

# **Do Food Stamps Cause an Over-Consumption of Food?**

by

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## **Abstract**

This paper analyzes the effects of the federal food stamp program on the consumption of food and the potential effects the incidence of obesity among food stamp recipients. Obviously, an effective food stamp program will lead to an increase in the consumption of food. However, if the food stamp program, because of the fixed quantity nature of its implementation, has led to an “over-consumption” of food and increased incidence of obesity, then switching from a fixed quantity subsidy to a cash grant would reduce the incidence of obesity among the poor. To examine these issues, this paper starts with a theoretical analysis using a standard microeconomic model of consumer optimization to analyze the effects of a food stamp program on the consumption of food and the effect that switching from a food stamp program to a program that provides a cash grant has on food consumption. The paper then proceeds to examine data on the food stamp program and the incidence of obesity among various groups.

Obesity is increasingly being recognized as a serious health problem, not just domestically where the United States leads the world in obesity, but also worldwide.<sup>1</sup> According to the Center for Disease Control, it is estimated that approximately 65 percent of the US adult population is overweight, while 30 percent of the adult population is considered obese.<sup>2</sup> Along with the increased recognition of obesity as a serious health problem, there has also been an increased number of studies into its possible causes. For example, a recent study by the World Health Organization has attributed the increased incidence of obesity worldwide to an increase in the consumption of refined sugars added to today's foods.<sup>3</sup> In paper recently presented at the American Heart Association meetings, Pereira et al. (2003) the rise in obesity is attributed to an increased consumption of fast foods. Chou, Grossman and Saffer (2002) have attributed the increasing incidence of obesity to the increased rate of women working outside the home which has resulted in the increased consumption of food prepared outside the home, including fast food and the decreasing rate of smoking in the US population. Lakdawalla and Philipson (2002) attribute the rise in obesity to technological change that has simultaneously reduced the price of food and reduced the amount of physical activity needed for both home and market production. In addition to the above studies, there have also been attempts to link the federal food stamp program to the increase in obesity among the poor (Besharov 2002). The public policy ramifications of this association are clear. If food stamps have led to an increase in the rate of obesity among the poor, then one solution is to provide cash grants instead of food stamps to reduce the overindulgence of food by food stamp recipients. This conclusion is reached by

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<sup>1</sup> World Health Organization (2002).

<sup>2</sup> Centers for Disease Control and Prevention, National Center for Health Statistics.

<sup>3</sup> World Health Organization (2003).

employing a well known principle of microeconomic theory, which states that consumers will weakly prefer a cash grant to an equivalent in kind subsidy. That is, cash grants are Pareto preferred to food stamps, in that cash will not make any consumers worse off and will make some better off.

This paper begins with a detailed examination of the micro theoretic foundations underlying the relationship between food stamps and food consumption. Specifically, this paper examines how the food stamp program can lead to the over-consumption of food, what effect switching from a food stamp program to a cash grant will have on food consumption and which consumers respond to the so called “cash out”.<sup>4</sup> The paper then proceeds to examine data on the food stamp program and the incidence of obesity among various groups by race, gender, income and education.

To investigate the effects of a food stamp program on the consumption of food, consider a standard consumer optimization model in which the consumer acts to maximize utility  $u(x_1, x_2)$  by choosing the combination of two goods,  $x_1$  and  $x_2$ , that maximizes utility subject to the budget constraint  $I = x_1p_1 + x_2p_2$ .

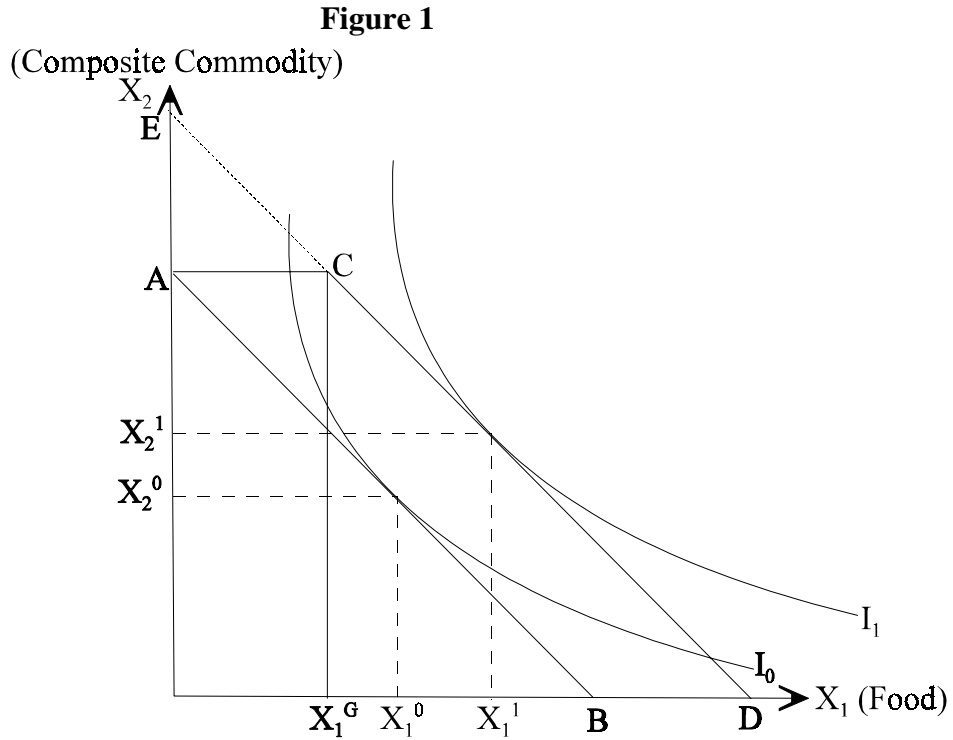
$$(1) \quad \underset{x_i}{\text{Max}} U(x_1, x_2) \text{ subject to } I = x_1p_1 + x_2 p_2, \forall i = (1, 2).$$

where  $I$  is an exogenous endowment and  $p_1$  and  $p_2$  are the prices of  $x_1$  and  $x_2$  respectively. Define  $x_1$  as food and  $x_2$  as a composite commodity consisting of all goods other than food. Assuming well behaved preferences<sup>5</sup>, optimization produces a unique solution  $x_i^* = x_i(p_1, p_2, I)$  for  $i = (1, 2)$ .

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<sup>4</sup> There are other programs that provide food to low income families including the school breakfast and lunch programs and the (WIC) program for women, infants and children.

<sup>5</sup> The utility functions have the usual conditions of being monotonic, continuously twice differentiable and strictly quasi-concave.



This is shown graphically in Figure One. Prior to the introduction of the food stamp program, the consumer chooses the utility maximizing consumption bundle  $(x_1^0, x_2^0)$ . Consider now the introduction a food stamp program which provides the consumer with  $fs$  dollars worth of food stamps which can only be used to purchase food. The food stamp program allows the consumer to purchase at least  $x_1^G$  units of food, where  $fs = x_1^G p_1$ . The inclusion of the food stamp program changes the budget constraint to  $I + x_1^G p_1 = x_1 p_1 + x_2 p_2$ . The effect of the food stamp program on the budget constraint is shown graphically in Figure One as a parallel shift in the budget constraint from  $AB$  to  $ACD$ . For a consumer who spent more on food prior to the institution of the food stamp program, the infra-marginal consumer, optimization in the presence of food stamps results in the utility maximizing demand function  $x_1(p_1, p_2, I) \geq x_1^G$ . In this case, the institution of the food stamp program is equivalent to a pure increase in income, and increases consumption of all normal goods. The increase in the consumption of food resulting from the

institution of the food stamp program is shown in Figure One as the increase from  $x_1^0$  to  $x_1^1$  while consumption of other goods increases to from  $x_2^0$  to  $x_2^1$ . It should be noted that, although the increase in consumption is usually considered an increase in the quantity of food, it could also be considered an increase in expenditures on food. These are not necessarily the same if the expenditures result in an increase in the consumption of higher quality food. If for example, fatty-foods are an inferior good, then the income effect caused by the food stamps would cause a decrease in consumption of fatty food and an increase in the consumption of healthier foods.<sup>6</sup> This is an especially important point as it relates to the problem of obesity, since an increase in the quality of food consumed may result in a lower incidence of obesity among food stamps recipients.

Note that the consumer shown in Figure One would be completely indifferent to a cash grant equivalent to  $x_1^G p_1$  dollars. A pure cash grant would have the effect of extending the budget constraint from the line segment CD to ED, resulting in no effect on the equilibrium consumption bundle of the consumer. More generally, those whose consumption of food prior to the institution of the food stamp program is greater than the amount provided by the food stamps will be indifferent between food stamps and a cash equivalent. These are referred to as infra-marginal consumers where the infra-marginal consumer is one for whom  $x_1^0 > x_1^G$ .

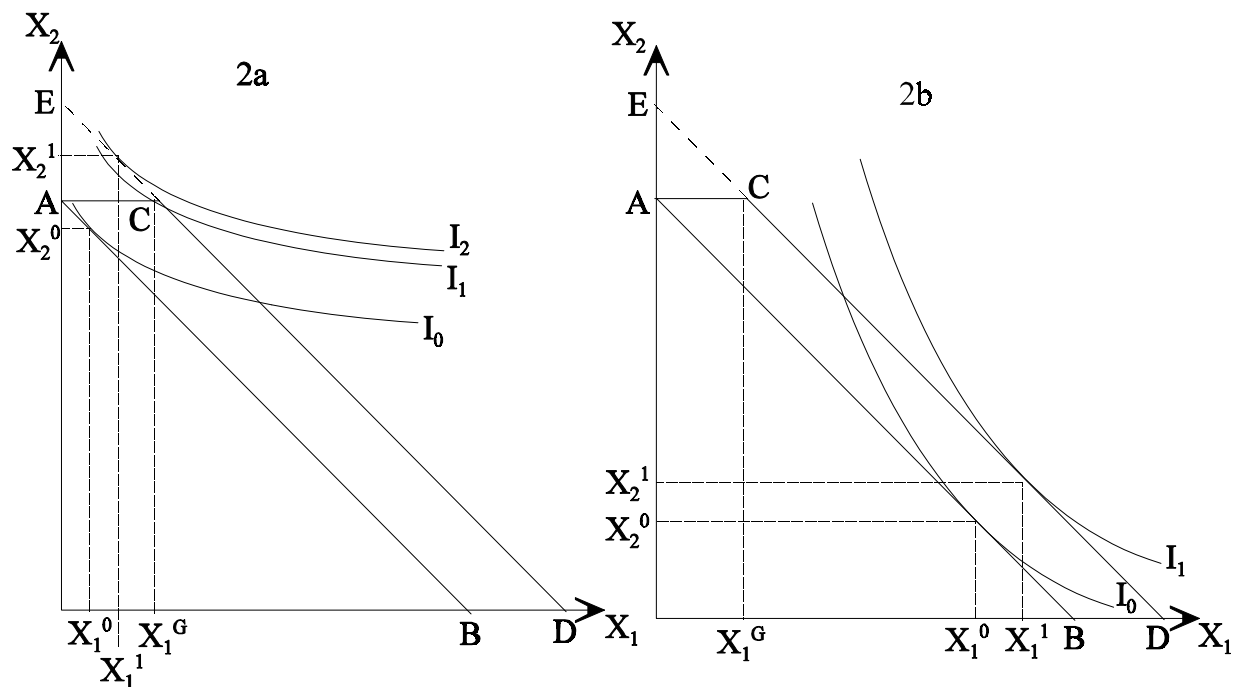
Those who would be made better off by the cash grant are those for whom the pre-food stamp consumption of food is less than that of the subsidized quantity,  $x_1^0 < x_1^G$ . For the supra marginal consumers, the optimization problem is

$$(2) \quad \underset{x_i}{\text{Max}} U(x_1^G, x_2) \text{ subject to } I = x_1^G p_1 + x_2 p_2, \forall i = (1, 2).$$

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<sup>6</sup> Higher quality food would include for example more fruits and vegetables.

Figure 2



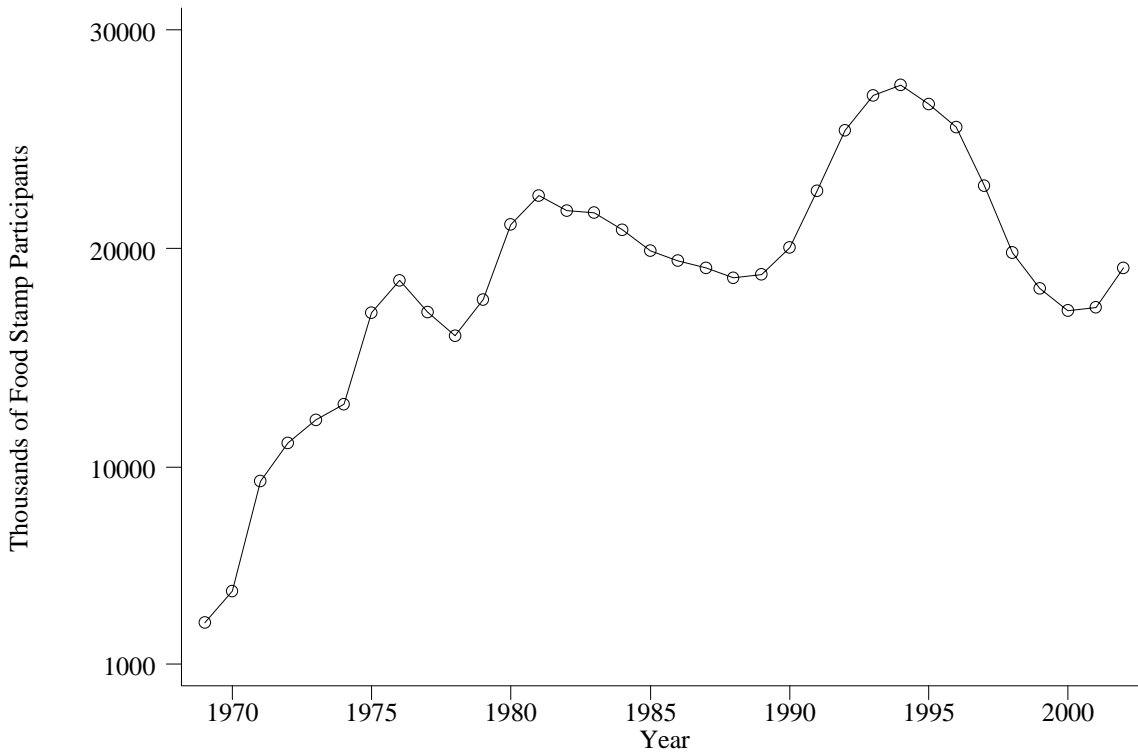
Optimization results in the consumer consuming  $x_1^* = x_1^G$  and  $x_2^* = x_2(x_1^G, p_2, I - x_1^G p_1)$ . This situation is shown graphically in Figure 2a. In the absence of the food stamp program, this consumer chooses the equilibrium consumption bundle  $(x_1^0, x_2^0)$  where  $x_1^0 < x_1^G$ . Given food stamps equal to  $x_1^G p_1$ , this consumer increases consumption to exactly that amount resulting in a corner solution in which the consumer spends all of his/her income on goods other than food. In this case the consumer is said to be over-consuming food since they are consuming more food than they would choose if given a cash equivalent of  $x_1^G p_1$ . Note that under the food stamp program, this consumer is made better off, shown graphically in Figure One as an increase in utility from  $I_0$  to  $I_1$ . However, Pareto improvement is possible, since if this consumer is given a cash grant, they could increase utility even more by choosing a quantity of food equal to  $x_1^1 < x_1^G$ . The effect on the budget constraint of switching from a food stamp program to a program that provides a cash grant is shown in Figure Two as a shift in the budget constraint from CD to ECD.

Given the preferences of the supra-marginal consumer, the cash grant allows the consumer to reach a higher indifference curve along the EC segment of the budget constraint. Clearly the consumer represented in Figure 2a has a relative preference for goods other than food. For comparison, Figure 2b shows a consumer with a relative preference for food, who is indifferent between the cash grant and the food stamps. The consumer shown in Figure 2b, like the consumer shown in Figure One, is an infra-marginal consumer.

The results of the theoretical analysis, shown in Figures One and Two, are clear. As long as food is a normal good, the food stamp program will increase the expenditures of food for all recipients. The effect on obesity, however, is ambiguous. If low quality foods are a normal good, then food stamps will result in an increase in the consumption of fat inducing foods thus contributing to obesity among food stamp recipients. However, if high quality foods are a normal good and low quality foods are an inferior good, then the effective increase in income resulting from the food stamps will reduce obesity.

What does the model say about the effect on food consumption of converting the food stamp program to a pure cash grant? To begin with, it is clear that a cash-out will have no effect on the infra-marginal consumer. Only those consumers constrained by the food stamp program, the supra marginal consumer, will reduce the optimal consumption of food when faced with a cash equivalent. Furthermore, those who reduce food consumption in response to the cash out, the supra-marginal consumers, are those who consume the least amount of food. Those who consume the most food, the infra-marginal consumers will not change their food consumption. Finally, if the proportion of infra-marginal consumers, which includes those with balanced preferences and those with a relative preference for food, is greater than that of the supra-marginal consumers, then a cash out of the food stamp program will not have a significant effect

**Figure 3**  
Food Stamp Participation 1969-2002 (Thousands)

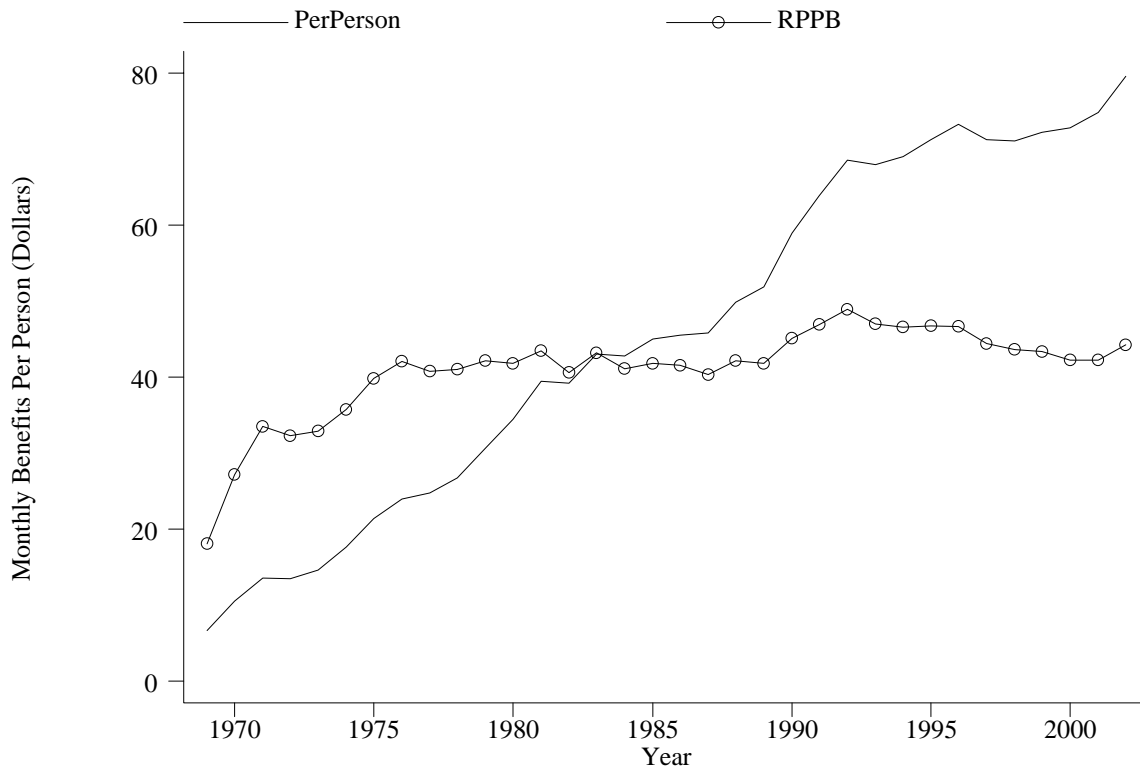


on the number of people reducing food consumption. Fraker (1990) estimates the proportion of constrained food stamp recipients to be between 5-15 percent while Whitmore (2002) estimates the proportion to be approximately 20-30 percent. Clearly, unconstrained or marginal consumers make up the bulk of food stamp recipients and would therefore result in a small proportion of people responding to the cash out of the food stamp program. Any subsequent effects on obesity would be minimal.

An examination of the data on food stamps and obesity further reveals the relationship between food stamps and obesity among the poor. Consider first the food stamp program. Although the food stamp program was established in 1964, reliable statistics are only available beginning in 1969. In 1969 there were nearly 3 million participants in the food stamp program, while in 2002 there were approximately 19 million. Figure Three shows the average

**Figure 4**

Nominal and Real Monthly Per Person Food Stamp Benefits 1969-2002 (Dollars)



participation in the food stamp program from 1969-2002. As can be seen from the graph, food stamp participation reached its peak in 1996 at approximately 25 million prior to the Welfare Reform Act of 1997. More relevant to the issue of individual food consumption is the average monthly benefits of those under the food stamp program. The monthly benefit available depends on a variety of factors including income and family size, and thus varies greatly, reaching a maximum of approximately \$465 per month for a family of four. However, the average monthly benefit is much lower. Figure Four shows nominal and real average monthly benefits per person from 1969 to 2002. As can be seen from Figure Four, while nominal monthly benefits have risen steadily throughout the period, inflation has depleted much of that growth resulting in virtually no change in real monthly benefits since the mid-1970's. For example, although the nominal average monthly benefit was approximately \$80 in 2002, the real value has remained

approximately \$45 per month for the last twenty five years.

Consider now the prevalence of obesity in the United States.<sup>7</sup> Because obesity was not always considered a disease, data on obesity are incomplete. However, the Center for Disease Control has collected data on obesity at various intervals starting in 1960. Table One shows obesity rates by gender, race and age group. For adults over the age of twenty the intervals are 1960-62, 1971-74, 1976-80, 1988-94 and 1999-2000. For children aged 6-11 and adolescents aged 12-19, the data provided are for those defined as overweight.<sup>8</sup>

The period for those aged 6-11 years old is the same as that covered for adults except for the starting period, which is 1963-65. For those aged 12-19, the period covered is the same as for adults except that the starting period is 1966-70. The data shown in Table 1 are shown graphically in Figures 5-7.

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<sup>7</sup> Obesity is defined as a Body Mass Index (BMI) greater than or equal to 30, where BMI is calculated as person's body weight in kilograms is divided by the square of his or her height in meters (i.e.,  $wt/(ht)^2$ ).

<sup>8</sup> Overweight is defined as a BMI at or above the 95 percentile for each group.

**Table 1****Group 1-Adults Over 20**

Year	All	Male	Female
60-62	13.3	10.7	15.7
71-74	14.6	12.2	16.8
76-80	15.1	12.8	17.1
88-94	23.3	20.6	26
99-00	30.9	27.7	34

**Group 2-Adults Over 20 by Gender and Race**

	White	White	Black	Black
Year	Male	Female	Male	Female
60-62	10.5	14.2	14	26.8
71-74	11.8	15.4	16.8	29.7
76-80	12.4	15.4	16.5	31
88-94	20.7	23.3	21.3	39.1
99-00	27.7	30.6	28.8	50.8

**Group 3-Children 6-11 by Gender**

	All	Boys	Girls
Year	Children	6-11	6-11
63-65	4.2	4	4.5
71-74	4	4.3	3.6
76-80	6.5	6.6	6.4
88-94	11.3	11.6	11
99-00	15.3	16	14.5

**Group 4-Children 6-11 by Gender and Race**

	White	Black	White	Black
Year	Boys 6-11	Boys 6-11	Girls 6-11	Girls 6-11
63-65	4.4	1.6	4.5	4.5
71-74	4.1	5.3	3.7	3.3
76-80	6.7	6.7	5.7	11.1
88-94	10.7	12.3	9.8	17
99-00	12	17.1	N/A	22.2

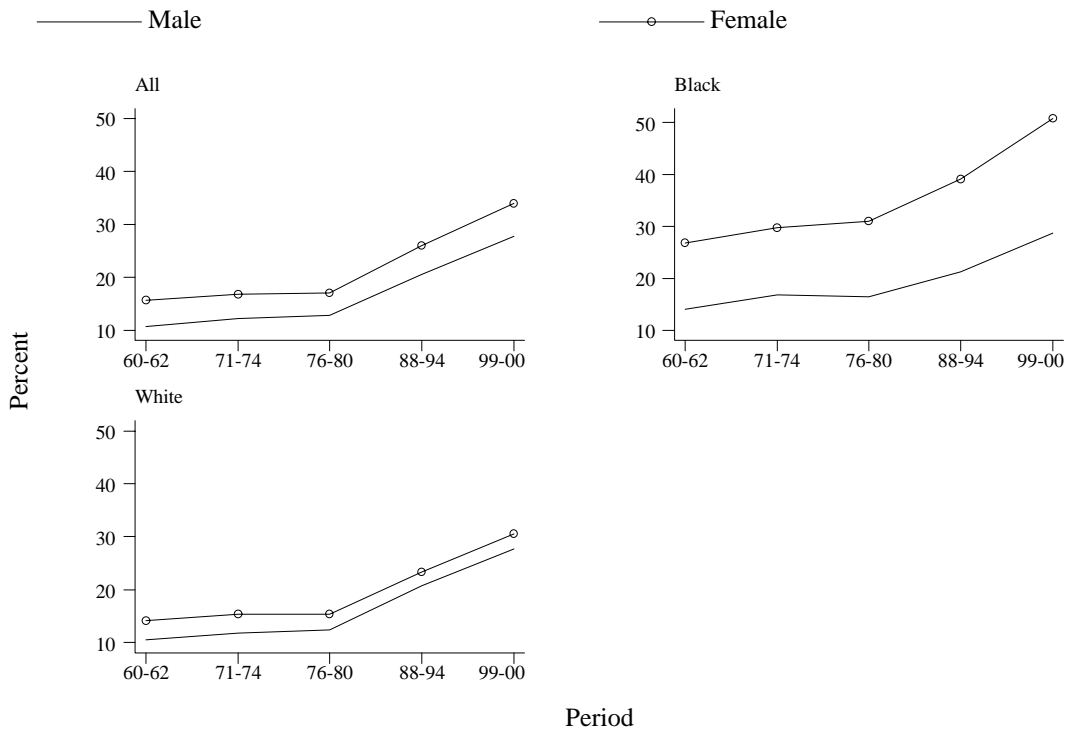
**Group 5-Children 12-19 by Gender**

	All	Boys	Girls
Year	12-19	12-19	12-19
66-67	4.6	4.5	4.7
71-74	6.1	6.1	6.2
76-80	5	4.8	5.3
88-94	10.5	11.3	9.7
99-00	15.5	15.5	15.5

**Group 6-Children 12-19 by Gender and Race**

	White	Black	White	Black
Year	Boys 12-19	Boys 12-19	Girls 12-19	Girls 12-19
66-67	4.7	3.1	4.5	6.4
71-74	5.5	5	6.1	10.1
76-80	4.6	4.8	4.7	10
88-94	11.6	10.7	8.9	16.3
99-00	12.8	20.7	12.4	26.6

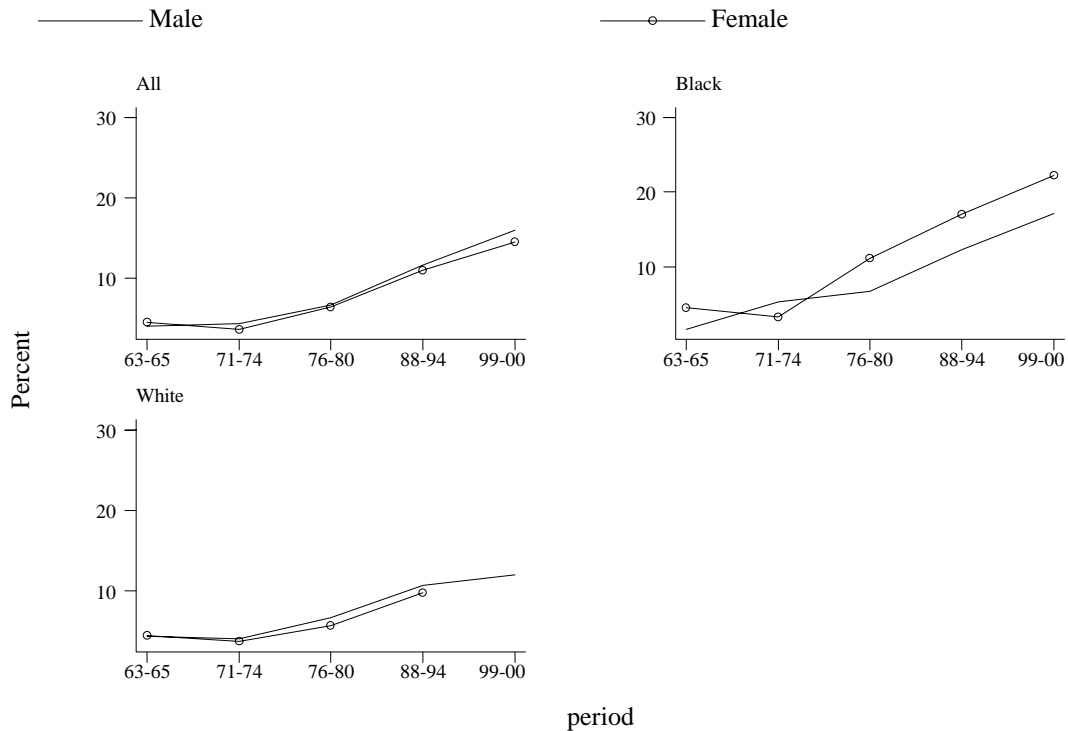
**Figure 5**



**Rates of Obesity for Adults by Race and Gender 1960-2000**

Consider first Group 1 shown in Figure 5, which includes all adults twenty and over, along with a breakdown for adult males and females. Two observations are evident from the graph of Group 1. The first is that the rate of obesity remained relatively flat until the period 1976-80, after which obesity began to rise precipitously. The second observation is that the rate of female obesity is persistently above that of males throughout the entire period. When adults are further broken down by race and gender, the same pattern of obesity emerges. However, Figure 5 does show that the rate of obesity for black females is significantly above that of white males and females and black males. According to the data, the rate of obesity for black females is approximately 15 percentage points greater than that of the general adult population for all periods observed, although following the same general pattern of growth of the other cohorts in that group. For example, in the first period observed 1960-62, the rate of obesity among black

**Figure 6**

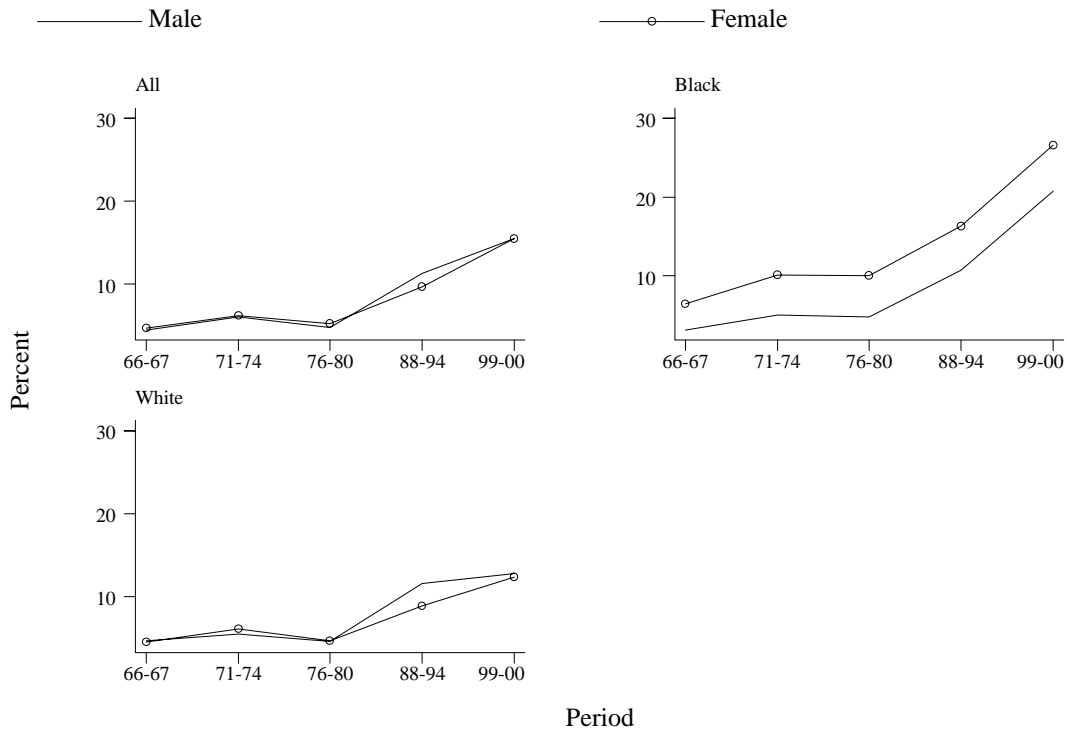


Rates of Obesity for Children Aged 6-11 by Race and Gender 1960-2000

females was approximately 27%, compared to about 13% for all adults, while in the most recent period observed, 1999-2000, the rate of obesity among black females reaches 50% compared to 31% for the adult population as a whole. While obesity has risen for the entire population as a whole, clearly the rate of obesity among black females has reached an epidemic proportion. However, the phenomena of black female obesity clearly pre-dates the institution of the food stamp program by at least a decade.

Figure 6 shows the data for children 6-11 years old. From Figure 6, you can see that the proportion of those overweight remains relatively flat from the period 1963-65 through 1971-74 and then begins to increase for both male and females. The break down of children by race and gender, Group 4, shows that the proportion of overweight black females 6-11 years old has risen much faster than their black male, white male and female counterparts.

**Figure 7**



**Rates of Obesity for Children Aged 12-19 by Race and Gender 1960-2000**

Figure 7 shows percentage of those overweight for Group 5, 12-19 year old adolescents by gender and race. From Figure 7 you can see that the percentage of those overweight begins to grow precipitously after the 1976-80 period. An examination of this same group by race and gender shows a similar pattern but again shows that the percentage of overweight black females 12-19 year olds is again consistently above that of the rest of the cohort.

Reliable data on obesity among food stamp recipients is not currently available, however data on obesity by income category does exist. Tables 2 and 3 provide data on the incidence of obesity by race and gender for different income groups. Table 2 shows data on obesity by income group while Table 3 provides data on the incidence of obesity by income group, where each income group is measured relative to the poverty level. If food stamps have

**Table 2**

Rates of Obesity

Income Category	1988-1991					
	Black		Mexican		White	
	Male	Female	Male	Female	Male	Female
Under \$10,000	23	53	33	52	33	43
\$10,000- under \$30,000	31	50	39	51	35	35
\$30,000- under \$50	34	54	45	43	36	37
Over \$50,000	42	49	48	42	31	27

contributed to the rising rate of obesity, then you would expect to observe a higher rate of obesity among lower income groups.

**Table 3**

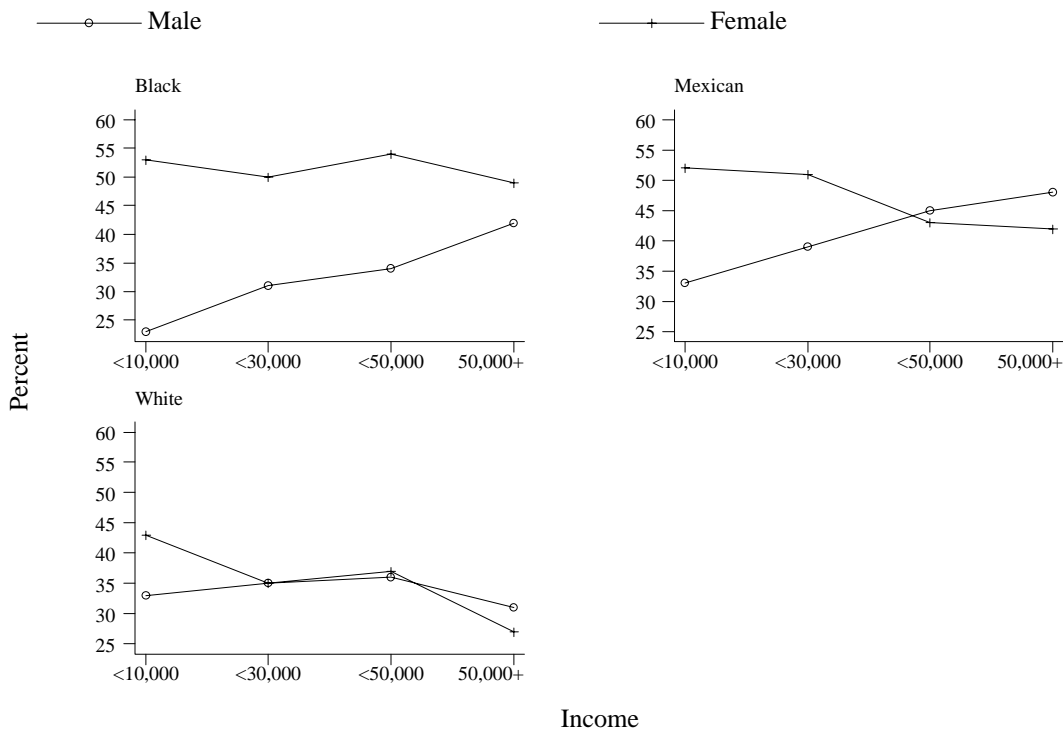
Rates of Obesity

Income Category Relative to Poverty	1988-1991					
	Black		Mexican		White	
	Male	Female	Male	Female	Male	Female
Below the Poverty Level	29.6	50	36.9	50.5	29.8	46.9
At or above the Poverty Level	32.8	49	40.6	44.4	32.3	30.1
Under 131% of the Poverty Level	28.4	51.1	37.2	50.3	33.3	44.7
131-350% of the Poverty Level	33.2	49	41.4	44.4	33.6	31.9
Over 350% of the poverty Level	36.4	46.1	46.1	40	28.7	26.4

The data on from Tables 2 and 3 are shown graphically in Figures 8 and 9.

Figure 8 does not indicate a clear relationship between obesity and income for any of the groups shown. For Black and Mexican males the incidence of obesity increases as income increases. For Black females there does not appear to be any correlation between obesity and income, while for Mexican females the incidence of obesity decreases as income increases.

**Figure 8**



**Rates of Obesity by Race, Gender and Poverty Status**

Similarly, the incidence of obesity for both White males and females decreases as income increases.

Figure 9 provides a graphical interpretation of the data in Table 3 where income is measured relative to the poverty level. The relationship between income and obesity becomes even more muddled when income is measured relative to the poverty level. The incidence of obesity is relatively constant for each group across all income levels. The only clear relationship that emerges from Figure 9 is that women have consistently higher rates of obesity across all racial groups and income levels.

**Figure 9**  
Obesity and Poverty by Race and Gender

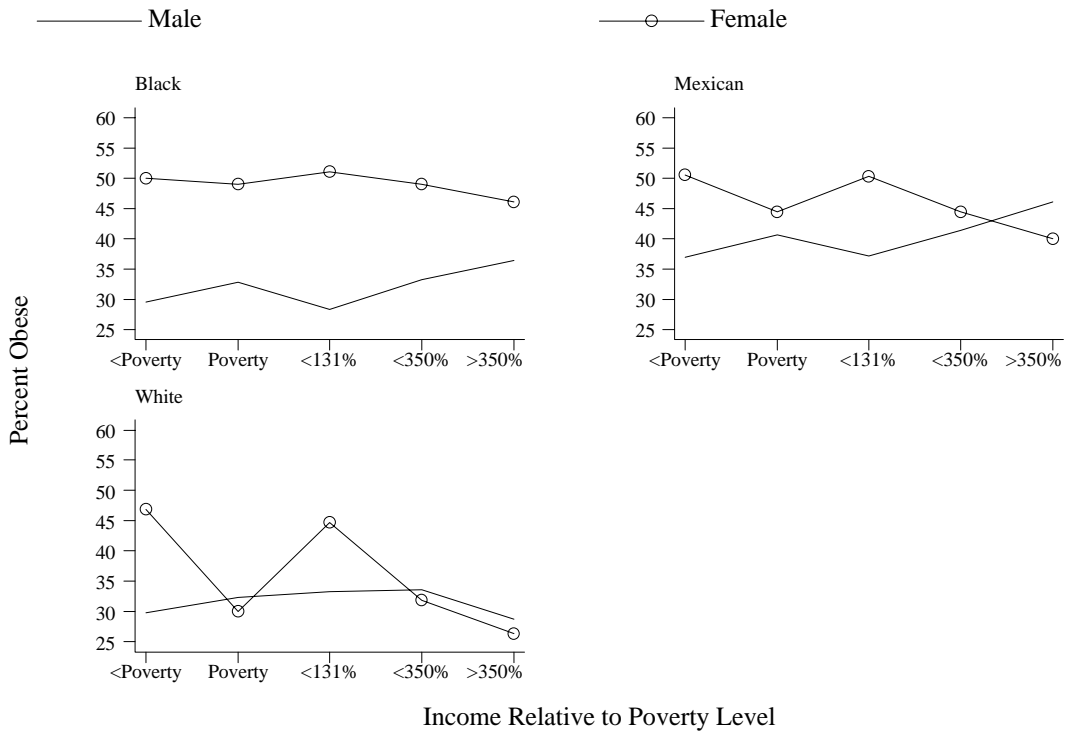
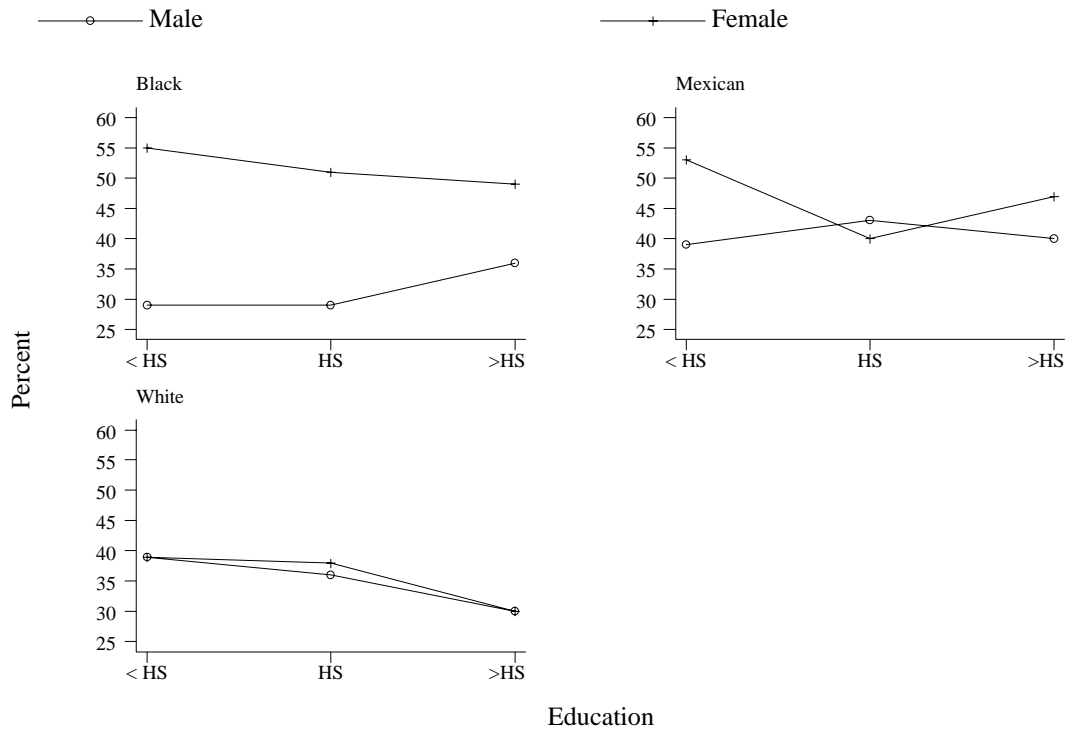


Table 4 provides the data on the incidence of obesity among various education groups by race and gender shown graphically in Figure 10. Obesity does appear to decrease as education increases for Black, Mexican and White women, however the incidence of obesity appears to increase among Black men and remains relatively constant across all education groups for Mexican men.

An examination of the available data does not indicate any relationship between obesity and food stamps. The only clear picture that emerges from the data is that women are afflicted by obesity at a much higher rate than men across income and education categories. This is especially true for Black women and to some extent for Mexican women, and occurs for the most part across income and education levels.

**Figure 10**



**Rates of Obesity by Race, Gender and Education**

**Table 4**  
Rates of Obesity  
1988-1991

Education Category	Black		Mexican		White	
	Male	Female	Male	Female	Male	Female
Less than 12 years of education	29	55	39	53	39	39
12 years of education	29	51	43	40	36	38
More than 12 years of education	39	49	40	47	30	30

**Conclusion**

It is clear that obesity has become a national health problem over the last ten to fifteen years, afflicting approximately thirty percent of the population. The problem of obesity,

however, has hit women, most notably minority women where obesity afflicts approximately half of all Black women, at a disproportionately higher rate than men. The relationship between food stamps and obesity is much less clear. Analysis using the standard consumer optimization model shows that food stamps do indeed have the intended effect of increasing expenditures on food. The effect on obesity, however, is ambiguous since the increase in income resulting from food stamps may induce a change in the types of food consumed. If low quality foods are a normal good, then food stamps result in an increase in the consumption of fat inducing foods and result in an increase in obesity among food stamp recipients. However, if high quality foods are a normal good and low quality foods are an inferior good, then the effective increase in income resulting from the food stamps will induce a substitution from lower quality foods to higher quality foods and reduce obesity. The degree to which low income families switch from low to high quality foods depends on the nutritional information possessed by low income families. It may be that low income consumers lack the nutritional education needed to make healthy diet choices. However, research shows that although low income consumers are not as nutrition conscious as high income consumers, low income families do choose similar diets to those of middle income consumers. Furthermore, the same research shows that food stamp recipients have diets similar to other low income families not receiving food stamps.<sup>9</sup> Whether or not food stamps induce recipients to change the mix of food consumed, food stamps will not necessarily increase the consumption of food beyond what most recipients would consume if given cash. Only those consumers with an extreme preference for goods other than food would be induced to consume more food under the food stamp program than they would under a program that provided an equivalent cash grant. Since these consumers are those who consume the least

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<sup>9</sup> Trippe (2000).

amount of food, it is highly unlikely that food stamps result in an increased incidence of obesity among these supra-marginal consumers. Consequently, a conversion of the food stamp program to a cash grant is unlikely to reduce obesity among food stamp recipients. Further doubt is cast upon the relationship between obesity and food stamps when data on food stamps, obesity and income are examined. The data fails to indicate a clear relationship between obesity and the implementation of the food stamp program. Nor does there appear to be any clear relationship between obesity and income or poverty status. The incidence of obesity among the most effected groups, namely females and most particularly minority females, predates the beginning of the food stamp program and occurs across income and education categories.

To be sure, the data examined in this paper are discrete and highly aggregated. Clearly, as better data becomes available, more research needs to be conducted. Nevertheless, the findings of this paper do not support, either theoretically or empirically, a causal link between food stamps and obesity. As a result, a move from a fixed quantity food stamp program to a program that provides a cash grant is unlikely to have any effect on the very real problem of obesity among the poor.

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