

## Supplementary Materials

**Table S1.** Each of 175 SIC definitions classified into one of 10 crude food outlet categories [17].

SIC definition	Crude food outlet category
1. Beverage stores	Carry-out restaurants
2. Box lunch stand	
3. Cafe	
4. Cafes	
5. Cafeteria	
6. Carry-out only (except pizza) restaurant	
7. Chicken restaurant	
8. Chili stand	
9. Coffee	
10. Coffee & tea	
11. Coffee roasting & handling equipment	Carry-out restaurants cont.
12. Coffee shop	
13. Coffee shops	
14. Delicatessen (eating places)	
15. Delicatessen stores	
16. Delicatessens	
17. Drive-in restaurant	
18. Food bars	
19. Foods-carry out	
20. Hamburger stand	
21. Health food restaurant	Convenience stores
22. Hot dog stand	
23. Luncheonette	
24. Lunchrooms and cafeterias	
25. Pizza	
26. Pizza restaurants	
27. Pizzeria, chain	
28. Pizzeria, independent	
29. Sandwiches	
30. Sandwiches and submarines shop	
31. Tea	Fast-food restaurants
32. Tea rooms	
33. Restaurants-food delivery	
34. Convenience stores	
35. Convenience stores, chain	
36. Convenience stores, independent	
37. Dairy products stores	
38. Dairy products-retail	
39. Filling stations, gasoline	
40. Gasoline service stations	
41. Petroleum products (whls)	Full-service restaurants
42. Service stations-gasoline & oil	
43. Fast food restaurants and stands	
44. Fast-food restaurant, chain	
45. Fast-food restaurant, independent	
46. American restaurant	
47. Barbecue restaurant	
48. Buffet (eating places)	
49. Cajun restaurant	
50. Caterers	
51. Chinese restaurant	
52. Diner	
53. Eating places	
54. Ethnic food restaurants	
55. Family restaurants	
56. French restaurant	
57. Greek restaurant	
58. Grills (eating places)	
59. Indian pakistan restaurant	

60. Italian restaurant	
61. Japanese restaurant	
62. Korean restaurant	
63. Macaroni spaghetti & noodles (mfrs)	
64. Mexican restaurant	
65. Oyster bar	Full-service restaurants cont.
66. Restaurant management	
67. Restaurant, family: chain	
68. Restaurant, family: independent	
69. Restaurant, lunch counter	
70. Restaurants	
71. Seafood restaurants	
72. Seafood shack	
73. Spanish restaurant	
74. Steak and barbecue restaurants	
75. Steak restaurant	
76. Sushi bar	
77. Thai restaurant	
78. Vietnamese restaurant	
79. Department stores	
80. Department stores, discount	
81. Drug stores	
82. Drug stores and proprietary stores	
83. Miscellaneous general merchandise stores	General merchandise stores
84. Pharmacies	
85. Proprietary (non-prescription medicine) stores	
86. Retail shops	
87. Variety stores	
88. Dried fruit	
89. Eggs and poultry	
90. Eggs-retail	
91. Fish and seafood markets	Healthy specialty stores
92. Fish markets	
93. Food and freezer plans, meat	
94. Food brokers (whls)	
95. Food products & manufacturers	
96. Frozen food and freezer plans, except meat	
97. Fruit and vegetable markets	
98. Fruits & vegetables & produce-retail	
99. Health & diet foods-retail	
100. Health and dietetic food stores	
101. Health foods	
102. Meat and fish markets	
103. Meat markets-kosher	
104. Meat markets, including freezer provisioners	
105. Meat-retail	
106. Meat-wholesale	
107. Mushrooms	
108. Nuts	
109. Nuts-edible	
110. Poultry-retail	
111. Salads (whls)	Healthy specialty stores cont.
112. Seafood markets	
113. Seafood packers (mfrs)	
114. Seafood-retail	
115. Vegetable stands or markets	
116. Food products (whls)	
117. Chinese food products	
118. Freezer provisioners, meat	
119. Gourmet food stores	Mixed specialty stores
120. Gourmet shops	
121. Juices-retail	
122. Kosher food products-wholesale	
123. Oriental goods	
124. Food markets	Small grocers/corner stores
125. Grocers-retail	

126. Grocers-wholesale	
127. Grocery stores	
128. Grocery stores, chain	
129. Grocery stores, independent	
130. Miscellaneous food stores	
131. Food products-retail	
132. Supermarkets	
133. Supermarkets, chain	
134. Supermarkets, independent	
135. Wholesale clubs	Superstores
136. Wholesalers	
137. Bagels	
138. Bakers-retail	
139. Bakers-wholesale	
140. Boutique items-retail	
141. Bread	
142. Bread/other bakery prod-ex cookies	
143. Butter	
144. Cakes	
145. Candy	
146. Candy & confectionery-manufacturers	
147. Candy & confectionery-retail	
148. Candy, nut, and confectionery stores	
149. Cheese	Unhealthy specialty stores
150. Chocolate & cocoa-manufacturers	
151. Cookies	
152. Cookies & crackers	
153. Doughnuts	
154. Frozen yogurt stand	
155. Ice cream & frozen desserts-distr (whls)	
156. Ice cream (packaged)	
157. Ice cream parlors	
158. Ice cream stands or dairy bars	
159. Ice cream, soft drink and soda fountain stands	
160. Italian food products	
161. Meat products (mfrs)	
162. Pastries	
163. Popcorn & popcorn supplies	Unhealthy specialty stores cont.
164. Pretzels	
165. Pretzels-retail	
166. Retail bakeries	
167. Sausages	
168. Sausages/other prepared meat prod (mfrs)	
169. Snack bar	
170. Snack products	
171. Snack shop	
172. Snow cone stand	
173. Soda fountain	
174. Soda fountain shops	
175. Yogurt	

**Table S2.** Keywords used to identify and tag dollar stores and carry-out restaurants [17].

Keywords for dollar stores:
Dollar
Local experts also identified and previously validated the following:
Deals
J H Wholesale
Liberty Buys

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Keywords for carry-out restaurants:
Chicken
Pizza
Pizzeria
Burger
Hamburgers
Chinese
China
Taco
Tacos
Deli
Delicatessen
Bagel
Bagels
Sandwich
Sandwiches
Coffee
Wings
Carry
Carry-out
Carryout

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**Table S3.** Top 50 fast food chain restaurants in the U.S, reported by the leading source of information for the quick-service industry, QRS Magazine (Available at: <https://www.qsrmagazine.com/reports/qs50-2015-top-50-chart>) [17].

Rank	Company/Chain Name	Rank	Company/Chain Name
1	McDonald's	41	Boston Market
2	Starbucks	42	In-n-Out Burger
3	Subway	43	Moe's Southwest Grill
4	Burger King	44	Long John Silver's
5	Wendy's	45	Firehouse Subs
6	Taco Bell	46	Baskin-Robbins
7	Dunkin' Donuts	47	Jersey Mike's Subs
8	Chick-fil-A	48	Jamba Juice
9	Pizza Hut	49	Captain D's
10	Panera Bread	50	Einstein Bros. Bagels
11	KFC		
12	Domino's		
13	Sonic Drive-In		
14	Chipotle		
15	Carl's Jr./Hardee's		
16	Little Caesars		
17	Dairy Queen		
18	Arby's		
19	Jack in the Box		
20	Papa John's		
21	Popeyes Louisiana Kitchen		
22	Panda Express		
23	Whataburger		
24	Jimmy John's		
25	Zaxby's		
26	Five Guys		
27	Culver's		
28	Bojangles'		
29	Steak 'n Shake		
30	Church's Chicken		
31	Papa Murphy's		
32	El Pollo Loco		
33	Checkers/Rally's		
34	Wingstop		
35	Qdoba		
36	Krispy Kreme		
37	Del Taco		
38	White Castle		

**Table S4.** Average median sales price of homes of CSAs, according to neighborhood SES and proportion of the neighborhood population that is African American.

<b>Predominantly African American, Cutoff at City's Average</b>				
	African American neighborhoods > 62%		Non-African American neighborhoods ≤ 62%	
<b>Neighborhood SES, cutoff at 50th percentile</b>	Average median sales price of homes (\$)	CSA (n)	Average median sales price of homes (\$)	CSA (n)
Low-SES (≤\$98K)	\$ 65,479	23	\$ 86,749	5
High-SES (>\$98K)	\$ 131,744	8	\$ 187,5812	19
<b>Neighborhood SES, cutoff at 75th percentile</b>	Average median sales price of homes (\$)	CSA (n)	Average median sales price of homes (\$)	CSA (n)
Low-SES (≤\$162K)	\$ 75,596	29	\$ 114,564	13
High-SES (>\$162K)	\$ 183,847	2	\$ 228,042	11
<b>Predominantly African American, Cutoff at 75th Percentile</b>				
	African American neighborhoods > 93%		Non-African American neighborhoods ≤ 93%	
<b>Neighborhood SES, cutoff at 50th percentile</b>	Average median sales price of homes (\$)	CSA (n)	Average median sales price of homes (\$)	CSA (n)
Low-SES (≤\$98K)	\$ 60,705	13	\$ 76,706	15
High-SES (>\$98K)	\$ 110,533	1	\$ 173,364	26
<b>Neighborhood SES, cutoff at 75th percentile</b>	Average median sales price of homes (\$)	CSA (n)	Average median sales price of homes (\$)	CSA (n)
Low-SES (≤\$162K)	\$ 64,265	14	\$ 99,354	28
High-SES (>\$162K)	N/A	0	\$ 221,243	13

The bold is to help differentiate the different subcategories/cutoff points i.e., 50<sup>th</sup> percentile cutoff and 75<sup>th</sup> percentile cutoff.

**Table S5.** Neighborhood fixed effects linear regression <sup>1</sup> for the relationship between changes in vacancy rates <sup>2</sup> and changes in the food swamp index <sup>3</sup> in Baltimore, MD, over the study period from 2001 to 2012, excluding CSA 52 and CSA 53 from 2001 through 2009. Results are from the pooled model and stratified models by African American neighborhoods and neighborhood SES.

	Food Swamp Index									
	Pooled Model		Stratified Models (By Predominantly African American <sup>4</sup> )				Stratified Models (By Neighborhood SES <sup>5</sup> )			
			Non-African American ≤ 62%		African American > 62%		High-SES > \$98,000		Low-SES ≤\$98,000	
	b (90% CI)	p-value	b (90% CI)	p-value	b (90% CI)	p-value	b (90% CI)	p-value	b (90% CI)	p-value
Vacancy rate	0.070 (-0.073, 0.21)	0.42	-0.38 (-0.64, -0.12)	0.015	0.15 (-0.060, 0.36)	0.24	-0.37 (-0.75, 0.021)	0.12	0.17 (0.045, 0.29)	0.025
Vacancy rate, 1-year lag	0.0031 (-0.15, 0.16)	0.97	-				-			

<sup>1</sup> The statistical models for the food swamp index is a neighborhood fixed effects linear regression model. Models include a fixed effect for each CSA, which accounts for baseline differences by CSA, indicator variables for each year to account for any secular trends in the outcome, and as time-varying covariates, neighborhood racial diversity index, median sales price of homes, and total population size.

<sup>2</sup> Vacancy rate was defined as the number of vacant and abandoned homes divided by the average number of homes, then multiplied by 100. Homes are classified as vacant and abandoned by Baltimore City Housing if the property is not habitable.

<sup>3</sup> Food swamp index was defined as the density (outlets per sq. mile) of BMI-unhealthy and BMI-intermediate outlets out of the density of all food outlets, including BMI-healthy outlets, then multiplied by 100. This index was an adaptation of the Modified Retail Food Environment Index (mRFEI) [28] and Physical Food Environment Index (PFEI) [29].

<sup>4</sup> Predominantly African American neighborhoods were defined as those with greater than 62 percent African American residents, based on the City’s average proportion of African American residents across CSAs over the observation period.

<sup>5</sup> High-SES neighborhoods were defined as those with an average median sales price of homes greater than \$98,000, which was the average value for median sales price among CSAs over the observation period.

**Table S6.** Global Moran's I <sup>1</sup> statistic for the regression residuals <sup>2</sup>, over the study period.

Year	Moran's I (Regression Residuals)	<i>p</i> -value
2001	0.087	0.099
2002	0.062	0.110
2003	0.094	0.074
2004	0.025	0.250
2005	0.092	0.072
2006	0.110	0.061
2007	0.016	0.250
2008	0.140	0.006
2009	0.043	0.220
2010	0.075	0.120
2011	0.097	0.073
2012	0.085	0.083

<sup>1</sup> Moran's I is one of the most commonly used measures of global spatial autocorrelation. Values can range from -1 and 1, indicating dispersion and spatial dependence, respectively; values closer to 0 indicate spatial randomness. The null hypothesis for these significance tests is that there is no spatial autocorrelation.

<sup>2</sup> Residuals were calculated from our neighborhood fixed-effects linear regression models, with the primary exposure variable, vacancy rate. All models included a fixed-effect for each CSA (accounting for baseline differences by CSA), indicator variables for each year (accounting for any secular trends in the outcome), and as time-varying covariates, neighborhood racial diversity index, median sales price of homes, and total population size.