Are Ethnic Fast-Casual Restaurants Healthy?

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Abstract

Over the last few years, ethnic restaurants have been growing throughout the country contributing to the boom of fast-casual restaurants in the US. This paper studies the effects of proximity to a Mexican restaurant -the dominant type of ethnic fast-casual restaurants- on maternal and child health. I use data on full residential addresses of all the mothers giving birth in the metropolitan area of Miami between 1989 and 2009 and match them to a time series of all the food and drinking restaurants and stores. This unique dataset allows me to use mother fixed-effects and exploit over time variation in the food-environment to identify the effects on maternal weight gain and child's birth outcomes. Results show that living in proximity to a Mexican restaurant is associated with a lower likelihood of excessive weight gain among US born mothers. These effects are concentrated in low-income neighborhoods and among disadvantaged groups (low-skilled, young, and African-Americans). No protective effect was found for the foreign-born. I find no evidence of significant effects on other maternal outcomes and on different metrics of child's health at birth.

Keywords: Weight gain, restaurants, food-deserts
JEL Classification Numbers: I10, R20

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1 Introduction

More than one third of the U.S. adult population are obese (35.7%).[1] Obesity is associated with higher risks of heart disease, stroke, type II diabetes, and certain types of cancer. Obesity is particularly high among non-Hispanic blacks (47.8%) and Hispanics (42.5%). Limited access to healthy-food,the increase in the away-from-home share of daily caloric intake, differences in preferences towards healthy food as well as affordability of healthy food are considered important factors explaining disparities in obesity rates. Despite the little evidence on the importance of access to healthy food in promoting healthier diets, several policy interventions have been introduced to improve access to healthy food. Community interventions in low-income neighborhoods have tried to favor supermarket entry and to promote the offerings of healthy food among retailers and restaurants. In areas characterized by a high density of immigrants, a few programs (e.g. "Salud Tiene Sabor" and "Steps to a Healthier Salinas") have explicitly focused on helping ethnic restaurants to promote healthy menus and reducing fats, while increasing fruit and vegetable availability (Hanni et al., 2010; Nevarez et al., 2013).[2]

A few studies have attempted to analyze the causal effects of food-environment and weight gain exploiting the entry of fast-food restaurants or large chain retailers such as Walmart. While previous evidence suggests that fast-food is less healthy and can importantly contribute to obesity (Rosenheck, 2008), there is little evidence that exposure to fast-food restaurants and food deserts have causal effects on health. Though different strategies led to slightly different conclusions on the magnitude and the significance of the effects on weight gain and obesity rates (Anderson and Matsa, 2011; Currie et al., 2010; Lhila, 2011), there is a growing consensus that food-deserts and proximity to fast-food restaurants play only a minimal role in explaining observed disparities in nutritional consumption (Handbury et al., 2015). On the contrary, we know relatively little about the role of different types

[1] Source: NCHS Data Brief, January 2012, `http://www.cdc.gov/obesity/data/adult.html`

[2] See also http://www.salud-america.org/sites/www.salud-america.org

of restaurants and variety in the food-environment. The goal of this study is to analyze the effects of proximity to Mexican restaurants, the dominant type of ethnic fast-casual restaurants on weight gain.

Over the last few years fast-casual restaurants (e.g., Chipotle, Shake Shack, Freshii), promising 'fresh food" but still offering some dishes at the same price as those at major burger joints, have been the only niche in the restaurant sector that has been growing. Since 1999 it grew by 550 percent, approximately ten times the growth of the fast-food industry over the same period (source: Euromonitor). In 2014, Americans spent $21 billion at fast casual restaurants, accounting now for more than a quarter of the total food service sales (source: National Restaurant Association. Within this segment Mexican, and more generally Latin and Caribbean-inspired fast-casual chains have cropped up with Chipotle and Qdoba leading the segment.[3] The popularity of these restaurants is driven by the rapid growth of the Hispanic population. Indeed, Schiff (2014) and Mazzolari and Neumark (2012) show that immigration is associated with increased restaurant diversity and more restaurant choice for the natives.

As first-generation immigrants, and in particular first-generation Hispanics, tend to have healthier dietary habits than their native counterparts (Vargas, 2012; Guendelman and Abrams, 1995), immigration may increase the demand for healthier menus, and, thus, the availability of healthy options in food-deserts. In particular, the entry of immigrants with similar tastes to a subgroup of natives (the healthy natives) may increase the provision of products preferred by those natives and, hence, increase their access to healthy options, particularly in low-income neighborhoods that are characterized by less diversity and a higher proportion of "unhealthy" restraurants (Schiff, 2014; Meltzer and Schuetz, 2011). This may in turn increase healthy consumption by reducing disparities in access to healthy food.

Consistent with this hypothesis, previous studies found that ethnic restaurants are more likely to offer non-fried carbohydrate offerings and fruit and vegetables (Hanni et al., 2010)

[3]http://www.economist.com/news/business/21638120-why-slightly-more-upmarket-outlets-are-eating-fast-foods-lunch-better-burgers-choicer-chicken.

and play an important role in improving access to healthy food in low-income, Latino communities (Nevarez et al., 2013; Emond et al., 2012). Furthermore, using survey data Duerksen et al. (2007) show that child and parent body mass index (BMI) are lowest in Mexican-American families who select Mexican restaurants. This evidence provides partial support to policy programs promoting ethnic restaurants as a way to increase access to healthy food. However, to the best of my knowledge there is no study analyzing the effects of fast-casual ethnic restaurants, or increased diversity in the food-environment, on weight gain.

This paper attempts to fill this gap in the literature and contributes to previous studies on food-deserts and proximity to fast-food restaurants by analzying the relationship between proximity to Mexican restaurants and weight gain. I focus on a sample of pregnant women and examine the effects on excessive maternal weight gain which has been linked to post-partum obesity and adverse health outcomes (Derbyshire, 2009). In addition, I examine the effect on other other pregnancy outcomes including several metrics of child's fitness at birth.

I obtained data on all pregnancies that occurred in the metropolitan area of Miami between 1990 and 2009 and matched them to a directory of all the eating and drinking establishments and food stores that were open in the metropolitan area of Miami between 1990 and 2009. One reason to focus on this area is that in the Miami metropolitan area ethnic restaurants grew particularly fast over the last couple of decades.[4] The main advantages of analyzing weight gain during pregnancy is that it allows me to exploit a large sample of administrative records drawn from the Vital Statistics of Florida and to use variation in the food-environment across pregnancies of the same mother. Using mother fixed effects accounts for time-invariant individual heterogeneity that may be correlated with individual location and the likelihood of gaining excessive weight. Similarly to Currie et al. (2010), I use data on the exact geographic location of restaurants and analyze how the availability of fast-food and ethnically defined restaurants is related to maternal weight gain, pregnancy outcomes and child's health at birth.

[4]See for instance, http://smartblogs.com/food-and-beverage/2012/03/08/why-fast-casual-connects-so-well-with-the-social-consumer/

The results of this paper suggest that the availability of a Mexican restaurant within half a mile from maternal residential address is associated with a lower likelihood of excessive weight gain among US born mothers during pregnancy. Effects appear to be larger among minorities, low-skilled, and young mothers, though these differences are not precisely estimated. No protective effect of proximity to Mexican restaurants was found for the foreign-born. I find no evidence of significant effects on other maternal and child's health outcomes (e.g, hypertention, diabetes, child's birth weight). Finally, I find no evidence of significant effects of fast-food proximity.

A natural concern with the identification strategy is that while I am trying to estimate the effects of changes in the supply of casual restaurants, the estimates may capture unobservable shifts in the demand for fast-casual restaurants or ethnic food. In particular, these chains are likely to open in areas where there are higher chances of market success and the demand is expected to be strong. Thus, one may be concerned that unobserved determinants of health and eating behavior may be correlated with the changes in the availability of ethnic restaurants. If the density of ethnic restaurants is correlated with lower risk of weight gain, I may over-estimate the positive effects of proximity to fast-casual ethnic restaurants. As in Currie et al. (2010), I am not able to rule out this possibility. However, it is worth noting that because of maternal fixed effects, the key identifying assumption is that the maternal behavior/weight gain of the same mother should not change in the absence of a change in the local food environment between different pregnancies. Furthermore to strengthen the credibility of the identification strategy and the causal interpretation of the results, I present some sensitivity analysis and unconfoundness tests. In particular, I show that proximity to future fast-casual restaurants has no effect on maternal weight gain. Furthermore, changes in the proximity to ethnic restaurants are not correlated with other important determinants of weight gain. Finally, the results are robust to the inclusion of a wide set of time-varying neighborhood characteristics.

This paper is organized as follows. Section 2 presents the background. Section 3 provides

a discussion of the data, the empirical specification, and the identification strategy. Section 4 presents the main results of the paper. Concluding remarks are reported in section 5.

2 Background and Theoretical Framework

2.1 Background

Several papers have examined the causes of the obesity epidemic in the US. Changes in agricultural, food production and distribution technology have been shown to have played an important role in the observed rise in obesity rates (Lakdawalla and Philipson, 2002; Philipson and Posner, 2003; Cutler et al., 2003; Courtemanche and Carden, 2011). At the same time, there is evidence that the decline in the relative cost of eating out versus home has favored the increase in adult obesity (Chou et al., 2004). Despite the evidence on negative health outcomes associated with fast food and eating out, there is debate on whether variations in the exposure to fast-food (or other types of restaurants) or food-deserts affect health. Powell and Bao (2009) and Beydoun et al. (2008) show that the supply of supermarkets, restaurants as well as the grocery prices are importantly related to healthier behaviors and better health outcomes. The causal interpretation of these correlations has been questioned by Anderson and Matsa (2011) who exploit interstate highways as an instrument for the availability of restaurants and found no evidence of significant effects on obesity. Currie et al. (2010) find different results providing evidence of modest, but significant effects on maternal weight gain. The difference in the findings is likely to be explained by the larger sample size and the more precise measures of proximity to fast-food restaurants used by the latter study. Using the Natality Detail Data, Lhila (2011) provides evidence of a positive association of greater access to fast-food restaurants with excessive weight gain during pregnancy, but no significant effects on birth-outcomes.

This study is closely related to the literature analyzing the causal effects of food-environment on weight gain (Anderson and Matsa, 2011; Currie et al., 2010; Lhila, 2011)

but it also speaks to other strands of the economic literature. First, as I am interested in examining the effects of increased variety on individuals' health, this paper relates to the extensive trade literature examining consumer gains from increased variety of goods (Broda and Weinstein, 2004; Feenstra, 1994). Second, as I exploit changes in the food-environment that respond to demographic changes, this paper speaks to the literature in industrial and urban economics analyzing preference externalities and the relationship between population demographics and the provision of private goods (Waldfogel, 2008), as well as the relationship between urban agglomeration and product variety (Schiff, 2014; Couture, 2013). Because of its focus on ethnic restaurants this paper is closely related to previous research analyzing the effects of immigration on diversity and product variety (Ottaviano and Peri, 2006; Mazzolari and Neumark, 2012).

2.2 Theoretical Framework

Restaurant operators' survey suggest that the lack of demand is the main explanation for why in certain neighborhoods restaurants and food retailers are reluctant to offer healthy products. A likely explanation is that, in a sector, like the restaurant industry, with relatively high fixed costs and markedly heterogeneous preferences, a product will be made available only if there is sufficient demand for it (George and Waldfogel, 2003; Waldfogel, 2003). As suggested by Waldfogel (2008), likewise for the provision of public goods responds to the preferences of the median voter, the supply of local private goods responds to the preferences of the median consumer and, thus, it's importantly related to the population composition of the market. Consistent with this hypothesis, Schiff (2014) shows that the presence of ethnic neighborhoods increases the likelihood that a a market supports a particular variety. The provision of private goods is therefore lumpy and sensitive to the distribution of preferences. This is particularly true for products that are perishable and need to be consumed locally.

Because the agglomeration of individuals with a given set of tastes results in the provision of certain products, Waldfogel (2008) suggests that immigration may have positive

externalities on the subgroup of natives sharing similar tastes, eventually shifting the median consumer's equilibrium. Consistent, with this conjecture he shows that the mix of locally available restaurants is sensitive to the zip code demographics by race and education. Mazzolari and Neumark (2012) provide further evidence that immigration affect product variety by testing directly the relationship between immigrant inflows and the composition of products in the retail sector and the restaurant sector. Duerksen et al. (2007) and Hanni et al. (2010) provide evidence that Mexican restaurants may promote access to healthier options supporting policy interventions such as "Salud Tiene Sabor". I extend these studies by examining whether the surge of fast-casual ethnic restaurants, and in particular of, Mexican restaurant affected weight gain.

From a theoretical perspective immigration may affect the provision of healthy food in a neighborhood by both affecting its demand and supply. If immigrants have healthier diets than natives, as the public health literature suggests (Guendelman and Abrams, 1995), then the demand for healthy products may increase in the neighborhoods where immigrants move into. If the population is composed of two types, healthy and unhealthy, one may expect that immigration would benefit the healthy types by increasing the availability of healthy products in a given neighborhood.

Even if tastes are stable in the population, and preferences are not affected by the supply in the short-run, food-variety may favor the consumption of healthy products among healthy types. Proximity to healthy options may not only reduces the cost of healthy food but also reduces self-control problems typical of obesogenic environments (O'Donoghue and Rabin, 2000; Laibson, 2001; O'Donoghue and Rabin, 2000; DellaVigna, 2009). However, the demand may also be affected by peer effects. Finally, immigrants may increase the supply of ethnic food, because of their comparative advantage in its production (Mazzolari and Neumark, 2012). However, whether increased access to food variety and, in particular, to fast-casual ethnic restaurants promotes the consumption of healthy food and positively affects the health of a community is ultimately an empirical question.

3 Data and Empirical Specification

3.1 Data

The main data used in this paper are drawn from Vital Statistics Natality Data from Florida and the National Establishment Time Series Database (NETS, Dun and Bradstreet). Specifically, the data on maternal and child's outcomes are drawn from the birth certificates of all children born in the metropolitan area of Miami between 1990 and 2009. I obtained confidential information on mother and child's name, exact date of birth, and full address of residence, and use this information to link births to the same mother. These administrative records include information on maternal age, education, race, ethnicity, country of birth; whether the mother was smoking during the pregnancy; child's gender, birth order, type of birth; and maternal weight gain. Following Currie et al. (2010), I restrict the sample to singleton births and to mothers with at least two births in the sample and non-missing information on weight gain.[5] The final sample consists of 565,871 observations.

The NETS dataset provides time-series information on establishment mobility patterns, sales growth performance, job creation and destruction, changes in primary markets, and historical D&B ratings. I obtained a panel of virtually all the establishments in SIC 58 ("Eating and Drinking Places") and SIC 54 ("Food Stores") from 1990 to 2009, with addresses, names and categorical classification allowing me to identify different types of restaurants and their exact geographical location. These data have been often used in previous studies on the restaurant industry and are considered more precise than yellow pages or business directories (Mazzolari and Neumark, 2012; Currie et al., 2010) and are considered the best to study business location (Kolko et al., 2007). In addition, the NETS data contain information on the primary standard industrial classification of each establishment. Either through letter surveys, phone surveys or internet updates, the establishment chooses (or Dun and Bradstreet assigns) its primary (and secondary) SICs from a list of over 18,750 SIC8s developed

[5]Information is missing for 7.7% of the sample.

by Dun and Bradstreet.

To identify Mexican restaurants that represent the largest category of ethnic fast-casual restaurants in the US, I define a narrower indicator identifying as Mexican restaurants all the restaurants that were classified in SIC 58120112: "Mexican restaurants". Note that Mexican-American fast-food restaurants as Taco-Bells are classified as fast-food restaurants and, not included, in the Mexican restaurant definition used in this study. I instead use the company name to identify Mexican restaurants that may have been misreported as generic eating places —but were not classified as fast-food restaurants— searching for words in the business names that would point to Mexican restaurants (e.g., "Mexican", "Mexico","Burrito" etc.). Following Mazzolari and Neumark (2012), I use this procedure for all types of ethnic restaurants (e.g., American, Cajun, Chinese, French, German, Greek, Indian, Italian, Japanese, Korean, Libanese, Mexican, Spanish, Thai, Vietnamese). I considered only the top 10 fast-food chains as fast-food restaurants (Currie et al., 2010). The fast-food list includes McDonalds, Subway, Burger King, Taco Bell, Pizza Hut, Little Caesars, KFC, Wendy's, Domino's Pizza, and Jack in the Box.[6] I also identify cafeterias, pizza places, family restaurants. Finally, I include data on the availability of food-stores and classify separately supermarkets, grocery stores, and convenience stores (Meltzer and Schuetz, 2011; Emond et al., 2012).

Using $ArcInfo$, I merged these data with the information drawn from the universe of Florida birth records using information on latitude and longitude of maternal address of residence and restaurant location. In particular, following Currie et al. (2010), I matched the data on weight gain during pregnancy and birth outcomes of the child with the proximity to fast-food, Mexican, other type of restaurants, and supermarkets in the year that overlaps the most with the gestation period.

[6]As alternative classifications for fast-food restaurants, I considered all the establishment in the fast-food 8digit SIC and all the chains listed by Wikipedia as fast-food restaurants. The main results are not substantially affected by this definition as the 10 top fast-food chains cover most of the market.

3.2 Summary Statistics

Table 1 shows the summary statistics for the main variables used in the analysis. Using data on restaurants and mother's address of residence, I constructed indicators for whether there were fast food, Mexican, other restaurants, and supermarkets or grocery stores located within 0.5 miles of the mother's residence. Half a mile is a distance that a person can walk in about 10 minutes and it's a measure of proximity that has been previously used in the literature (Davis and Carpenter, 2009; Rundle et al., 2009; Currie et al., 2010).

Column 1 includes data on all births. Column 2 presents the same statistics on the restricted sample of mothers who had at least two siblings, while in column 3(4) I restrict the sample to mothers who reside within 0.5 mile from a fast-food (Mexican) restaurant. About 40.3% of pregnant mothers in the sample live within 0.5 miles of a fast-food restaurants and 12.5% are within a 0.5 miles from a Mexican restaurant. Mothers who live in proximity of fast-food of Mexican restaurants have slightly different characteristics than the average mothers. Mothers who live in proximity of Mexican restaurants tend to be younger, are less likely to be black, more likely to be Hispanic, and less likely to smoke. There are 135,068 mothers with greater at least two children in the sample. There are 101,469 mothers who experience a change in fast-food availability within 0.5 miles, and 47,046 mothers who experienced a change in Mexican-restaurant availability within 0.5 miles.

3.3 Empirical Specification

The baseline specification is:

$$Y_{izt} = \beta_1 F5_{izt} + \beta_2 MX5_{izt} + \beta_4 3Other5_{izt} + \beta_4 SPM5_{izt} + \delta X_{izt} + Z_{zt} + d_i + \epsilon_{izt} \qquad (1)$$

where Y_{it} is an indicator equal to 1 if the mother i living in zipcode z at time t gains more than 20kg during pregnancy; $F5$ is an indicator equal to one if there is a fast-food within 0.5 miles of the mother's address of residence; $MX5$ is an indicator equal to one if there

is a Mexican restaurant within 0.5 miles of the mother's address of residence; $Other5$ is an indicator equal to one if other types of restaurants ((not classified as Mexican or a fast-food) are available within 0.5 miles of the mother's address of residence; $SPM5$ is a vector of three indicators for whether the mother lived within 0.5 miles from a supermarket, a grocery store, or a convenience store; X_{izt} is a vector of time-varying maternal characteristics including age dummies, four dummies for education (high-school drop-out, high-school graduate, some college, college or more), tobacco consumption, child's gender, parity, marital status and year dummies, dummies for race and ethnicity; Z_{zt} is a set of time varying zip-code characteristics including share of high-school drop-outs, high-school, college graduate, and those with more than college degree, share of Hispanics and Blacks, share of Cuban, Puerto Rican and Mexican mothers, share of female population, income per capita, income per capita among Hispanics; d_i is a mother fixed effect. Standard errors are clustered by mother. In alternative specifications, I include zip code fixed effects which capture time-invariant characteristics at the zip code level.

As the variation in restaurants' supply across different pregnancies could be induced by changes in the local food environment or by mothers' relocation, I also consider an alternative model focusing on mothers who kept living in the same place, therefore limiting the source of variation to openings and closings of different types of restaurants nearby between pregnancies. Using within-mother analysis allows to control for individual unobservables that might affect both her own locational choices and the likelihood of negative health outcomes. It is worth noting that measurement error may cause attenuation bias in the main estimates of the paper.

4 Main Results

Table 2 analyzes the relationship between food-environment and excessive maternal weight gain. Following previous studies, I use as dependent variable a dummy taking value

equal to 1 if weight gain is above 20 kg. This threshold has been previously used in the literature as the incidence of low APGAR[7] scores is shown to increase significantly with weight gain above 20 kg (Currie et al., 2010). When analyzing all the mothers with at least two pregnancies in the sample, I find no evidence of significant effects of proximity to fast-food or Mexican restaurants (column 1).[8] It is worth noting that the differences in sample size and in the populations analyzed can explain the differences with respect to the findings of Currie et al. (2010).

Interestingly, when focusing on US-born mothers, the availability of a Mexican restaurant within 0.5 miles is associated with a 1.2 percentage points reduction in the likelihood of gaining excessive weight during the pregnancy (column 2). This corresponds to a 8.5% effect with respect to the incidence of excessive weight gain in the sample. The fact that the sign of the coefficient reverses when analyzing the foreign-born (column 3) can be explained by the fact that immigrants tend to be healthier than US natives (healthy immigrant effect) and, in particular, first-generation Hispanics are less likely to eat out and have healthier diets (Vargas, 2012; Guendelman and Abrams, 1995), thus the proximity to Mexican restaurants may actually promote less healthy choices in this population. It is also worth noting that focusing on the US-born also mitigates the endogeneity bias that may be caused by the correlation between immigrant location choices and neighborhood changes in the supply of food-environment.

In Table 3, I show that including both mother and zip-code fixed effects (column 2) the coefficient remains significant and substantially unchanged with respect to the baseline regression reported in column 1. When restricting the sample to mothers who did not changed zip-code across their pregnancies, the point-estimate remains relatively stable -if anything it

[7]The Apgar scale is determined by evaluating the newborn baby on five simple criteria: appearance, pulse, grimace, activity, respiration).

[8]While OLS estimates confirm a positive correlation between fast-food exposure and maternal weight gain, when including socio-demographic controls the coefficient shrinks and becomes non-significant. Among US -mothers the positive correlation remains robust to the addition of individual socio-demographic controls and zip-code time varying characteristics, but becomes non-significant once including zip-code (mother) fixed effects. Results are available upon request.

increases in absolute value- but the coefficient is only marginally significant as I reduce the identification power excluding from the analysis mothers who changed neighborhood across pregnancies.

Table 4, illustrates the heterogeneity of the results across different socio-demographic groups. The coefficient on the proximity to Mexican restaurants is larger among minorities, low-educated and younger mothers.[9] While the differences are not precisely estimated the point-estimates reported in columns 2-4 are smaller for US-born white mothers than for US-born black mothers. Column 5 and 6 show that the coefficient is significantly smaller among mothers with at least some college education (column 6) compared to mothers with high-school degree or less (column 5). Finally, in column 7, I restrict the analysis to mothers who gave birth at a relatively young age (below the median age in the sample, 28). Again, though the differences across groups are not statistically significant, the point-estimate is larger than among mothers who gave birth at a later age (column 8).[10]

4.1 Robustness Checks

Table 5 presents an unconfoundness test examining the effect of the future openings of restaurants and analyzing the effects on weight gain determinants that should not be affected by the food-environment.

Column 1 shows that, consistently with the identification assumption, the future openings of Mexican restaurant have no effect on maternal weight gain. It is worth noting that the coefficient is not only non-statistically different from zero, but also very small in magnitude.

Columns 2-4 present a placebo test analyzing the relationship between the availability of different types of restaurants and time-varying individual characteristics, while controlling for

[9] Results are similar when including zip-code fixed effects, or focusing on stayers.

[10] Interestingly, the effects are larger among women who were not overweight before the pregnancy and those who already have kids and are likely more constrained with time. Table A.1 shows that the coefficient is larger among women who already had a child. This could be explained by the fact that pregnant women who have older children may be particularly stressed with time and more inclined to dine out. However, the results reported in Table A.1 are not statistically significant and should be interpreted with caution given the size of the standard errors and the lack of identification power.

mother fixed effects. I examine maternal smoking, marital status, and an indicator for quality of care. These variables are time-varying within mothers. If the identification assumption is correctly specified then these variables should not be correlated with changes in the food-environment, and in particular with the proximity to Mexican restaurants. Consistent with this prior, I find no evidence that these individual time-varying characteristics are correlated with the availability of a Mexican restaurant within 0.5 mile. Though this does not allow us to rule out the possibility that the results presented so-far may be capturing unobserved shifts in the demand that are correlated with the opening and closing of restaurants across areas, these results show that the coefficients reported in Tables 2-7 are not confounded by observable individual characteristics that are known to affect maternal weight gain during pregnancy and mitigate the concern that other unobservables may confound the main estimates.

4.2 Other Results

Since 2004, the birth records data contain information on pre-pregnancy BMI, using this information results suggest that -if anything- proximity to a Mexican restaurant seems to have larger protective effects (in terms of lower likelihood of excessive weight-gain) among mothers who were not overweight at the beginning of the pregnancy (BMI $\geq$25) (column 4-5). However, as the analysis is restricted to 2004 onward the sample of pregnancies for mothers with at least two singleton births is substantially smaller and these coefficients are not precisely estimated and should be interpreted with caution.

Using the 2004-2009 sample, I can also analyze the effects of proximity to different types of restaurants on the weight-gain across different pregnancies. While again I do not have enough power to identify any statistically significant effect, the point-estimates reported in columns 1-3 of Table A.2 suggest that the availability of a Mexican restaurant reduces the risk of weight gain across pregnancies and the likelihood of becoming obese or overweight. There is no evidence of significant effects on gestational hypertentsion and diabetes.

Table A.3 shows no evidence of significant effects of proximity to fast-food, or Mexican

restaurants on different metrics on birth weight in grams, the incidence of low birth weight (birth weight below 2,500 grams), the likelihood of reporting a low 5-minute APGAR score (APGAR < 8) score.[11]

5 Conclusion

This paper extends previous studies by analyzing the role of Mexican restaurants and examining a broad set of maternal and pregnancy outcomes. I exploit changes in restaurants' availability within half a mile from the mother's address of residence across births of the same mother. I find that mothers living within half a mile from a Mexican restaurant are less likely to gain excessive weight during pregnancy. Results suggest that this relationship might be stronger among those at higher risk of unhealthy behaviors and characterized by low socio-economic status: low-educated, young and black women. Interestingly, foreign-born are not affected by proximity to fast-food or Mexican restaurants. Finally, there is no evidence of significant effects on other maternal and child's health outcomes.

More research is needed to pin-down the exact mechanisms underlying these results and their external validity. Yet, these results provide some support for policy programs promoting ethnic restaurants and ethnic food as a strategy to increase access to healthy options and healthy eating in low-income neighborhood.

Taken together, these findings are consistent with a model in which increased variety in the food environment lowers the cost of healthy options and reduces self-control problems that may be exacerbated by lack of variety and lower ability of "healthy consumers" to find a "healthy option" in the menu (DellaVigna, 2009; Laibson, 2001).

[11] The Apgar scale is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10.

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Table 1: Summary Statistics, Florida Birth Records (1989-2009), Miami CBSA

	All births	Siblings only	Siblings ≤0.5mile from a fast-food rest.	Siblings ≤0.5mile from a Mexican rest.
Age of mother	27.813	27.194	27.082	27.362
Mother graduated from high-school	0.358	0.344	0.361	0.346
Mother attended some college	0.191	0.187	0.185	0.164
Mother attended college or more	0.233	0.229	0.210	0.221
Mother is black	0.271	0.301	0.286	0.184
Mother is hispanic	0.563	0.561	0.598	0.694
Mother is smoking	0.023	0.020	0.019	0.016
Child is male	0.512	0.514	0.516	0.513
Parity	0.942	1.073	1.050	1.065
Mother is married	0.592	0.604	0.588	0.592
Weight gain grater than 20kg	0.144	0.140	0.140	0.140
Observations	565,869	323,880	96,175	34,216

Notes - There are 135,068 mothers with greater than or equal two children in the sample. There are 101,469 mothers who experience a change in fast-food availability within 0.5 miles, and 47,046 mothers who experienced a change in Mexican-restaurant availability within 0.5 miles.

Table 2: Food Environment and Excessive Weight Gain (larger than 20 kg), Florida Birth Records(1989-2009), Miami CBSA

Demographic Sub-samples:	(1) Overall	(2) US Born	(3) Foreign Born
Availability of a Mexican restaurant within 0.5 miles	0.0002 (0.003)	-0.0113** (0.005)	0.0090** (0.004)
Availability of a fast-food restaurant within 0.5 miles	-0.0016 (0.002)	-0.0028 (0.004)	-0.0007 (0.003)
Availability of other eating places within 0.5 miles	0.0026 (0.003)	0.0046 (0.004)	0.0014 (0.005)
Availability of a convenience store within 0.5 miles	0.0031 (0.002)	0.0033 (0.003)	0.0025 (0.003)
Availability of a grocery store within 0.5 miles	0.0025 (0.002)	0.0029 (0.004)	0.0022 (0.003)
Availability of a supermarket within 0.5 miles	-0.0001 (0.002)	-0.0011 (0.004)	0.0002 (0.003)
Mother fixed effects	YES	YES	YES
Observations	512,436	213,541	298,895

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. The dependent variable is excessive maternal weight gain, defined as a dummy variable which equals 1 when the weight-gain during pregnancy is above 20 kg. Entries reported in rows are the coefficients on a dummy for the availability of respectively a Mexican, a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence. All estimates include controls for time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). Finally, all estimates include mother fixed-effects. Standard errors clustered by mother are reported in parentheses.

Table 3: Food Environment and Excessive Weight Gain (larger than 20 kg), Florida Birth Records(1989-2009), Miami CBSA: Alternative Specifications

Demographic Sub-samples:	(1) US Born Overall	(2) US Born Overall	(3) US Born Stayers
Availability of a Mexican restaurant within 0.5 miles	-0.0113** (0.005)	-0.0113** (0.005)	-0.0134 (0.008)
Availability of a fast-food restaurant within 0.5 miles	-0.0028 (0.004)	-0.0028 (0.004)	-0.0030 (0.005)
Availability of other eating places within 0.5 miles	0.0046 (0.004)	0.0046 (0.004)	0.0096 (0.007)
Availability of a convenience store within 0.5 miles	0.0033 (0.003)	0.0033 (0.003)	-0.0031 (0.005)
Availability of a grocery store within 0.5 miles	0.0029 (0.004)	0.0029 (0.004)	0.0005 (0.006)
Availability of a supermarket within 0.5 miles	-0.0011 (0.004)	-0.0011 (0.004)	0.0028 (0.006)
Mother fixed effects	YES	YES	YES
Zip code fixed effects	NO	YES	NO
Observations	213,541	213,541	134,104

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. The dependent variable is excessive maternal weight gain, defined as a dummy variable which equals 1 when the weight-gain during pregnancy is above 20 kg. Entries reported in rows are the coefficients on a dummy for the availability of respectively a Mexican, a fast-food restaurant, other eating places(not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence. All estimates include controls for time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Colunm 2 includes zip code fixed effects. Column 3 restricts the analysis to mothers who lived in the same zip-code across different pregnancies. Standard errors clustered by mother are reported in parentheses.

Table 4: Food Environment and Excessive Weight Gain (larger than 20 kg) by Socio-Demographic Groups, Florida Birth Records(1989-2009), Miami CBSA

	(1) Overall	(2) Whites	(3) Blacks & Hispanics	(4) Blacks	(5) Low-Skilled	(6) High-Skilled	(7) Age< 28	(8) Age≥28
Availability of a Mexican restaurant	-0.0113**	-0.0070	-0.0112*	-0.0103	-0.0180**	0.0002	-0.0105	-0.0073
within 0.5 miles	(0.005)	(0.007)	(0.006)	(0.009)	(0.007)	(0.009)	(0.008)	(0.010)
Availability of a fast-food restaurant	-0.0028	-0.0022	-0.0051	-0.0024	-0.0047	0.0024	-0.0016	-0.0022
within 0.5 miles	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)
Availability of other eating place	0.0046	-0.0006	0.0053	0.0079	-0.0003	0.0045	0.0082	0.0062
within 0.5 miles	(0.004)	(0.006)	(0.005)	(0.007)	(0.006)	(0.007)	(0.006)	(0.008)
Availability of a grocery store	0.0029	0.0024	0.0018	0.0031	0.0013	0.0048	-0.0014	0.0046
within 0.5 miles	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)
Availability of a a convenience store	0.0033	-0.0010	0.0046	0.0043	0.0047	0.0028	0.0017	0.0078
within 0.5 miles	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.006)	(0.004)	(0.006)
Availability of a supermarket	-0.0011	-0.0107**	0.0016	0.0053	0.0002	-0.0056	0.0017	-0.0044
within 0.5 miles	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)	(0.005)	(0.007)
Mother fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	213,541	129,267	153,418	84,274	114,437	99,104	123,658	89,883

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. The dependent variable is excessive maternal weight gain, defined as a dummy variable which equals 1 when the weight-gain during pregnancy is above 20 kg. Entries reported in rows are the coefficients on a dummy for the availability of respectively a Mexican, a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence. All estimates include controls for time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Standard errors clustered by mother are reported in parentheses.

Table 5: Unconfoudness and Placebo Tests: Florida Birth Records (1989-2009), Miami CBSA

Dependent variable:	(1) Excessive weight gain	(3) Mother smokes	(4) Adequate prenatal care	(5) Mother is married
Availability of a Mexican restaurant within 0.5 mile	-0.0125** (0.006)	0.0007 (0.002)	-0.0021 (0.005)	0.0050 (0.005)
Availability of a Mexican restaurant within 0.5 mile, 3 years later	0.0017 (0.006)			
Mother fixed effects	YES	YES	YES	YES
Observations	213,541	233,645	228,892	233,645

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. All estimates include controls for the availability of a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence, time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Standard errors clustered by mother are reported in parentheses.

6 Appendix

Appendix A

Table A.1: Food Environment and Excessive Weight Gain (larger than 20 kg) by number of previous children and BMI before pregnancy, Florida Birth Records(1989-2009), Miami CBSA

	(1) No other children 1991-2009	(2) Has other children 1991-2009	(3) Was not Overweight before pregnancy 2004-2009	(4) Was Overweight before pregnancy 2004-2009
Availability of a Mexican restaurant within 0.5 miles	0.0054 (0.048)	-0.0162** (0.008)	-0.0176 (0.016)	0.0152 (0.023)
Mother fixed effects	YES	YES	YES	YES
Observations	96,229	117,312	33,225	28,693

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. The dependent variable is excessive maternal weight gain, defined as a dummy variable which equals 1 when the weight-gain during pregnancy is above 20 kg. All estimates include controls for the availability of a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence, time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Standard errors clustered by mother are reported in parentheses.

Table A.2: Food Environment and Other Maternal Outcomes, Florida Birth Records(2004-2009), Miami CBSA

Dependent Variable	(1) Weight Gain (in kg) Across Pregnacies	(2) Overweight	(3) Obese	(4) Hypertension	(5) Diabetes
Availability of a Mexican restaurant within 0.5 miles	-0.8762 (0.591)	-0.0157 (0.012)	-0.0006 (0.010)	0.0061 (0.005)	0.0007 (0.002)
Mother fixed effects	YES	YES	YES	YES	YES
Observations	63,872	63,436	63,436	71,790	71,790

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. All estimates include controls for the availability of a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence, time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Standard errors clustered by mother are reported in parentheses.

Table A.3: Food Environment and Birth Outcomes, Florida Birth Records(1989-2009), Miami CBSA

Dependent Variable:	(1) birth weight (grams)	(2) low birth weight	(3) Very low birth weight (<2,500 grams)	(4) Low Apgar Score (<1,500 grams)	(5) Birth weight $> 4000 grams$
Availability of a Mexican restaurant within 0.5 miles	2.8544 (6.805)	-0.0035 (0.004)	0.0004 (0.002)	0.0016 (0.002)	0.0006 (0.003)
Mother fixed effects	YES	YES	YES	YES	YES
Observations	233,550	233,550	233,550	233,010	233,550

Notes - The unit of observation is a pregnancy for mothers with at least two singleton births. Tll estimates include controls for the availability of a fast-food restaurant, other eating places (not classified as Mexican or fast-food), a convenience store, a grocery store, or a supermarket within 0.5 miles from mother's residence, time varying mother's characteristics including child's gender, mother's education (4 groups), mother's age dummies, parity, marital status, child's year of birth dummies. Regressions also included a set of controls at the zip-code level: share of adults (over 25) with high school degree or less, some college, college or more, share of female, black, white and Hispanic population, share of Cuban, Mexican and Puerto Rican mothers, poverty rate, per capita income and per capita in come in the Hispanic population. The zip-code level data are drawn from the 1990 US Census for all pregnancies that occurred before 2000 and from the 2000 US Census for the pregnancies that occurred since year 2000. Other controls are indicators for variables with missing information (tobacco use, parity, marital status, race). All estimates include fixed-effects. Standard errors clustered by mother are reported in parentheses.