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I'm not fat, just too short for my weight

Family Child Care and Obesity in Germany

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Abstract

Obesity is increasing worldwide for both adults and children. Genetic disposition is responsible for some variation in body weight but cannot explain the dramatic increase in the last two decades. The increase must be due to structural and behavioral changes. One such behavioral change is the increase in working females in the last decades. The absence from the mother reduces potential child care time in the family. Reduced child care time may have adverse effects on the prevalence of obesity in children and adults. This paper analyzes the effect of mother's labor supply in childhood on young adults probability of being obese in Germany. Using a sample drawn from the German Socio-Economic Panel the results show that a higher labor supply of the mother increases the probability for her child to be obese as young adult. This result underlines the importance of childhood environment on children's later life outcome and the importance of behavioral changes in explaining the increase in obesity.

JEL Classification: I12, J22, D10

Keywords: GSOEP, obesity, female labor supply, child care, sibling estimation

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Introduction

> Overweight and obesity may not be infectious diseases, but they have reached epidemic proportions in the Unites States. ... Approximately 300,000 death a year in this country are currently associated with overweight and obesity. Left unabated, overweight and obesity may soon cause as much preventable disease and death as cigarette smoking. (*D. Satcher, M.D.,Ph.D., Surgeon General, 2001*)

The quotation of D. Satcher, U.S. Surgeon General documents the importance and tragedy of overweight and obesity. In the U.S. obesity increased form 15 in the late 1970s to 23 percent in 1988 - 1994 survey to 27 percent in the 1999 (U.S. Department of Health and Human Services, 2001). The increase in obesity is worrisome because obesity has negative health and economic consequences. Obese people have a higher mortality risk from coronary hearth diseases and a higher morbidity risks for chronic diseases including diabetes mellitus, hypertension, several cancer types, musculoskeletal disorder, sleep apnea and gallbladder disease (Pi-Sunyer, 1993, Finkelstein, Fiebelkorn and Wang, 2004). The higher risk of chronic diseases and the required medical treatment increase personal and public health cost. Obese have 36 percent higher average medical costs than normal weight people and health costs related to obesity are four percent of total health costs in Germany (Schneider, 1996, Sturm, 2002). Estimates for the U.S. show that total obesity related public health costs are around six percent of total expenditures (Finkelstein, Fiebelkorn and Wang, 2004). Beside higher health risks and costs obese people are discriminated in the labor market. Studies for the U.S. of the return on investments in appearance related human capital reveal lower earnings for obese. A body weight difference of 65 pounds (29.4 kg) is equivalent to a wage effect of roughly 1.5 years of education or of three years work experience (Cawley, 2004). A study by Hamermesh and Biddle (1994) show a earnings plainness penalty of five to ten percent and a beauty premium between four and five percent. Using a sample of 23 to 31 Averette and Koreman (1996) find beside other results robust evidence of labor market discrimination against obese women.

The obesity epidemic is not only restricted to the U.S. The WHO documents (WHO, 2000), that the prevalence of obese people has grown worldwide.

[Table 1 about here.]

Table 1 shows, for some selected countries, the trends in in obesity. Most of the countries have dramatic increases in obesity for men and women. Only Canada, the Netherlands and Japan report small decreases in obese women in the observed years. In Europe the prevalence of obese people increased as well and Germany does not make an exception in the worldwide obesity growth. Between 1985 and 2002 moderate obesity (BMI $\geq$ 30) increased form 16.2 to 22.5 percent and 16.2 to 23.5 percent for male and female Germans, respectively. The increase in pronounced obesity (BMI $\geq$ 35) increased in the same time from 1.5 to 5.2 percent for males and from 4.5 to 7.5 percent for females. Obese people have mostly a low educational status, low occupational status and low household incomes (Helmert and Strube, 2004). Toschke et al. (2005) show with data for 19 years old Germans from the medical examination for military service that obesity increased between 1889 and 1998 from 3.4 to 5.7. They comment that obesity prevalence is inversely related to educational level but the increase is unrelated to educational level. The impact of obesity on health cost or economic outcomes for Europe is not as well documented as for the U.S.. Comparing the U.S. and Germany reveals that only U.S. women have a BMI penalty on labor earnings (Cawley, Grabka and Lillard, 2005). A comparison of nine European countries shows a reduction in earnings of 3.3 and 1.9 percent for men and women respectively for a BMI increase of ten percent. This effect is larger in Southern Europe countries compared to Northern Europe countries due to different culture and labor markets (Brunello and D'Hombres, 2007).

To lower the increase in obesity the determinants and their impact on the increase have to be identified. If the determinants are not known the design of policy reforms is not fruitful. unfortunately obesity is determined by multiple factors like genetic, cultural, socio-economic or behavioral factors. All of these factors on their own or in combination could be a source for the increase in obesity. The underlining genetic disposition did not change in the last 20 years and therefore cannot explain the increase in obesity on its own. One's genetic disposition may favor or hamper the occurrence of obesity for different persons with different life styles and in different environments. The growth must be due to structural and behavioral changes in the last two decades (Rössner, 1998). Technological change substitutes low-physical-energy for high-physical-

energy work and lowers energy expenditure. Individuals pay nowadays for physical activity (costs of gym, forgone leisure time) rather be paid for it. Therefore obesity is avoidable if benefits of not being obese are larger than the costs of behavioral changes (Philipson and Posner, 2003). Lakdawalla and Philipson (2002) support the technological change hypothesis adding technological change in agriculture. Agricultural innovations lower food prices and the costs of energy intake. Together with more sedentary jobs this may explain the long run growth in body weight. The increasing division of labor in food preparation lowers the time price of food. Centralized food preparation allows a rapid consumption (microwave meals, preprocessed food) and increased the quantity of consumed meals (Cutler, Glaeser and Shapiro, 2003). The transformation of the urban structure is an other possible explanation of the increase in obesity. More homogeneous districts make it almost impossible to find grocery stores in walking distance compared to mixed-used neighborhoods. The reduction in walking time in exclusive residential neighborhoods has a significant positive effect of being obese (Ewing et al., 2003). Mela (2001) shows that food choice is important in the probability of being obese. Differences in food likes and dislikes develop through life due to food experiences and learned eating habits. Overweight and obese individuals show a tendency toward energy-dense food, which contribute to the development and maintenance of these conditions. Individual consumption preferences today and health tomorrow is an other explanation of obesity. Weight control requires to forgo current consumption and investments in physical activity for future health. Higher valuation of consumption today leads therefore to weight gain (Komlos, Smith and Bogin, 2004).

A further structural reason for the increase in obesity in the last two decades may be changes in family structures. The importance of family background on children's development or later life achievements is a field of comprehensive research. It is well documented that disadvantaged family background has significant negative effects on children's later life outcomes. For the U.S. studies show that raised in non-intact families is associated with more emotional, behavioral or academic problems and lower self-rated health (Kovar, 1991, Gorman, Heard and Kapinus, 2006). Family structure can constrain economic and social resources such as parent's ability to spend time with their children, supervision by homework or monetary expanses. Time spent with children has

positive effects on educational and social outcomes (Schneider, Atteberry and Owens, 2005). An example for economic constraints is shown in Mahler and Winkelmann (2006). The authors show that children raised in single parent households have lower educational attainments than children raised in intact families. In traditional families, two biological parents and where the father is working whereas the mother stays at home, child care is mostly the job of the mother and 24 hours a day available. In the last years this traditional family structure was challenged by other forms like women living alone with their child, being divorced or living in other family arrangements like apartment-sharing communities or patch-work families. The biggest change occurred in the traditional families, where more and more married women start working. The fraction of working married women increased from little over 40 percent in 1970 to almost 70 percent in 2000 with a steep increase in the mid 1980s (Merz, 2006). In this families child care time by the mother is clearly reduced if no other person takes care of the child when the mother is working.

In the light of the above mentioned research the increase in female labor supply in traditional families, with reduced child care potential, rises the question of adverse effects on children's later life outcomes. This paper investigates the effect of an increase in mother's labor supply on young adults probability of being obese. The basic idea is that different female labor results in different hours of child care. Less child care time is assumed to lead to a higher probability of being obese as young adult. For the U.S. Anderson, Butcher and Levine (2003) show that if the mother worked more hours per week over child's life the more likely the child is obese. They found that this negative effect is stronger in families with a higher socio-economic background. Mothers with a low socio-economic background may not provide healthy food or active play time with their children because of the insecure neighborhood they live in. In this cast the time constraints due to work has no effect on child's probability of being obese. Mothers with a high socio-economic background may provide their children with healthy food or active play time due to higher financial opportunities and more secure neighborhood. With less hours worked a day the mother has more time for childcare, cooking or organizing sports and to provide a day-to-day routine for her child.

The working hypothesis in this paper is that reduced child care time in childhood increases the probability of being obese as young adult. To identify this effect we use only two parent families

and the fact that in the last years more married women worked. In families where to mother works the potential supervision time is reduced in comparison to families where the mother is not working. Less parental supervision may lead to obesity through two channels. Firstly by a direct impact in childhood, less sport and more high calorie food and secondly the child may adopt to a more sedentary life style and move less as young adult and therefore be more likely to be obese. We explain the empirical approach further in the next section. The analysis is based on a sample drawn from the German Socio-Economic Panel (GSOEP) and restricted to young adults who were raised their whole childhood in a two parent family. The data, selected sample and used variables are presented in section three. We find that reduced supervision time, measured with mothers absence due to work, increases the probability of being obese as young adult. Section four presents a comprehensive discussion of the results. We believe that this finding is important because it shows firstly the relevance of child care and secondly it may help to reduce the increase in obesity by finding appropriate policy conclusions.

Empirics

A person's weight is mostly determined by that person's diet, physical activities and to some degree by the genetic disposition. To illustrate this think of a balance. One scale represents a person's energy intake and in the other scale that person's energy expenditure. If that person eats then the energy intake scale is filled and heavier than the empty energy expenditure scale. As time goes by the body uses the stored energy and the balance returns into the initial equilibrium. If a person's energy intake is higher than his energy expenditure then the balance has an overweight on the energy intake side and one's energy balance is positive and the body stores the excess energy as fat. When the energy balance of a person is positive over a longer time then the stored energy remains in the body and the person gains weight. If now the ratio of body weight to body height squared (kg/m^2), the so called BMI, is over 30 then that person is obese (WHO, 2000).

In childhood physical activity and diet depend mostly on parental decisions. In this toy model mother's absence from home may influence a person's energy balance in two ways. The first one is a short term effect (during childhood) and the second one can be seen more as a long term

effect (transmission of behavior). In the short term the absence of the mother affects child's energy intake as well as his energy expenditure. In the absence of the mother the child may watch TV (Proctor et al., 2003, Andersen et al., 1998) or he cannot go out for sports because the way to sports facilities is to far. Another reason may be that the neighborhood does not allow to let the child play outside alone. Here when the mother is working the child has to stay at home. This decreases energy expenditure due to lower physical activity. To use our picture of the balance, given a constant energy intake, the pointer moves toward energy storage because the energy cannot be used. On the energy intake side the mother may return tired from work and has no time or will to prepare proper cooked meals. The alternative may be fast food or preprocessed meals to heat up in the microwave. Both substitutes are more energy dense than proper cooked meals and energy intake is higher. Again the pointer of the balance moves toward energy storage. This effects taken together increase the probability of a child being overweight or obese in childhood (Anderson, Butcher and Levine, 2003) and subsequent are at higher risk of being obese as adults (Whitaker et al., 1997, Wright et al., 2001).

The long term aspect is that the child learns and adopt a behavioral pattern of eating habits and physical activities. On the one hand the parental sedentary life style may transmit to the child because he did not experience a more active childhood. On the other hand he may stick to preprocessed or fast food due to a lack of the knowledge how to cock proper meals.

Energy intake and expenditure and therefore a person's BMI and the probability of being obese, $P(O)$ depends on that persons childhood family background, CFS and socio-demographic factors, X

$$BMI = f(CFS, X)$$

$$P(O) = f(CFS, X).$$

The controls can be grouped in three categories. The first group includes variables related to a person's childhood. This variables control for the living area, if that persons lived as child in the former GDR and the variables of interest parental labor supply. The regional variables control for the higher female labor supply and better child care facilities in the former GDR. They also control for the following argument. If the child is home alone and is supposed to eat more

and move less a supply of high energy food or the possibility of watching TV must be available. Mother's labor supply is a proxy for potential reduced child care. If two families are compared and in one family the mother is working and in the other not then this variable should measure the effect of reduced child care. The second group includes information about childhood family living conditions. We control for parental education as proxy for childhood household income, parental BMI to control for genetic disposition and family life style. A higher BMI may indicate a more sedentary life style and we proxy the quality of family life with a dummy indicating if that person had conflicts as 15 years old with his father or mother. The last group sums actual (as young adult) personal characteristics like age and gender.

For the econometric analysis of the binary dependent variable obesity we use a standard logit model (Wooldridge, 2003). The probability of being obese is represented in the latent function

$$O^* = \beta_0 + \beta_1 CFS + \beta_2 X + u,$$

where CFS includes childhood family structure controls, X is a vector of socio-demographic variables and u is standard logistic distributed error term. Obesity is equal to one if the latent variable O^* is greater than zero and zero otherwise

$$O = \begin{cases} 1 & \text{if } O^* > 0 \quad \text{“Obese”} \\ 0 & \text{if } O^* \leq 0 \quad \text{“otherwise”} \end{cases}$$

The OLS regression model for young adult's BMI is specified as follows

$$BMI = \alpha_0 + \alpha_1 CFS + \alpha_2 X + v,$$

CFS and X represent the same variables as in the latent obesity function. v is a standard error term.

In the pooled sample an observation may appear in both years. Ignoring this would lead to biased standard errors due to the correlation of the two observations. Therefore the standard errors are calculated as Huber White standard errors.

Both specifications may suffer from unobserved family heterogeneity. Unobserved factors like parental involvement or the quality of the time spent with the children may be correlated with parental schooling. When higher educated parents spend time with her children then this

time may be more productive than by lower educated parents. This correlation leads to biased estimators. Two prominent ways to deal with unobserved heterogeneity, IV estimation or fixed effects models are not possible to apply. For the former a plausible instrument is not available. A possible instrument one can think of could be to use the average female labor supply in the same city or federal state and age or age group for the actual labor supply of the mother. This variable is certainly correlated with actual labor supply of the mother and probably uncorrelated with potential unobserved heterogeneity. But this information is maybe not available or hard to receive. A fixed effects approach would erase all constant information on a person's childhood and delete the variables of main interest in this paper. This can be omitted using a sibling setup. If the parental behavior is independent of characteristics of the individual children then omitted family effects can be captured in a family specific error term ω_j. The BMI of a sibling ship can then be expressed as

$$y_{1j} = \beta_1 X_{1j} + \omega_j + \epsilon_{1j} \tag{1}$$

$$y_{2j} = \beta_2 X_{2j} + \omega_j + \epsilon_{2j} \tag{2}$$

where y_{ij} is the outcome for child i in family j, X_{ij} is a vector control variables, ω_j a family specific error term and ϵ_{ij} a standard error term, assumed to be orthogonal to X_{ij} and ϵ_{ij}. Estimates of equations (1) and (2) are biased when the family specific error term, ω_j, correlates with X_{ij}, which is very likely. For example family life style may be correlated with parental schooling.

Taking the difference from equation (1) and (2) eliminates the family specific error term ω_j and leaves the reduced form

$$\Delta y_j = \lambda \Delta X_j + \xi_j$$

where $\Delta y_j = (y_{1j} - y_{2j})$ is the BMI of the older sibling minus the BMI of the younger sibling. Analogously $\Delta X_j = (X_{1j} - X_{2j})$ is the difference in the control variables of the siblings and ξ_j is a standard error term.

The sibling estimator has some caveats as well. First, unobserved family heterogeneity. The environment (outside stimuli) may change from one sibling to the other. The father may become unemployed in the meantime or the family structure may change. To reduce this problem and

to ensure a family environment as similar as possible we focus only on families with 15 years of marriage.

The second caveat is the difference between the observable variables between siblings near together. Think about twins as an extreme example. The familial environment does not vary between the two. As closer the siblings are born the more likely the variation in the variables is little.

Data

The data for this analysis are drawn from the German Socio-Economic Panel (GSOEP). The information about the actual demographic life situation stems from the 2002 and 2004 surveys, whereas the information about childhood specific life situation and socio-economic background the biography files are used (see SOEP Group, 2001, Haisken-DeNew and Frick, 2002 for further details). We tranformed the information from the spell data into variables measuring the duration of full time or part time work of both parents. We constructed a time window when the young adult was between zero and 15 years old and adjusted the beginning of this window, i.e. young adults birth year, with the respective year in the parental job trajectory. This procedure allows us to count the years of full and part time labor supply of the parents during young adult's childhood.The other variables are directly taken from the respective data file. Table 2 describes the used variables for the analysis. As lined out above we only keep observations who spent their entire childhood, zero to 15 years of age, with both biological parents. Further we restricted the sample to observations who are in the age range of 18 to 25, which we define as young adulthood. The two files for 2002 and 2004 are then pooled and we merged it withe the respective childhood information. Finally observations with missing values in one of the variables are dropped. The final sample consists of 1641 observations, where for 519 observations information is available for both years and for 603 observations information is either available for 2002 or 2004. 47 of the 1641 observations or around three percent of the sample are obese. This is slightly lower than the official statistics. According to the official statistic 3.5 percent of the persons in the respective age range are obese.

For the sibling sample we did not restrict the age to 25. The reason is to increase the sample size. When a family has more than two children we only keep the two youngest siblings. The sample has 818 observation with 33 being obese. The sample includes not only same gender siblings. We included also mixed siblings to increase the sample. Around 49 percent are same gender siblings and around 51 percent are mixed gender siblings.

[Table 2 about here.]

Table 3 shows the means of the parental labor supply variables. The upper panel shows the means for the full sample and the lower panel shows the means for the sibling sample.

[Table 3 about here.]

72 percent of the mothers of obese young adults worked at least once compared to only 61 percent in the non obese sample. Additional to the higher labor supply mothers of obese young adults work with an average of 5.96 years of full time work longer compared to four years in the non obese group. This difference is statistically significant (t-statistic of -2.54). Father's full time labor supply is statistically not different. Fathers in the obese and non obese group work 12.66 and 12.04 years respectively. Mothers of obese young adults work 2.87 years part time whereas mothers from non obese young adults work on average 3.21 years part time. The difference is statistically not different. Part time employment of fathers is negligible with 0.13 and 0.18 years in average for the obese and non obese group respectively. To sum up we conclude that mothers of obese young adults have on average a higher labor force participation and work more years full time than mothers of non obese young adults. Fathers full and part time employment does not differ between the groups. This underlines the above formulated hypothesis that missing child care time may affect the probability of being obese as young adult.

Comparing obese young adults with non obese young adults in a sibling ship we do not find a different pattern as in the full sample. Mothers of obese young adults have a higher labor force participation with 79 percent compared to 54 percent in the non obese group. Average years of full time work of mothers in the obese group is 6.8 years and four years in the non obese group. This difference is statistical significant (t-value 2.911). Mother's in the obese group work less

part time than mothers from non obese young adults with 2.6 and 3.2 years respectively but the difference is not statistically significant. Father's full time and part time labor supply does not differ between the groups.

[Table 4 about here.]

Table 4 presents the means of the other control variables. The first two columns present the means for the full sample and the next two columns for the sibling sample. First we describe the full sample. The socio-demographic variables we use show that males are more obese than females, whereas age is slightly higher in the obese group. Mother's schooling is 11.6 and 12.6 years for the obese and non obese group. Father's schooling is 11.5 and 13 years in the two groups. Parental education is statistically higher in the group of the non obese young adults with t-statistics of 2.25 and 3.33 for the mothers and fathers, respectively. Better education may lead to better nutrition and more physical activity or the family may, due to potentially higher household income, afford to live in a better neighborhood, better food or to hire a nanny. The conflict potential is slightly higher in the obese group. 21 percent of the obese young adults have problems with her parents and 17 an 14 percent of the non obese young adults have problems with her mother and father respectively. Parental BMI and the fraction of obese parents of obese young adults is higher. This may support the assumption made above that BMI may capture on the one hand genetic disposition and on the other hand intergenerational transmission of life style. A dramatically higher fraction of obese parents in the group of obese young adults underlines this assumption. With respect to the living areas the two groups do not differ.

In the sibling sample the pattern is similar. The mean BMI and age in the sibling sample are higher than in the full sample because we dropped the age restriction in the sibling sample. The age range in this sample is 17 to 47 years. As in the full sample father's education is statistically significant between obese and non obese young adults (t-value 1.84) but in contrast mother's education is statistically not different between the two groups. The conflict potential with parents is slightly lower in the sibling sample and similar for both groups.

As mentioned above the sibling sample allows us the take the differences between the siblings of non constant variables. The differences are shown in table 5.

[Table 5 about here.]

The mean differences in BMI is roughly 0.6 with a minimum of 16 and a maximum of 24 points difference between the older and the younger sibling. The differences in mother's full time labor supply is roughly 0.1. The extremes go from -14 to 10 years. The mean age differences between the two siblings is three years with a minimum of zero and a maximum of 12 years. The only positive values of the east dummy shows that when one of the siblings moved he moved to West Germany.

Results

The results are discussed in their direction and significance and focuses on variables defining parental working time. The descriptives show that mothers of obese young adults work more years full time than mothers of non obese young adults and have therefore less potential child care time. The question is now if mother's working time affects young adults probability of being obese or not if we control for socio-demographic factors.

[Table 6 about here.]

Table 6 presents the regression results. We estimate two specifications of the logit model. In model (1) we only include parental labor supply as the years of full time work. In model (2) we additional include the years of parental part time work. We first discuss the results of model (1) and then the additional findings of model (2) are discussed.

In model (1) maternal full time labor supply is statistical significant an positive. The longer the mother works full time the higher is the probability for young adults being obese. Father's full time labor supply has no significant effect.

Father's education has a negative significant effect on young adult's probability of being obese. The negative effect of father's education may point to the importance of income and education in the prevention of obesity. In the same direction point the negative, but not significant, effect of mother's schooling. The quality of family life does not affect the probability of being obese significantly. The positive point estimate indicates that conflicts in childhood at home may

increase the probability of being obese. Genetic disposition and parental life style, measured with parental BMI, has a positive ans significant effect on young adults probability of being obese. Through which channel parental BMI affect young adults obesity cannot be separated here. It could be interesting to analyze the potential of behavioral transmission from parent to child and how strong the genetic disposition transmit from parent to child. Male young adults have a higher probability of being obese than female young adults. The controls for living place, living in the former GDR before 1989 and living in an urban area, has no effect on one's probability of being obese. The results of the socio-demographic factors are in line with research for the U.S. (Classen and Hokayem, 2005).

In model (2) we added years of part time work to control for potential influences of higher child care time when working part time. Unfortunately we cannot determine if the part time work is more prominent when the children are young to analyze a potential timing effect. With the data at hand we find no no significant effect of part time work. The other controls have the same sign and significance as in model (1).

In Model (3) we regress one's BMI on the usual set of control variables. We find a statistically positive effect of potential child care time on young adult's BMI. One additional year of mother's full time work increases the BMI 0.04 points. This effect is little compared to father's schooling or parental BMI. In contrast to the models (1) and (2) in model (3) age and living in East Germany before 1989 are statistically significant. The positive effect of age is in line with previous research that BMI increases with age. The negative sign of east points to the possibility that in East Germany preprocessed and high energy food was not available.

[Table 7 about here.]

Table 7 presents the results of the sibling difference estimation. The difference in mother's full time labor supply of a sibling ship on the difference in BMI is positive and significant. If the mother worked more years full time in one sibling's childhood than in the other sibling's childhood the sibling with less maternal support has a higher BMI. This result underlines the previous mentioned observation, that mother's labor supply as a proxy for child care time has a positive effect on young adult's BMI and probability of being obese.

[Table 8 about here.]

Table 8 shows the marginal probability effects of selected variables from Model 2. The mean probability of being obese is 2.86 percent. An additional year of mother's full time work increases the probability of being obese 0.003 percentage points. The size of the effect is comparable to an additional year of parental schooling.

Conclusion

In this paper we analyze the effect of mother's child care on young adults probability of being obese. The absence of the mother at home may favor the increase in obese people. Using data from the German Socio-Economic Panel we conclude that mother's absence from home when working increases the probability of children being obese as young adults. Including part time work, to control for more potential child care time, does not change the effect of mother's full time work. A sibling estimation using the difference in siblings BMI as defendant variable underlines the found relationship between mother's labor supply or the other way around mother's potential child care time and body weight as young adult. This finding for Germany contributes to the understanding of the increase in obesity. This result is supported when we use a sibling estimation approach to better control for unobserved family heterogeneity. The results show that BMI difference can be explained with a difference in mother's full time labor supply and therefore less potential child care time.

With the data at hand we cannot control for actual child care time or other persons taking care of the child during childhood. This is a limitation of the study but should not reduce the result that child care time of the mother may influence obesity in later life. This could be a point where further research could step in. This would require a detailed data set of a child's care and who provides it. The question if child care by an other person replaces child care by one's mother is important for policy conclusions. If mother's child care is more effective than child care provided elsewhere then for example an increase in day care facilities would not help to combat the obesity epidemic.

Even though this limitation we provide, to our knowledge, a first insight in the relation between

obesity in young adulthood and mother's potential child care time for Germany with a large scale data set. A secondly novelty we apply a sibling estimation the context of the German Socio-Economic Panel.

References

Andersen, R. E. et al. (1998): "Relationship of Physical Activity and Television Watching With Body Weight and Level of Fatness Among Children," *Journal of the American Medical Association*, 105(2), 260 - 275.

Anderson, P. M., K. F. Butscher and P. B. Levine (2003): "Maternal employment and overweight children," *Journal of Heath Economics*, 22, 477 - 504.

Averett, S. and S. Korenman (1996): "The Economic Reality of the Beauty Myth," *Journal of Human Resources*, 31(2), 304 - 330.

Brunello, G. and B. D'Hombres (2007): "Does body weight affect wages? Evidence from Europe," *Economics and Human Biology*, 5, 1 - 19.

Cawley, J. (2004): "The Impact of Obesity on Wages," *Journal of Human Resources*, 39, 452 - 474.

Cawley, J., M. M. Grabka and D. R. Lillard (2005): "A Comparison of the Relationship Between Obesity and Earnings in th U.S. and Germany," *Schmollers Jahrbuch*, 125, 119 - 129.

Classen, T. and C. Hokayem (2005): "Childhood influences on youth obesity," *Economics and Human Biology*, 3, 165 - 187.

Cutler, D. M., E. L. Glaeser and J. M. Shapiro (2003): "Why Have Americans Become More Obese?," *Journal of Economic Perspectives*, 17(3), 93 - 118.

De Galdeano, A. S. (2005): "The Obesity Epidemic in Europe," *IZA Discussion Paper*, 1814.

Ewing, R. et al. (2003): "Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity," *American Journal of Health Promotion*, 18(1), 47 - 57.

Finkelstein, E. A., I. C. Fiebelkorn and G. Wang (2004): "State-Level Estimates of Annual Medical Expenditures Attributable to Obesity," *Obesity Research*, 12(1), 18 - 24.

Gorman, B. K., H. E. Heard and C. A. Kapinus (2006): "Family Structure, Parent-Child Relationships, and Self-Rated Health in Adolescence and Young Adulthood," Unpublished Manuscript.

Haisken-DeNew, J. P. and J. R. Frick (2002): "Desktop Companion th the German Socio-Economic Panel Study," *DIW Berlin*.

Hamermesh, D. S. and J. E. Biddle (1994): "Beauty and the Labor Market," *American Economic Review*, 84(5), 1174 - 1194.

Helmert, U. and H. Strube (2004): "Trends in the Development and Prevalence of Obesity in Germany Between 1985 and 2002," *Gesundheitswesen*, 66, 409 - 415.

Komlos, J., P. Smith and B. Bogin (2004): "Obesity and the Rate of Time Preferences: Is there a Connection?," *Journal of Biosocial Science*, 36, 209 - 219.

Kovar, M. G. (1991): "New from NCHS," *American Journal of Public Health*, 81(11), 1526 - 1528.

Lakdawalla, D. and T. Philipson (2002): "The Growth of Obesity and Technological Change: A Theoretical and Empirical Examination," *NBER Working Paper*, 8946.

Mahler, P. and R. Winkelmann (2006): "Secondary School Track Selection of Single-Parent Children - Evidence from the German Socio-Economic Panel," in: Weiss, M. (Hrsg.) *Evidenzbasierte Bildungspolitik: Beiträge der Bildungsökonomie*, Duncker & Humbolt, Berlin, 39 - 54.

Mela, D. J. (2001): "Determinants of Food Choice: Relationships with Obesity and Weight Control," *Obesity Research*, 9(S 4), 249S - 255S.

Merz, M. (2006): "Collective Female Labor Supply: Evidence from Germany," *Manuscript, University of Bonn*.

Philipson, T. J. and R. A. Posner (2003): "The Long-Run Growth in Obesity as a Function of Technological Change," *Perspective in Biology and Medicine*, 46(S 3), 87S - 107S.

Pi-Sunyer, F. X. (1993): "Medical Hazards of Obesity," *Annals of Internal Medicine*, 119(7[P 2]), 655 - 660.

Proctor, M. H. et al. (2003): "Television viewing ans change in body fat from preschool to early adolescence: The Framingham Children's Study," *International Journal of Obesity*, 27, 827 - 833.

Rössner, S. (1998): "Childhood obesity and adulthood consequences," *Acta Paediatr*, 87, 1 - 5.

Schneider, B. (1996): "Relevanz und Kosten der Adipositas in Deutschland," *Ernährungs-Umschau*, 43(10), 369 - 374.

Schneider, B., A. Atteberry and A. Owens (2005): *Family Matters: Family Structure and Child Outcomes*, Alabama Policy Institute, Alabama.

SOEP Group (2001): "The German Socio-Economic Panel (GSOEP) after more than 15 years - Overview," In: Holst E., Lillard D. R. and DiPrete T. A. (Hg.): Proceedings of the 2000 Fourth International Conference of German Socio-Economic Panel Study Users (GSOEP 2000), *Vierteljahreshefte zur Wirtschaftsforschung*, 279(12), 938 - 942.

Sturm, R. (2002): "The Effects of Obesity, Smoking, and Drinking on Medical Problems and Costs," *Health Affairs*, 21(2), 245 - 253.

Toschke, A. M., R. Lüdde, R. Eisele and R. von Kreis (2005): "The obesity epidemic in young men is not confined to low social classes - a time series of 18-year-old German men at medical examination for military service with different educational attainment," *International Journal of Obesity*, 29, 875 - 877.

U.S. Department of Health and Human Services (2001): *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*, Public Health Services, Office of the Surgeon General, Rockville, MD.

Whitaker, R. C. et al. (1997): "Predicting Obesity in Young Adulthood from Childhood and Parental Obesity," *New England Journal of Medicine*, 337(13), 869 - 873.

WHO (2000): "Obesity: Preventing and Managing the Global Epidemic," *WHO Technical Report*, 894.

Wooldridge, J. M. (2003): *Introductory Econometrics, A Modern Approach.* Thomson, Ohio.

Wright, C. M. et al. (2001): "Implications of childhood obesity for adult health: findings from thousand families cohort study," *British Medical Journal*, 323, 1280 - 1284.

Tables

Table 1: Increase in obesity in selected countries worldwide

Country	Men	Women	Years	Reference
Brazil	3.1 - 5.9	8.2 - 13.3	1975 - 1989	WHO, 2001
Canada	6.8 - 9	9.6 - 9.2	1978 - 1988	
England	6 - 15	8 - 16.5	1980 - 1995	
Finland	10 - 14	10 - 11	1978 - 1993	
Netherlands	6 - 8.4	8.5 - 8.3	1987 - 1995	
Italy	7.9 - 9	6.6 - 7.4	1998 - 2001	De Galdeano, 2005
Spain	12.9 - 14	11.8 - 13	1998 - 2001	
Greece	9.8 - 10.1	9.3 - 10.2	1998 - 2001	
Austria	10.8 - 11.4	9.9 - 10.9	1998 - 2001	
Australia	9.3 - 11.5	8 - 13.2	1980 - 1989	WHO, 2001
Japan	0.7 - 1.8	2.8 - 2.6	1976 - 1993	

Table 2: Description of variables

Variable	Description
Mother Full time (Dummy)	Equal to one if mother was at least working one year full time, child aged 0 to 15
Mother Full time	Mother full time labor supply measured in years, child aged 0 to 15
Father Full time	Father full time labor supply measured in years, child aged 0 to 15
Mother Part time	Mother part time labor supply measured in years, child aged 0 to 15
Father Part time	Father part time labor supply measured in years, child aged 0 to 15
BMI	BMI of young adult, BMI = kg/m^2
Age	Age of young adult, measured in years
Male	Gender of young adult, equal to one if young adult is male, zero otherwise
Mother School	Schooling of mother, measured in years
Father School	Schooling of father, measured in years
Conflict w/ Mother	Equal to one if young adult had problems with mother during childhood, zero otherwise
Conflict w/ Father	Equal to one if young adult had problems with father during childhood, zero otherwise
BMI Mother	BMI of mother, BMI = kg/m^2
BMI Father	BMI of father, BMI = kg/m^2
Mother obese	Equal to one if mother's BMI ≥ 30, zero otherwise
Father obese	Equal to one if father's BMI ≥ 30, zero otherwise
Urban	Equal to one if childhood spent in a village, city or big city, zero otherwise
East	Equal to one if young adult lived in East Germany before 1989, zero otherwise
Δ BMI	Difference in sibling's BMI
Δ Age	Difference in sibling's age
Δ Mother Full time	Difference in sibling's mother full time work
Δ Father Full time	Difference in sibling's father full time work
Δ Mother Part time	Difference in sibling's mother part time work
Δ Father Part time	Difference in sibling's father part time work
Δ Conflict w/ Mother	Difference in sibling's problem with mother
Δ Conflict w/ Father	Difference in sibling's problem with father
Δ Male	Difference in sibling's gender

Table 3: Obesity and potential child care time, Means

Full sample Variable	Obese	Non Obese
Mother Full time (Dummy)	0.72	0.61
	(0.066)	(0.012)
Mother Full time	5.96	4.00
	(0.829)	(0.130)
Father Full time	12.66	12.04
	(0.684)	(0.130)
Mother Part time	2.87	3.29
	(0.601)	(0.112)
Father Part time	0.13	0.18
	(0.072)	(0.023)
N	47	1594
Sibling sample Variable	Obese	Non Obese
Mother Full time (Dummy)	0.79	0.54
	(0.072)	(0.018)
Mother Full time	6.82	4.00
	(1.000)	(0.194)
Father Full time	13.39	13.11
	(0.684)	(0.149)
Mother Part time	2.55	3.22
	(0.780)	(0.168)
Father Part time	0.12	0.11
	(0.084)	(0.026)
N	33	785

Standard errors in parentheses.

Table 4: Means by Obesity and Sample

	Full sample		Sibling sample	
Variable	Obese	Non Obese	Obese	Non Obese
Socio-demographic variables				
BMI	32.56	21.83	33.26	22.01
	(0.599)	(0.069)	(0.893)	(0.102)
Age	21.15	20.38	23.30	21.96
	(0.352)	(0.054)	(0.666)	(0.137)
Male	0.74	0.51	0.76	0.54
	(0.064)	(0.013)	(0.076)	(0.018)
Family background variables				
Mother School	11.63	12.55	11.74	12.53
	(0.382)	(0.069)	(0.454)	(0.102)
Father School	11.54	13.03	12.12	13.18
	(0.294)	(0.076)	(0.455)	(0.117)
Conflict w/ Mother	0.21	0.17	0.12	0.14
	(0.060)	(0.009)	(0.058)	(0.012)
Conflict w/ Father	0.21	0.14	0.15	0.13
	(0.060)	(0.009)	(0.063)	(0.012)
BMI Mother	29.25	25.13	29.47	25.24
	(0.934)	(0.117)	(1.048)	(0.180)
BMI Father	30.23	26.78	29.81	26.63
	(0.629)	(0.088)	(0.531)	(0.114)
Mother obese	0.40	0.12	0.45	0.11
	(0.072)	(0.008)	(0.088)	(0.011)
Father obese	0.47	0.16	0.48	0.13
	(0.074)	(0.009)	(0.088)	(0.012)
Urban	0.55	0.65	0.61	0.61
	(0.073)	(0.012)	(0.086)	(0.017)
East	0.28	0.27	0.36	0.22
	(0.066)	(0.011)	(0.085)	(0.015)
N	47	1594	33	785

Standard errors in parentheses.

Table 5: Means sibling differences

Variable	Mean	Min	Max
Δ BMI	0.555	-16.38	24.73
	(0.222)		
Δ Mother Full time	0.099	-14	10
	(0.109)		
Δ Father Full time	-0.003	-14	15
	(0.151)		
Δ Mother Part time	-0.453	-14	14
	(0.131)		
Δ Father Part time	-0.059	-12	2
	(0.035)		
Δ Age	2.96	0	12
	(0.099)		
Δ Conflict w/ Mother	0.015	-1	1
	(0.022)		
Δ Conflict w/ Father	0.020	-1	1
	(0.022)		
Δ Male	0.005	-1	1
	(0.036)		
Δ Urban	-0.036	-1	1
	(0.012)		
Δ East	0.003	0	1
	(0.003)		
N	393		

Standard errors in parentheses.

Older - Younger Sibling.

Table 6: Regression results full sample, dependent variable: Obesity (Model 1 and 2), BMI (Model 3)

Variable	Model 1	Model 2	Model 3
Mother full time	0.102†††	0.107†††	0.039†
	(0.037)	(0.041)	(0.023)
Father full time	0.017	0.012	-0.005
	(0.041)	(0.043)	(0.0189)
Mother part time		0.011	0.018
		(0.044)	(0.020)
Father part time		- 0.070	-0.018
		(0.167)	(0.099)
Mother School	- 0.069	- 0.067	0.001
	(0.096)	(0.097)	(0.039)
Father School	- 0.114†	- 0.116†	-0.079††
	(0.063)	(0.064)	(0.035)
Conflict w/ Mother	0.387	0.390	0.015
	(0.423)	(0.422)	(0.256)
Conflict w/ Father	0.306	0.292	-0.029
	(0.431)	(0.438)	(0.286)
BMI Mother	0.089†††	0.090†††	0.139†††
	(0.026)	(0.026)	(0.026)
BMI Father	0.158†††	0.157†††	0.167†††
	(0.036)	(0.037)	(0.027)
Urban	- 0.079	- 0.072	-0.308
	(0.381)	(0.384)	(0.203)
Male	1.051†††	1.051†††	1.553†††
	(0.414)	(0.415)	(0.187)
Age	0.089	0.091	0.138†††
	(0.075)	(0.076)	(0.037)
East	- 0.148	- 0.152	-0.434†
	(0.414)	(0.416)	(0.236)
Intercept	- 11.396†††	- 11.399†††	11.806†††
	(2.456)	(2.481)	(1.185)
Log-likelihood	-174.525	-174.441	
χ^2	59.99	60.11	
F (15, 1121)			15.98
R^2			0.187

Notes: Adjusted (1122 clusters) standard errors in parentheses.
Significance levels: † 10 percent, †† 5 percent, ††† 1 percent.
$N = 1641$, time dummy included in all models

Table 7: Regression results sibling differences, dependent variable: Δ BMI

Variable	Model 4
Δ Mother full time	0.228†
	(0.135)
Δ Father full time	0.009
	(0.062)
Δ Mother part time	0.090
	(0.081)
Δ Father part time	0.114
	(0.223)
Δ Conflict w/ Mother	0.004
	(0.786)
Δ Conflict w/ Father	-0.637
	(0.923)
Δ Urban	0.656
	(1.178)
Δ Male	1.198†††
	(0.409)
Δ Age	0.106
	(0.114)
Intercept	0.296
	(0.421)
F (9, 243)	1.72
R^2	0.064

Notes: $N = 393$, Adjusted (244 clusters) standard errors in parentheses.
Significance levels: † 10 percent, †† 5 percent, ††† 1 percent.

Table 8: Marginal Probability Effects, Logit Obese Yes/No

Variable		Variable	
Mother Full time	0.003	Mother Part time	0.001
	(0.001)		(0.001)
Father School	-0.003	Mother School	-0.002
	(0.002)		(0.002)
BMI Father	0.004	BMI Mother	0.002
	(0.001)		(0.001)

Bootstrapped standard errors in parentheses.

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