Restaurant Sales and Maternal Employment

Samuel Taylor

Advisor: Professor Donald Vandegrift

Abstract:

Over the past thirty-five years, child obesity has become a major health problem in the United States. One intuitively appealing explanation is the increase in employment among women and mothers. If women, who are largely responsible for food preparation within the family, are working in greater numbers, then the relative cost of meals outside of the home falls and families are more likely to eat out. By studying the relationship between the labor force participation rates among women and restaurant sales across the United States, we hope to better understand the mechanism by which women's labor decisions affect the obesity epidemic. We find that an increase in labor force participation among women is indeed correlated with an increase in restaurant sales, indicating a shift away from meals prepared within the home.

I. Introduction

Over the past thirty-five years, obesity has become a major health problem in the United States. According to the Center for Disease Control (CDC), obesity among Americans has increased over 50 percent from 1975 to 2005. Equally troublesome are rising obesity rates among children. According to surveys done by the Department of Health and Human Services, the percentage of overweight children aged 6-11 increased from 6.5 to 18.8 percent from 1976 to 2004. While the physiological explanation for weight gain is straight forward (consuming more calories than the body needs for energy), this reasoning does not explain the recent change in behavior leading to weight gain. Because obesity is a leading cause of heart disease, type 2 diabetes, high blood pressure, and stroke, it is highly important to determine the causes of this newfound epidemic (CDC). Further, since overweight children are more likely to become overweight adults, the future occurrence of these obesity-related illnesses may increase (Anderson 2003). Because weight-related illnesses are such major causes of sickness and death in the US, rising rates of obesity have significantly affected the price of health care. It is estimated that 9.1 percent of total U.S. medical spending is related to weight-related illness (CDC). For these reasons, investigating the causes of obesity is an important task.

A commonly offered explanation for increased obesity rates is the changing nature of the American diets. If individuals are eating more of their meals outside of the home, especially at fast food restaurants where food is more caloric, then we would expect the average weight of individuals to increase. Indeed, from the late 1970s to the mid 1990s meals prepared outside of the home have increased from 17 to 30 percent of the average American child's diet (Anderson 2003). It is therefore necessary to explain why Americans are eating more of their meals outside of the home. One intuitively appealing explanation is the increase in employment among women

and mothers. If women, who are largely responsible for food preparation within the family, are working in greater numbers, then the relative cost of meals outside of the home falls. This is because food preparation is a time-intensive activity, and a greater potential income raises the cost of time-intensive goods. Increases in the number of working mothers may also explain child obesity rates, as children depend on their parents for sources of nutrition. In fact, from 1985 to 1995, the number of married mothers in the labor force increased from 61 to 70 percent (Cohany 2007). Patricia Anderson, a leading researcher on the economic causes of childhood obesity, explains, "[p]opular opinion routinely draws a direct link between mothers working and poor health and social outcomes for children" (Anderson, 2003). Our paper examines this hypothesis.

By studying the relationship between the labor force participation rates among women and restaurant sales across the United States, we hope to better understand the mechanism by which women's labor decisions affect the obesity epidemic. In particular, we look at both traditional and fast food restaurant sales as a function of employment among both mothers and women in general. This paper is organized as follows: First, we discuss the theoretical underpinnings of the proposed relationship between labor force participation among women and increased restaurant sales. Then, we review the literature on the economic causes of obesity and discuss our sources of data. Finally, we explain our statistical model and review our findings.

II. Analytical Framework

To explain how labor decisions among women could potentially affect restaurant sales and thereby obesity rates among both adults and children, we examine the trade-off between home- and restaurant-prepared meals. Following the work of Ekelund and Watson (2001) we employ the theory of household production to analyze the decision to eat out. According to the

theory, as wages increase, individuals are more likely to substitute goods-intensive commodities for time-intensive ones. That is, because the price of one's time, measured in wages, is greater, the individual is likely to shift her consumption to activities that require less time relative to monetary cost. Hence, if women have the potential to make greater earnings, they will shift from activities that require significant time, like preparing dinner, to those that do not, like eating their meals outside of the home.

In our case, however, we are interested in how increased labor force participation among women, and particularly mothers, affects their decision to prepare meals for the family. Hence, we will take the increased involvement of women in the workplace as an exogenous factor. Regardless of its causes, women's greater willingness to work outside of the home decreases the amount of time available to prepare meals, thereby increasing the likelihood of eating meals outside of the home. Since meals prepared outside of the home, especially at fast food restaurants, are more caloric than those prepared within the home, this behavior may results in higher obesity rates (Fertig 2006). Further, since those with higher incomes are better able to afford meals prepared at restaurants, we would expect this effect to be more significant among wealthier families.

III. Literature Review

The recent increase in obesity, especially among children, has received significant attention. Here, we review the literature concerning the role that maternal employment and restaurant food consumption has on the obesity trend. See Vandergrift and Yoked (200) for other potential explanations of increased obesity. Anderson et al. (2002) finds that the more a mother works, the greater the likelihood that her child is overweight. In their study, they employ the

National Longitudinal Survey of the Youth to track the relationship between maternal employment and overweight children. They use the body mass index (BMI) of children aged 3 to 11 and their mother's employment history as the variables of interest. Controlling for income, maternal education, and race, they employ a standard probit model to determine the probability of a child being overweight given his/her mother's hours of labor per week. Interestingly, maternal employment has a statistically significant effect on the likelihood of a child being overweight only for the highest income quartile. For these mothers, an extra 10 hours of work per week increases the likelihood of their children being overweight by between 1.3 and 3.8 percentage points (Anderson 2002).

These results are echoed by the findings of Ruhm (2004). Ruhm investigates the effects of maternal employment on a range of outcomes related to child health including cognitive ability and body weight. Also employing data from the National Longitudinal Survey of Youth, Ruhm finds that maternal employment is detrimental to child development, especially for children of wealthier families. Ruhm reports that compared to children of women who do not work, maternal employment of 40 hours a week increases the likelihood of child obesity 6.6 percentage points. Although increased patronage of restaurants is not the only avenue by which maternal employment may affect childhood obesity, both the results of Anderson and Ruhm may be explained by our hypothesis. In fact, both studies find a greater impact on families with higher income. Since wealthier families are more able to substitute restaurant-prepared meals for home-made ones, our hypothesis predicts these results.

Fertig et al. (2006) confirms the findings of Anderson et al. (2003) and Kuhm (2004) by investigating the mechanisms by which material employment affects childhood obesity using data from the Child Development Supplement of the Panel Study of Income Dynamics. They

determine: 1) the relationship between the weights of children who participated in the study and the activities performed by the children as recorded in time diaries; and 2) that the primary ways in which maternal employment affects childhood obesity are through lower levels of nutrition and less overall supervision by mothers. Particularly, they find that 8 percent of the effect that maternal employment has on child obesity is from the decline in the number of meals eaten by the child and that 3 percent of this effect is from an increase in watching television. Fertig et al. also attempt to account for the role of maternal employment on the number of restaurant meals eaten by children. However, because of the limitations of their data set, they were unable to distinguish between home-made and take-out meals as well as whether the family ate at a traditional or fast food restaurant.

While the studies above focus on the causes of obesity among children, Ekelund and Watson (2001) investigate the changing nature of meals eaten by adults. They report that Americans are consistently spending relatively more of their income on meals prepared outside of the home, especially on fast food. Further, Reidpath et al. (2001) finds that individuals in the lowest socio-economic category are exposed to fast food establishments 2.5 times as much as individuals in the highest category. Chou et al. (2004) also use the growth of the fast food restaurant industry to explain increasing obesity rates among Americans. Using panel data from 1984 to 1999, they conclude that the greatest factor contributing to American obesity is the rise in the number of restaurants per capita. Growth in number of restaurants accounts for 61 percent of growth in BMI and 65 percent of the increase in obesity rates. Instead of treating fast food restaurants as the source of obesity, however, they suspect that “the growth in these restaurants […] is to a large extent a response to the increasing scarcity and increasing value of household or non-market time" (Chou 2004). Determining whether this is the case is the objective of this

paper.

IV. Data and Methods

The food service industry can be roughly divided into full-service and limited-service restaurants. In their analysis of the industry, Friddle et al. states that, “full service restaurants have a broad, full-line menu along with tables, counter and/or booth service, and a wait staff” (2001). These restaurants account for 29 percent of the food-service industry. This contrasts with limited-service restaurants, which are establishments “without wait staff and that offer a limited menu of prepared foods” (Friddle 2001). The limited-service restaurant industry accounts for 32 percent of total food service, and is dominated by fast food chains such as McDonald's, Burger King, Taco Bell, KFC, and Pizza Hut (Friddle 2001). In our analysis, we will separately examine the effects of labor force participation rates of women and mothers on both the full- and limited-service industries. Since fast food meals purchased at limited-service restaurants are the ones most often accused of as being an unhealthy substitute for home-cooked meals, distinguishing between full- and limited-service allow us to test this hypothesis.

For our analysis, we use panel data from 1998 to 2006 collected for each of the 51 states, including the District of Columbia. The County Business Patterns survey provides data during this period for number of establishments, number of employees, and total annual sales for both the full- and limited- service industry by state. Once converted to some relative form, these three variables are used to track activity in the restaurant industry that result from the changing proportions of women and mothers in the labor force. Since each of these indicators has its own strengths, we compare our regression results across all three variables to check the robustness of our conclusions**.**

For information on labor force participation among women and mothers, we use data from the March supplement of the Current Population Survey, which provides the number of women and mothers in the labor force by state for each year of interest and is collected by the Bureau of the Census. We included labor force participation for both women and mothers—the former set obviously containing the latter— to test the previously stated hypothesis: Women who are responsible for meal preparation will substitute meals prepared at restaurants for those prepared at home under the time constraints that come with employment. Since mothers are traditionally charged with this responsibility, we expect that employment among women with children will have a larger impact on restaurant sales.

To identify other factors that affect the food service industry we return to the analysis of Friddle et al. According to their study, "The key consumer drivers [of the food service industry] are an aging population, growing ethnic diversity, increase in dual income families, single person households, time constraints, and a variety of attitudes correlated with different generations" (2001). We therefore include as independent variables the percent of the population over 65, the percent of the population that is black, the percent of the population that is Asian, and the average income of the population. Table 1 provides the variables used in our analysis along with a few summary statistics.

Table 1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
estpthfs	459	7.70164	1.596575	4.590021	12.59676
Estpthls	459	8.47619	1.2778	6.476159	17.27502
empertfs	459	1.525459	0.3325865	0.8028113	3.544849
empertls	459	1.322794	0.2151744	0.7540047	1.825425
salepinfs	459	0.6090714	0.1516525	0.3595599	1.30024
salepinls	459	0.4474629	0.0901563	0.2322398	0.6795661
salepfs	459	186.9339	72.64753	70.27598	734.6337
salepls	459	133.2078	25.90733	79.34402	263.8412
perfem	459	47.76084	3.415331	38.45002	57.01992
perfemc	459	40.88713	3.469637	33.36217	51.6125

incomepe	459	30380.29	5764.604	19545	57896
perpop65	459	11.38193	3.811417	0.5887042	18.3389
perbl	459	10.90349	11.61107	0.1	62.3
peras	459	3.257516	6.548166	0.3	63.6

Variables: *estpth(fs/ls)* - number of establishments per 10,000 people for full-service (fs) and limited-service (ls) restaurants, *empert(fs/ls)* - percent of individuals employed by the industry among the entire population, *salep(fs/ls)* - the average dollar value spent by the individuals annually at restaurants, *perfem* - the percent of women in the labor force, *perfemc* - the percent of mothers in the labor force, *incomepe* - the average income within the state, *perpop65* - the percent of the population 65 or over, *perbl* - the percent of the population that is black, *peras* - the percent of the population that is Asian

With this data, we employ a fixed effects model to estimate the impact of labor force participation of women and mothers on restaurant activity. As explained above, we have a total of six choices for dependent variables (three indicators of the restaurant industry for both the full- and limited- service industries) and two choices of explanatory variables (women and mothers), resulting in a total of 12 regressions. The forms of the dependent variables used in the regressions are as follows: *estpth(fs/ls)* is the number of establishments per 10,000 people for full-service (fs) and limited-service (ls) restaurants, *empert(fs/ls)* is the percent of individuals employed by the industry among the entire population, and *salep(fs/ls)* is the average dollar value spent by the individuals annually at restaurants. The dependent variables used in the regression include the following: *perfem* is the percent of women in the labor force, *perfemc* is the percent of mothers in the labor force, *incomepe* is the average income within the state, *perpop65* is the percent of the population 65 or over, *perbl* is the percent of the population that is black, and *peras* is the percent of the population that is Asian. All regression statistics reported below are computed using robust standard errors and regressions do not show evidence of multicollinearity.

V. Results and Discussion

The regression results lend weak support to the hypothesis that labor force participation among women positively affects restaurant sales. However, we find strong support for the claim that labor force participation of women/mothers increases the number of full-service establishments and the number of employees in the full service industry. Of the twelve regressions performed in this study, the effect of labor force participation on restaurant activity is significant with the anticipated sign at the 5 percent level in six regressions. Tables 2 through 4 provide the results of each regression. A closer investigation of the differing effects on the full-service versus the limited-service industries and whether labor force participation among women or mothers was the regressor of interest provides more interesting results.

Table 2: Establishments

	Full-Service (estpthfs)		Limited- Service (estpthls)	
Variables	Women	Mothers	Women	Mothers
perfem	.019811 p = .037		-.0017725 p = .886	
perfemc		.0281377 p = .002		.0164377 p = .116
incomepe	-9.28 x 10^-6 p = .074	-4.36 x 10^-6 p = .425	.0000975 p = .000	.0001006 p = .000

perpop65	-.008556 p = .032	-.0085643 p = .028	-.0113094 p = .056	-.0113742 p = .053
perbl	.0159657 p = .734	.022143 p = .647	-.0210492 p = .832	-.0130432 p = .895
peras	.0257913 p = .000	.0269886 p = .000	-.017652 p = .261	-.0166773 p = .287
constant	6.882684 p = .000	6.451897 p = .000	6.014344 p = .000	5.073889 p = .000

Table 3: Employees

	Full-Service (empertfs)		Limited- Service (empertls)	
Variables	Women	Mothers	Women	Mothers
perfem	.005049 p = .017		.0036605 p = .032	
perfemc		.0038696 p = .039		.0021059 p = .102
incomepe	.0000153 p = .000	.000016 p = .000	.0000155 p = .000	.0000158 p = .000

perpop65	.0004675 p = .588	.000477 p = .584	-.0022375 p = .002	-.0022282 p = .002
perbl	-.021902 p = .140	-.0218183 p = .152	.0120138 p = .093	.0117586 p = .102
peras	-.006522 p = .023	-.0064053 p = .021	-.0016943 p = .097	-.0016496 p = .122
constant	1.074996 p = .000	1.135723 p = .000	.5785153 p = .000	.6586743 p = .000

Table 4: Sales

	Limited-Service (salefs)		Full- Service (salels)	
Variables	Women	Mothers	Women	Mothers
perfem	.2369835 p = .464		.1337233 p = .447	
perfemc		.5494669 p = .050		.1273122 p = .396
incomepe	.00619863 p = .000	.0062639 p = .000	.0041176 p = .000	.0041404 p = .000

perpop65	.0619863 p = .734	.0611625 p = .737	-.1642341 p = .074	-.1640683 p = .074
perbl	-8.797484 p = .009	-8.62747 p = .011	.2073657 p = .775	.2207902 p = .763
peras	-.8362889 p = .182	-.8098176 p = .190	-.6038383 p = .008	.2207902 p = .008
constant	86.32867 p=.012	70.18068 p = .057	3.303192 p = .825	3.629328 p = .789

It is clear from our analysis that employment among women and mothers is a much weaker determinant of sales in the limited-service restaurant industry than the full-service industry. For example, while the variable corresponding to labor force participation among women/mothers was insignificant in only one of the six regressions corresponding to the full-service industry, it was an insignificant predictor of activity in the limited-service in five out of the six regressions[1]. This implies that traditional restaurants are far more sensitive to the changing pattern of female employment than are fast-food restaurants. Therefore, if women are substituting meals prepared outside of the home for those prepared within it, it appears that they are doing so at traditional, full-service restaurants.

Since labor force participation among women and mothers has its clearest effect on the full-service restaurant industry, the remainder of our analysis focuses on this relationship. Here, we find that labor force participation among mothers has a larger impact on restaurant sales than women in general. This can be seen in both the significance and coefficients of the explanatory variables through evidence provided by comparing the first two columns of Tables 2-4. In Table 2, the number of establishments per 10,000 people is regressed on the percent of women (mothers) in the labor force. While both regressors are significant at the 5 percent level, the

1 Here, significance corresponds to a p-values less than .1.

coefficient for labor force participation among mothers is twice that of women in general. Whereas an additional 1 percent increase in labor force participation among women corresponds to an increase in 1.9 establishments per million people, the corresponding coefficient for mothers is 2.8 establishments per million people. The comparison in Table 3 is less clear. While both regressors are statistically significant, the coefficient for labor force participation among women shows a slightly greater impact on employment in the restaurant industry than does that of mothers. However, in Tables 4 we see again that labor force participation among mothers is more significant than that of women. Here, it is shown that while involvement in the labor force among mothers is a significant predictor of the average amount spent by individuals at full-service restaurants, the corresponding variable for women is not. In fact, an additional one percent increase in labor force participation among mothers raises the amount that an average individual spends at full-service restaurants by about 55 cents per year.

The greater apparent influence that labor force participation among mothers has on the restaurant industry agrees with the hypothesis stated above, where time-constrained women will substitute restaurant-prepared meals for meals prepared within the home. Although this statement does not distinguish between mothers and non-mothers, it is likely that the impact on restaurant activity would be appear more distinct when solely looking at mothers rather than women in general. This is because women with children are more often charged with meal preparation within the family. Therefore, although it is true that a time constraint for any individual may cause that individual to prepare fewer meals at home, the impact on the restaurant industry will be most sizable when that individual is responsible for meal preparation for herself and her family.

Table 5: Effects of Labor Force Participation on Restaurant Activity

	Full-Service		Limited-Service	
	Women (perfem)	Mothers (perfemc)	Women (perfem)	Mothers (perfemc)
Establishments (estpth)	.0198 p= .030	.0281 p= .000	-.0017 p= .889	.0164 p = .125
Employees (empert)	.0050 p= .016	.0039 p = .030	.0037 p= .03	.00211 p = .141
Sales (salep)	.2370 p= .495	.5494 p= .061	.1337 p= .466	.1273 p= .413

Note: regression coefficients are given along with p-values

VI. Conclusion

As our results indicate, the substitution of restaurant-prepared meals for meals prepared within the home may indeed be an important mechanism by which increased labor force participation among women and mothers affects obesity rates within the United States. This lends significant support to an explanation for increasing obesity rates that is common within the literature: When women/mothers are employed, they (and their families) are more likely to eat out. Since restaurant meals often have more calories than their home-cooked counterparts, eating out contributes to obesity among children and adults.

It is interesting to note, however, that our results are far less conclusive for the limited-service industry; that is, fast-food restaurants are less affected by changes in employment among women than are traditional restaurants. This is most likely the result of a certain income effect. While women may substitute restaurant meals for meals made at home upon entering the labor force, this effect will be diminished for fast food if it is interpreted as an inferior good. Hence, the additional income from employment may offset the consumption of fast food in favor of meals at traditional restaurants. Determining whether this is the case should be the objective of future studies.

Regardless of the effects on the limited-service industry, the impact of female

employment on the full-service restaurant industry is clear. Further, this effect is intensified when considering mothers in particular as opposed to just women in general. Since women with children are most often responsible for meal preparation within the family, this result strengthens the connection between maternal employment and childhood obesity that is so prevalent in the literature. Future research should then focus on this link and determine to what extend we can attribute increased obesity rates among adults and children to the consumption of meals prepared outside of the home.

References

Anderson, Patricia M., Kristin F. Butcher , and Phillip B. Levine, 2003, "Economic perspectives on childhood obesity," *Economic Perspectives*, 3Q/2003, 30-48.

Anderson, Patricia M., Kristin F. Butcher , and Phillip B. Levine, 2003, "Maternal Employment and Overweight Children," *Journal of Health Economics*, 22(3), 477-504.

Chou, Shin-Yi, Michael Grossman, and Henry Seffer, 2004, "An economic analysis of adultobesity: results from the Behavioral Risk Factor Surveillance System," *Journal of Health Economics*, 23, 565-587.

Cohany, Sharon R., 2007, "Trends in labor force participation of married mothers of infants," *Monthly Labor Review*, February 2007, 9-16.

Ekelund, Robert B., and John Keith Watson, 2001, "Restaurant Cuisine, Fast Food and Ethnic Edibles: An Empirical Note on Household Meal Production," *Kyklos*, 44(4), 613-627.

Fertig, Angela, Gerhard Glomm, and Rusty Tchernis, 2006, "The Connection between Maternal Employment and Childhood Obesity: Inspecting the Mechanisms," CEPR Working Papers, 2006-020, 1- 33.

Friddle, Charlotte, Sandeep Mangaraj, and Jean Kinsey, 2001, "The Food Service Industry: Trends and Changing Structure in the New Millennium," The Retail Food Industry Center Working Paper 01-02, 1-65.

Ruhm, Christopher J., 2004, "Maternal Employment and Adolescent Development," NBER Working Papers, 10691, 1 – 54.

Reidpath, Daniel, Cate Burns, Jan Garrard, Mary Mahoney, Mardie Townsend, 2002, "An ecological study of the relationship between social and environmental determinates of obesity," *Health and Place*, 8, 141-145.

Vandegrift, Donald, Tommer Yoked, 2004, "Obesity rates, income, and suburban sprawl: an analysis of US states," *Health and Place*, 10, 221-229.