event 9 (Flexibility 4):* On January 31, 2017, the 115th Congress (2017–2018) introduced
284 the CSNDA of 2017 (H.R. 772: new version of H.R. 2017). This legislation provides restaurants
285 with flexibility in displaying nutritional information.

286 *Event 10 (Restriction 6):* On April 27, 2017, the U.S. FDA submitted a request for
287 regulatory review to the Office of Management and Budget in the White House, signaling further
288 delay for an effective date for compliance. The request appeared only a week before the deadline
289 for compliance, May 5, 2017, and consequently adding confusion to the industry on why the
290 deadline had to be moved just a week prior to compliance.

291 *Event 11 (Restriction 7):* On May 4, 2017, just one day before the final rule was supposed
292 to become effective, the U.S. FDA announced plans to delay the date for compliance with the
293 rule. While large chain restaurants prepared the regulations on the basis of this time frame, short
294 notice of delay generated negative responses from the industry. Similar to Event 10, a third
295 request for the delay of the MLA implementation caused additional industry confusion because
296 there would not realistically be enough time for regulators to clearly address questions, and for
297 industry to clearly adapt to regulators' new directions.

298 *Event 12 (Restriction 8):* On July 3, 2017, the U.S. FDA finally issued a final rule and
299 proposed an extension for compliance to May 7, 2018. The U.S. FDA indicated that a primary
300 reason for the extension was to provide flexibility for businesses. However, the rule became

301 subject to litigation by the CSPI and the National Consumers League on the grounds that the
302 interim final rule violated administrative procedural regulations. CSPI announced that the lawsuit
303 challenging the delay would proceed only if the U.S. FDA announces additional enforcement
304 delays or changes to the final rule for the industry by the end of 2017.

305 *Event 13 (Flexibility 5):* During these maneuvers, CSNDA (H.R. 772), welcomed by the
306 restaurant industry, was passed to the House on February 6, 2018.

307 *Event 14 (Restriction 9):* On May 7, 2018, the final implementation of the law occurred.

308 *[Table 1 around here]*

309

310 Hypothesis Development

311 Based on the preceding data, the MLA is evidently a significant issue in the restaurant
312 industry as the act can significantly impact the future profitability of firms, given that certain
313 factors tend to increase operational costs for U.S. foodservice firms. The major elements that affect
314 the costs of the MLA are: 1) collecting and managing records of nutritional analysis for each
315 standard menu item; 2) revising or replacing existing menus and menu boards and providing fully
316 written nutritional information; 3) training employees to understand nutritional information to
317 ensure compliance with the final requirements; 4) legal review (U.S. FDA, 2014); and 5) limited
318 flexibility of menus (Mah et al., 2013). Customers and firms likewise shoulder the new costs for
319 the industry (U.S. FDA, 2014), but the degree to which these costs are passed on to customers and
320 firms is uncertain.

321 Under the Efficient Market Hypothesis (Malkiel, 1992), stock returns are expected to fully
322 reflect all new information that may have an influence on firms, including expectations about
323 future performance. Stock prices determine the market value. Thus, changes in firm market value

324 are expected when new information is published. The present study explores certain ways in which
325 the introduction of the MLA poses a significant impact on the value of restaurant firms' equity. In
326 general, this study hypothesizes that events that restrict the restaurant industry negatively impact
327 the stock market. By contrast, events that allow for flexibility or provide additional time for policy
328 implementation are welcomed by the industry and positively impact the traded securities of
329 restaurant firms.

330

331 *Hypothesis 1₀*: The occurrence of the passage of the MLA events (1, 2, 3, 7, 8, 10, 11, 12,
332 and 14), suggesting *Restriction* to the restaurant industry, has no effect on the market
333 value of the subjected restaurant firms.

334 *Hypothesis 1_a*: The occurrence of the passage of the MLA events (1, 2, 3, 7, 8, 10, 11, 12,
335 and 14), suggesting *Restriction* to the restaurant industry, has a negative effect on the
336 market value of the subjected restaurant firms.

337 *Hypothesis 2₀*: The occurrence of the passage of the MLA events (4, 5, 6, 9, and 13),
338 providing *Flexibility* to the restaurant industry, has no effect on the market value of the
339 subjected restaurant firms.

340 *Hypothesis 2_a*: The occurrence of the passage of the MLA events (4, 5, 6, 9, and 13),
341 providing *Flexibility* to the restaurant industry, has a positive effect on the market value
342 of the subjected restaurant firms.

343 To further validate these hypotheses, we analyze the effects when a restriction is
344 preceded by flexibility and vice versa. On the basis of loss aversion and diminishing sensitivity
345 phenomenon (Kahneman and Tversky, 1979), we expect that a restriction-generating event
346 followed by flexibility can have a larger impact than when the situation is followed by another

347 restriction-generating event. Conversely, we also expect that a flexibility followed by a
348 restriction-generating event can have a larger impact than when the situation is followed by
349 another flexibility event. Accordingly, the following hypotheses are proposed:

350 *Hypothesis 3₀*: When the event is restrictive, the size of the impact does not depend on
351 whether the preceding news releases provide flexibility, rather than restriction.

352 *Hypothesis 3_a*: When the event is restrictive, its negative impact is large if it is preceded
353 by news releases that provide flexibility, rather than restriction.

354 *Hypothesis 4₀*: When the event provides flexibility, the size of the impact does not
355 depend on whether the preceding news releases provide restriction, rather than flexibility.

356 *Hypothesis 4_a*: When the event provides flexibility, its positive impact is large if it is
357 preceded by news releases that provide restriction, rather than flexibility.

358

359 RESEARCH DESIGN

360 Method and Data

361 The effects of MLA on foodservice firms were estimated through changes in their market
362 value. We created a portfolio of the restaurant firms trading on the U.S. stock market. Our final
363 sample consisted of 46 publicly traded restaurant firms in the U.S. Among them, two criteria
364 were applied. First, when the MLA applies to brands with 20 or more branches, we excluded
365 firms that are not applicable. Second, firms acquired by another firm or that went private during
366 the time frame of the MLA events were also excluded. With regard to the data used, we obtained
367 the returns of all 46 restaurant firms trading in the U.S. stock market from Yahoo! Finance (see
368 supplement information).

369 To analyze the impact of MLA-related announcements on restaurant market value, we
370 must find the optimum market model specification to estimate the abnormal returns. To detect
371 potential abnormal returns, we followed Sharpe's (1963, 1964) market model, which is defined
372 as follows:

$$373 \quad R_t = \alpha + \beta R_{mt} + \varepsilon_t,$$

374 where R_t and R_{mt} represent the returns on the portfolio of restaurants and the return on the market
375 portfolio on day t , respectively. Coefficients α and β are the constant and the systematic risk,
376 respectively; ε_t is the error term. As a substitute of market portfolio R_{mt} , the Dow Jones Index
377 was used. Moreover, autoregressive conditional heteroscedasticity models were employed to
378 prevent the estimate from being affected by kurtosis and heteroscedasticity in the error term. In
379 particular, ARCH, GARCH, EGARCH, TGARCH, and PGARCH models were estimated. The
380 best model was identified using Schwarz's Information Criterion (SIC).

381 After identifying the optimum model, we estimated the abnormal returns. Given that
382 certain events occurred closely, the traditional event study methodology could bring about
383 spurious estimates, owing to the assumption that MLA events would take place in the estimation
384 period of other MLA events. Accordingly, we used Karafiath's (1988) procedure for dummy
385 variable D_t to be added to the market model. The variable takes a value of 1 on the event day to
386 capture the reaction of each N event. Consequently, to reflect the generated abnormal returns, we
387 employed:

$$388 \quad R_t = \alpha + \beta R_{mt} + \sum_{j=1}^N \xi_j D_{jt} + \varepsilon_t,$$

389 where ξ_j is a parameter that exhibits the effect of event j .

390 To test hypotheses 1 and 2 and distinguish the global effects of negative (N^-) and positive
391 (N^+) events, we aggregated the dummy variables with the hypothesized positive and negative

392 effects into two different groups, so that a common parameter for each group, ξ^+ and ξ^- , could be
 393 estimated.

$$394 \quad R_t = \alpha + \beta R_{mt} + \sum_{j^+=1}^{N^+} \xi^+ \cdot D_{jt}^+ + \sum_{j^-=1}^{N^-} \xi^- \cdot D_{jt}^- + \varepsilon_t.$$

395 These estimates allowed us to observe whether they exhibit symmetric or asymmetric
 396 impacts on firm value. Accordingly, symmetric effects can be found if $\xi^+ = \xi^-$.

397 To test hypotheses 3 and 4, we defined the following four dummy variables to represent
 398 each situation. These dummy variables are D^{RR} Restriction preceded by restriction with N^{RR}
 399 events, D^{RF} Restriction preceded by flexibility with N^{RF} events, D^{FR} Flexibility preceded by
 400 restriction with N^{FR} events, and D^{FF} Flexibility preceded by flexibility with N^{FF} events.

401 Accordingly, four parameters ($\xi^{RR}, \xi^{RF}, \xi^{FR}, \xi^{FF}$) associated with each variable were estimated
 402 through the following equation:

$$403 \quad R_t = \alpha + \beta R_{mt} + \sum_{j^{RR}=1}^{N^{RR}} \xi^{RR} \cdot D_{jt}^{RR} + \sum_{j^{RF}=1}^{N^{RF}} \xi^{RF} \cdot D_{jt}^{RF} + \sum_{j^{FR}=1}^{N^{FR}} \xi^{FR} \cdot D_{jt}^{FR} + \sum_{j^{FF}=1}^{N^{FF}} \xi^{FF} \cdot D_{jt}^{FF} + \varepsilon_t.$$

404
 405 Hypothesis 3 can be accepted if $\xi^{RF} > \xi^{RR}$, whereas hypothesis 4 can be accepted if $\xi^{FR} > \xi^{FF}$.

406

407 RESULTS

408 We initially created an index that reflects the returns of the portfolio of restaurants
 409 trading in the U.S. stock market. We calculated the average of all firms for each day during the
 410 study period. We then regressed this average value on the market portfolio (Dow Jones Index) to
 411 find the optimum model that best represents the relationship between these two variables. Table

412 2 shows the SIC values for different specifications, and the best model is identified as the
413 GARCH (1,1).

414 *[Table 2 around here]*

415 Subsequently, we estimated the abnormal returns for the hypothesized positive and
416 negative effects. Model 1 in Table 3 shows the global effects and presents significant impacts of
417 negative (1, 2, 3, 7, 8, 10, 11, 12, and 14) and positive (4, 5, 6, 9 and 13) events, thereby
418 rejecting null Hypothesis 1₀ and supporting alternative Hypothesis 1_a ($\xi^- = -0.0029$; $p < 0.01$)
419 and rejecting null Hypothesis 2₀ and supporting alternative Hypothesis 2_a ($\xi^+ = 0.0080$; $p < 0.05$).
420 Therefore, events associated with restrictions tend to reduce the restaurant market value by
421 -0.29% in a single day, whereas events related to flexibility increase it by 0.80% in a day. Both
422 parameters are significantly different (Wald test = 13.09; $p < 0.01$) in absolute terms (Wald test =
423 73.20; $p < 0.01$), implying that these effects are asymmetric; the positive events exhibit effects
424 that are significantly greater than the negative events. To make these figures comparable to
425 annual equivalent rates, note that -0.29% and 0.80% in one day are equivalent to annual returns
426 of -65.3% and 1732.7% , respectively.

427 We analyzed six different window lengths with 1, 2, 3, 5, 10, and 20 days, and the one-
428 day duration is essentially the common result. Although the duration of the impact may be short
429 (one day), the relevant result is the increase or decrease observed in share price, which is defined
430 by the change in the present value of future cash flow. Therefore, this finding reflects the
431 expectations of future profits (McWilliams and Siegel, 1997). The comparison between the
432 positive figure of 1732.7% (which is the annual percentage yield) and the risk-free interest rate
433 (such as the 3-month Treasury bill, whose maximum rate for the period of study is 2.43%), gives

434 an idea of the magnitude of the reaction. The results of different lengths are available from the
435 authors upon request.

436 When each event was individually analyzed in Model 2, we found that Events 1, 2, 3, 7, 8,
437 10, 11, and 14 have significant and negative effects on restaurant market value, whereas Events 4,
438 5, 6, 9, 12, and 13 exert significant and positive impacts. Figure 1 illustrates these effects. Apart
439 from Event 12, all other events exhibit the expected sign. To confirm that the global asymmetric
440 effects (found in Model 1) remain the same after controlling for those individual events with
441 empirical negative and positive impacts detected in Model 2, we estimated Model 3 wherein all
442 the negative and positive parameters in Model 2 are grouped into two different sets. We found that
443 the events with negative effects in Model 2 show a significantly global negative effect in Model 3
444 ($\xi^- = -0.0033$; $p < 0.01$), and the events with positive effects in Model 2 present a significantly
445 global positive effect in Model 3 ($\xi^+ = 0.0069$; $p < 0.05$). Both parameters are significantly
446 different (Wald test = 13.83; $p < 0.01$) in absolute terms (Wald test = 53.31; $p < 0.01$), confirming
447 the asymmetry found in Model 1. Thus, the positive effects are higher than the negative ones.

448 Although the *Announcement of an Interim Final Rule by FDA* (Event 12) was observed, a
449 priori, as a restriction, it seems that it was actually perceived as flexibility for businesses. The
450 final rule and compliance data were delayed several times, which elicited frustrations to
451 businesses when the rule was finally announced on July 3, 2017, with a one-year grace period.
452 Therefore, this event may be considered a positive effect on the industry. The U.S. FDA's
453 announcement on this event also supports the U.S. FDA's decision on the extension to provide
454 flexibility for businesses.

455 *[Figure 1 around here]*

456 *[Table 3 around here]*

457 To observe which events have large or small effects, we ranked the events that exhibit
458 negative and positive impacts. Tables 5 and 6 reveal the Wald tests regarding the significant
459 differences among pairs of events, distinguishing between negative (Table 4) and positive (Table
460 5) events and rank ordered in terms of size.

461 *[Table 4 around here]*

462 *[Table 5 around here]*

463 Model 4 tests hypotheses 3 and 4. We did not find differences between the events
464 “Restriction preceded by a Restriction” and “Restriction preceded by a Flexibility,” thus
465 accepting null Hypothesis 3₀ and rejecting alternative Hypothesis 3_a (*When the event is*
466 *restrictive, its negative impact is large if it is preceded by news releases that provide flexibility,*
467 *rather than restriction*). We did find differences between “Flexibility preceded by a Restriction”
468 and “Flexibility preceded by a Flexibility,” thereby rejecting null Hypothesis 4₀ and accepting
469 alternative Hypothesis 4_a (*When the event is flexibility, its positive impact is large if it is*
470 *preceded by news releases that provide restriction, rather than flexibility*).

471 Rank Order of Negative Effects

472 The largest negative effects were triggered by *Introduction of H.R. 3590: PPACA* (Event
473 1, $\xi_1^- = -0.0050$) and *Final Guideline Publish & Compliance Date Set by FDA* (Event 8, $\xi_8^- =$
474 -0.0050). Both effects were not significantly different in these two events (Table 4). The largest
475 negative impact came from the very first announcement of the law, which came as a “surprise,”
476 thereby eliciting drastic reactions from the market. These events were followed by the
477 *Announcement of the third delay of the compliance date by FDA* (Event 11, $\xi_{11}^- = -0.0044$) and
478 *Introduction of proposed rule* (Event 3, $\xi_3^- = -0.0035$), the incremental differences of which
479 were significant (p -value < 0.01). Subsequently, the *Submission of a request for regulatory*

480 *review to the Office of Management and Budget in the White House by FDA* (Event 10, $\xi_{10}^- =$
481 -0.0028) and *H.R. 3590 Become Public Law – Signed by President* (Event 2, $\xi_2^- = -0.0027$)
482 showed an insignificant relationship, thereby exerting a similar impact. Finally, the
483 *Announcement of the second delay of the compliance date by FDA without indicating the date*
484 (Event 7, $\xi_7^- = -0.0013$) and *The Final Date of the Compliance* (Event 14, $\xi_{14}^- = -0.0009$) were
485 significantly different (p -value < 0.01). The final date of compliance has the lowest impact (in
486 absolute terms), implying that the market has assumed the application of the law as a reality.

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488 Rank Order of Positive Effects

489 Table 5 presents that all the paired comparisons are significantly different between each
490 pair of parameters at a level of 0.01. These parameters are ranked in ascending order in terms of
491 size. Specifically, the following is the order. First is the *Announcement of an Interim Final Rule*
492 *by FDA* (Event 12, $\xi_{12}^+ = 0.0009$), which evidently is the lowest positive effect, given that this
493 event is originally expected as negative; second, *H.R. 722 Pass House* (Event 13, $\xi_{13}^+ = 0.0013$);
494 third, *Introduction of H.R. 772* (Event 9, $\xi_9^+ = 0.0027$); fourth, *Announcement of the first delay of*
495 *the compliance date by FDA* (Event 5, $\xi_5^+ = 0.0053$); fifth, *H.R. 2017 Pass House* (Event 6, ξ_6^+
496 $= 0.0110$); and sixth, *Introduction of H.R. 2017* (Event 4, $\xi_4^+ = 0.0185$). On Event 4, the 115th
497 Congress introduced H.R. 2017 to provide restaurants with flexibility in displaying nutritional
498 information. This legislation was the first proposal against H.R. 3590 (PPACA) after it was
499 signed by President Obama and became a public law. Therefore, Event 4 is accepted and
500 supported by many opponents and business stakeholders, thus explaining why this event showed
501 the largest positive impact.

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DISCUSSION and IMPLICATIONS

The MLA has become one of the most critical and controversial issues that the restaurant industry has faced during the last eight years, which is the amount of time it took to fully implement the initiative. The study has analyzed the impact of the chronological MLA-related events on restaurant market value. The assessment of restaurants' reactions is conducted by analyzing a forward-looking measure, that is, market value.

The empirical analysis, which is applied to a sample of 46 restaurant firms trading on the U.S. stock market, estimates the abnormal returns of the MLA-related events through an autoregressive conditional heteroscedasticity model. In particular, the GARCH (1,1) is identified as the model that best represents the data.

The results revealed that the events related to the passage of the MLA that restrict the industry have negative impacts on restaurant market value. By contrast, the events that provide flexibility to the industry exhibit positive impacts. An observed asymmetry exists for these positive versus negative effects, and the positive impacts are greater than the negative ones. The negative view on the initial proposal of MLA is due to the associated high costs for restaurants (the first announcement of this initiative caused the most negative reaction in the market value of restaurants among all the negative events examined). Nevertheless, the different steps and actions that attempt to clarify and render the initiative as further flexible have resulted in a slightly negative impact on restaurant market value, mainly due to great transparency and the potential to attract customers.

The ranking of positive events seems to be influenced by timing, that is, the sooner the positive event, the greater its impact. Early positive events are perceived by shareholders as "big relieves" after initial negative events. Nevertheless, the ranking of negative events seems to be

526 influenced by a “surprise effect,” that is, the first restrictive event has the largest impact, whereas
527 the last restrictive event has the lowest effect. These patterns are not conclusive, thus testing
528 hypotheses 3 and 4 can help uncover certain intricacies in these effects. In particular, when
529 events that provide flexibility occur after an event that brings restriction (“Flexibility preceded
530 by a Restriction”), shareholders react more positively (more happily) than the case “Flexibility
531 preceded by a Flexibility.” This result is viewed logically, given that shareholders should react
532 positively when they receive good news after hearing bad news. The fact that “Flexibility
533 preceded by a Restriction” is significantly different from “Flexibility preceded by a Flexibility,”
534 and “Restriction preceded by a Restriction” and “Restriction preceded by a Flexibility” are not
535 significantly different, this finding is consistent with our previous result that positive events have
536 significantly greater effects than negative events.

537 Our results provide theoretical contributions to restaurant management literature. The
538 importance of the effect of the MLA has received consistent attention from scholars in the
539 foodservice field. Most research focuses on the effect of the MLA on consumers, but academic
540 research lacks a clear indication of such an impact on business market value. Therefore, this
541 study provides insights into the outcomes of the chronological events, which occurred between
542 the period of enactment and implementation, in an attempt to assess businesses’ reactions
543 through a forward-looking measure, that is, market value. Therefore, the major contribution of
544 the study is to uncover the effect of the MLA on restaurant firms by providing empirical results.
545 Furthermore, the rank order of the negative effects of the events that restrict businesses and the
546 rank order of positive effects of the events that allow flexibility to businesses are investigated.
547 The event of the proposed opposition act to the MLA dictated by the Congress (Event 4) shows
548 the greatest positive impact, whereas the greatest negative effects are caused by the FDA’s

549 announcement of the final guideline and compliance date. These impacts have been empirically
550 investigated in any research before, leaving a question of whether or not the legislative activity
551 certainly affects business market value. Therefore, this study confirms that implementing menu
552 labeling is a concern among restaurant firm shareholders, and such labeling affects their market
553 value. Moreover, the negative effects gradually decrease until the actual implementation.

554 Flexibility-enhancing news preceded by restrictive news bring about a greater positive impact on
555 market value than flexibility-enhancing news preceded by another flexibility-enhancing news
556 item, as if compensating for the negative effect of the previous restrictive news item.

557 Although providing menu labeling may contribute positive effects for restaurant
558 consumers, many restaurant firms are hesitant to provide nutritional information, and
559 shareholders concern about the negative effects of such labeling on business performance.
560 Owing to these reasons, the market value of restaurant firms reacts to the announcements and
561 actions of the government regarding the initiatives on menu labeling. Therefore, the findings of
562 the study provide policymakers with additional information about the net cost of regulation and
563 suggest managerial implications to minimize the negative impacts on restaurants.

564 First, the greatest negative effects occurred from the initial announcement of the law
565 (*Event 1*) and from the first announcement of the guideline (*Event 8*). The stock market reacted
566 more dramatically to these events than to any other events. This outcome led to a decrease in
567 market value. However, after finalizing a clear guideline and giving enough time to prepare for
568 implementation, a minimized negative effect ensued or generated a positive effect. Therefore,
569 clear communication and accurate guideline minimize confusion and help businesses in taking
570 the initiative to implement practices. For the successful implementation of any government
571 regulation, policymakers should encourage open communication about the benefits and barriers

572 for stakeholders. Developing clear guidelines and communication platforms should provide
573 sound data and supporting technology/data that may minimize the financial burden of the
574 industry. Based on the findings, policymakers should recognize the necessity of effective
575 approaches to implement a governmental policy as an essential element for achieving a healthy
576 and sustainable food system that benefits all. However, policymakers should recognize the need
577 to support profitable systems for businesses.

578 Management teams of restaurant firms should communicate and share the value of MLA
579 practices with stakeholders in an attempt to take advantage of the positive abnormal returns (by
580 releasing new information that enhances this positive reaction) and counteract the negative
581 reactions (by communicating the idea that the firms will make the necessary arrangements to
582 abide by the new legislation). Although firms and investors may believe that providing menu
583 labeling only establishes financial and operational barriers, customers perceive that disclosing
584 information on menus protects their rights and creates a healthy eating environment by providing
585 customers with informed choices, thereby resulting in enhanced brand image and trust (Kim &
586 Ham, 2016). Therefore, firms can view the MLA as an opportunity to improve, reposition, and
587 communicate their corporate social responsibility strategy (Kim & Ham, 2016) to customers and
588 shareholders alike. Because firms with greater than 20 units have to abide by the MLA, this can
589 be viewed as an opportunity to update their corporate social responsibility (CSR) strategy by
590 repositioning a legal requirement into increased consumer transparency and accountability. With
591 enough critical mass and time, customers could demand the information disclosed via the MLA
592 as part of their dining decision which, if not available, could lead to a loss customer lifetime
593 equity value.

594 Although this study is valuable as a new research that investigates the effect of MLA on
595 the restaurant industry, a few limitations are acknowledged. The study focuses on a single market
596 (the U.S. market) and a type of firm (restaurants). As previously indicated, other countries have
597 established similar policies. Therefore, whether or not the same effects appear in other contexts
598 would be relevant, especially if the reasons for the contradiction are different. Likewise, the
599 MLA applies to supermarkets, convenience stores, and movie theaters, and knowing the impact
600 on the performance of these types of firms can help generalize this study's conclusions. Another
601 meaningful avenue for future research is conducting a cost-benefit analysis and regulatory
602 impact assessment of the regulation on the performance of restaurant businesses. Understanding
603 costs and benefits can provide valuable suggestions for business practices.

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CONCLUDING SUMMARY

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The research examined the impact of the MLA-related announcements on restaurant market value. The study also confirmed that announcements associated with restrictions tend to reduce restaurant market value by 0.29% per day, whereas announcements related to flexibility increase such market value by 0.80% (flexibility reflects the amount of time that the industry provides for its firms to adapt their business to the law). The research contributes to the theoretical background by evolving the knowledge on the relationship between the act and the market value. Practical implications are also provided for policymakers and practitioners in the food service industry.

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Table 1. Chronological list of key milestones in the development and passage of the Menu Labeling Act

Event (Effect)	Date	Event related to PPACA (H.R. 3590) : MLA	Event related to CSNDA (H.R. 772) : Opposition Act
	September 17, 2009	Introduction of H.R. 3590: PPACA	
	October 8, 2009	H.R. 3590 Pass House	
Event 1 (Restriction 1)	December 24, 2009	H.R. 3590 Pass Senate	
Event 2 (Restriction 2)	March 23, 2010	H.R. 3590 Become Public Law – Signed by the President	
Event 3 (Restriction 3)	March 28, 2011	Introduction of the proposed rule (FDA-2011-F-0172-0001)	
Event 4 (Flexibility 1)	April 23, 2015		Introduction of H.R. 2017: CSNDA of 2015
Event 5 (Flexibility 2)	July 9, 2015	Announcement of the first delay of the compliance date by FDA	
Event 6 (Flexibility 3)	February. 12, 2016		H.R. 2017 Pass House
Event 7 (Restriction 4)	March 9, 2016	Announcement of the second delay of the compliance date by FDA without indicating the date	
Event 8 (Restriction 5)	May 5, 2016	Final Guideline Publishing & Compliance Date Set by FDA	
Event 9 (Flexibility 4)	January 31, 2017		Introduction of H.R.772: CSNDA of 2017
Event 10 (Restriction 6)	April 27, 2017	Submission of a request by FDA for a regulatory review to the Office of Management and Budget in the White House	
Event 11 (Restriction 7)	May 4, 2017	Announcement of the third delay of the compliance date by FDA	
Event 12 (Restriction 8)	July 3, 2017	Announcement of an Interim Final Rule and the compliance date by FDA	
Event 13 (Flexibility 5)	February 6, 2018 ^a		H.R. 772 Pass House
Event 14 (Restriction 9)	May 7, 2018	The Final Date of Compliance	

Nine Events related to Restriction	Five Events related to Flexibility
Events 1, 2, 3, 7, 8, 10, 11, 12, and 13	Events 4, 5, 6, 9, and 13
Events in the category of <i>Restriction</i> generated concerns and negative responses from stakeholders. The government’s announcements or proposal restricted the restaurant industry or gave a tight schedule to prepare in compliance with the regulations, thereby impacting industry stakeholders negatively.	Events in the category of <i>Flexibility</i> allowed for flexibility by providing additional time for the implementation of policies or the introduction of the counter-proposal. These events were welcomed by the industry and positively impacted the traded securities of restaurant firms welcomed by industry stakeholders.

772 Note: ^aThe bill was passed at 4:37 PM (EST) on February 6, 2018, when the stock market closed. The Senate
773 received the legislation February 7, 2018. Therefore, stock data use the February 7th date.

774 **Table 2. Selection of the optimum model**

Model	SIC	Model	SIC
OLS	-6.664	TGARCH (4,4)	-6.800
ARCH (0,1)	-6.708	EGARCH (1,1)	-6.814
GARCH (1,1)	-6.818	EGARCH (2,1)	-6.811
GARCH (2,1)	-6.547	EGARCH (2,2)	-6.810
GARCH (2,2)	-6.572	EGARCH (1,2)	-6.813
GARCH (1,2)	-6.815	EGARCH (3,2)	-6.806
GARCH (3,2)	-6.812	EGARCH (3,3)	-6.816
GARCH (3,3)	-6.813	EGARCH (2,3)	-6.810
GARCH (2,3)	-6.815	EGARCH (3,1)	-6.811
GARCH (3,1)	-6.572	EGARCH (1,3)	-6.812
GARCH (1,3)	-6.814	EGARCH (4,4)	-6.801
GARCH (4,4)	-6.808	PGARCH (1,1)	-6.812
TGARCH (1,1)	-6.815	PGARCH (2,1)	-6.809
TGARCH (2,1)	-6.812	PGARCH (2,2)	-6.812
TGARCH (2,2)	-6.814	PGARCH (1,2)	-6.810
TGARCH (1,2)	-6.812	PGARCH (3,2)	-6.809
TGARCH (3,2)	-6.808	PGARCH (3,3)	-6.806
TGARCH (3,3)	-6.808	PGARCH (2,3)	-6.809
TGARCH (2,3)	-6.811	PGARCH (3,1)	-6.808
TGARCH (3,1)	-6.810	PGARCH (1,3)	-6.809
TGARCH (1,3)	-6.811	PGARCH (4,4)	-6.806

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Table 3. Effect of the Menu Labeling Act events on restaurant market value

Variable	Model 1	Model 2	Model 3	Model 4
Market portfolio (R_m)	0.8545a (0.020)	0.8538 ^a (0.020)	0.8543 ^a (0.020)	0.8542 ^a (0.016)
Event 1 (Restriction 1)		-0.005 ^a (0.0002)		
Event 2 (Restriction 2)		-0.0027 ^a (0.0002)		
Event 3 (Restriction 3)		-0.0035 ^a (0.0002)		
Event 4 (Flexibility 1)		0.0186 ^a (0.0002)		
Event 5 (Flexibility 2)		0.0053 ^a (0.0002)		
Event 6 (Flexibility 3)		0.0111 ^a (0.0004)		
Event 7 (Restriction 4)		-0.0013 ^a (0.0002)		
Event 8 (Restriction 5)		-0.0051 ^a (0.0002)		
Event 9 (Flexibility 4)		0.0028 ^a (0.0002)		
Event 10 (Restriction 6)		-0.0029 ^a (0.0002)		
Event 11 (Restriction 7)		-0.0044 ^a (0.0002)		
Event 12 (Restriction 8)		0.0009 ^a (0.0002)		
Event 13 (Flexibility 5)		0.0014 ^a (0.0002)		
Event 14 (Restriction 9)		-0.0009 ^a (0.0002)		
Negative events	-0.0029 ^a (0.0006)		-0.0033 ^a (0.0005)	
Positive events	0.0080 ^b (0.0030)		0.0069 ^b (0.0027)	
Restriction preceded by restriction (2,3,8,11,12)				-0.0030 (0.0127)
Restriction preceded by flexibility (7,10,14)				-0.0018 (0.0360)
Flexibility preceded by restriction (4,9,13)				0.0080 ^b (0.0038)
Flexibility preceded by flexibility (5,6)				0.0078 (0.0133)
Constant	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0016)
R-squared	0.5082	0.5088	0.5081	0.5081
Adjusted R-squared	0.5075	0.5056	0.5074	0.5070
SIC	-6.813	-6.775	-6.813	-6.807

^a $p < 0.01$; ^b $p < 0.05$

779 **Table 4. Wald tests for paired comparisons among events with negative parameters**

	Event 8	Event 1	Event 11	Event 3	Event 10	Event 2	Event 7
	$\xi_8^- = -0.0050$	$\xi_1^- = -0.0050$	$\xi_{11}^- = -0.0044$	$\xi_3^- = -0.0035$	$\xi_{10}^- = -0.0028$	$\xi_2^- = -0.0027$	$\xi_7^- = -0.0013$
Event 8 (Restriction 8) $\xi_8^- = -0.0050$							
Event 1 (Restriction 1) $\xi_1^- = -0.0050$	0.04						
Event 11 (Restriction 7) $\xi_{11}^- = -0.0044$	1496.55 ^a	34.13 ^a					
Event 3 (Restriction 3) $\xi_3^- = -0.0035$	1001.97 ^a	115.40 ^a	775.15 ^a				
Event 10 (Restriction 6) $\xi_{10}^- = -0.0028$	210938.30 ^a	505.99 ^a	16090.33 ^a	239.79 ^a			
Event 2 (Restriction 2) $\xi_2^- = -0.0027$	169.16 ^a	695.479 ^a	73.39 ^a	12.87 ^a	0.63		
Event 7 (Restriction 4) $\xi_7^- = -0.0013$	13544.52 ^a	3871.82 ^a	3957.12 ^a	763.18 ^a	1753.87 ^a	89.36 ^a	
Event 14 (Restriction 9) $\xi_{14}^- = -0.0009$	3747.89 ^a	28598.50 ^a	1699.18 ^a	510.68 ^a	721.36 ^a	255.03 ^a	125.84 ^a

^a $p < 0.01$

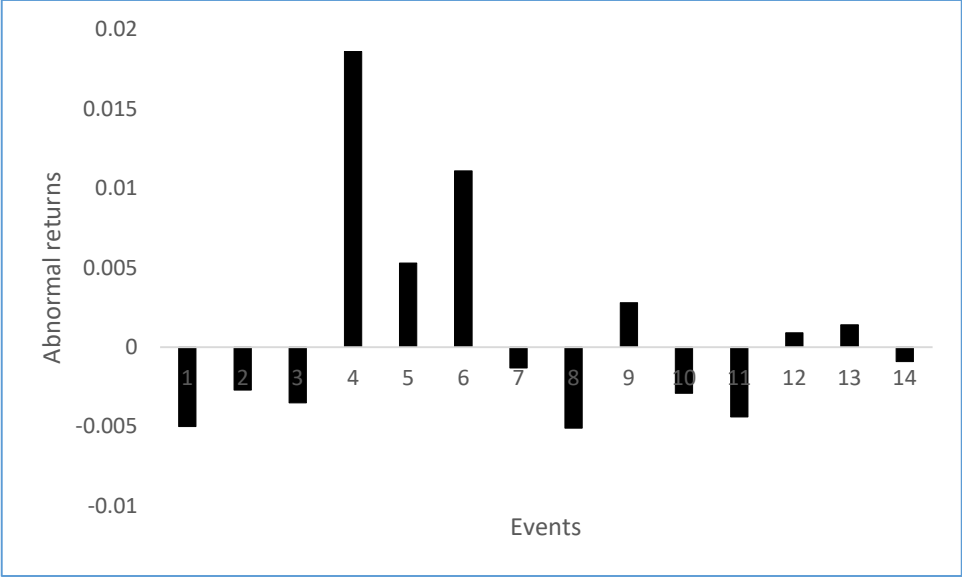
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Table 5. Wald tests for paired comparisons among events with positive parameters

	Event 12	Event 13	Event 9	Event 5	Event 6
	$\xi_{12}^+ = 0.0009$	$\xi_{13}^+ = 0.0013$	$\xi_9^+ = 0.0027$	$\xi_5^+ = 0.0053$	$\xi_6^+ = 0.0110$
Event 12 (Restriction 8) $\xi_{12}^+ = 0.0009$					
Event 13 (Flexibility 5) $\xi_{13}^+ = 0.0013$	10.56 ^a				
Event 9 (Flexibility 4) $\xi_9^+ = 0.0027$	64.05 ^a	227.15 ^a			
Event 5 (Flexibility 2) $\xi_5^+ = 0.0053$	2797.90 ^a	5476.08 ^a	313.05 ^a		
Event 6 (Flexibility 3) $\xi_6^+ = 0.0110$	1360.25 ^a	555.80 ^a	273.27 ^a	257.92 ^a	
Event 4 (Flexibility 1) $\xi_4^+ = 0.0185$	32078.46 ^a	202201.60 ^a	14752.41 ^a	753304.90 ^a	398.92 ^a

^a $p < 0.01$

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Figure 1. Abnormal returns for each event