Untangling the Direct and Indirect Effects of Body Mass Dynamics on Earnings

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1 Introduction

In this study we aim to assess the effect of body mass on earnings. It has been shown that the body mass of white females is negatively correlated with wages (Cawley, 2004). We argue that this observed correlation may capture the influence of body mass on life-cycle decisions such as educational attainment, work experience, marital status, and fertility, which, in turn, determine wages. Similarly, these behaviors may impact body mass over the life cycle. Admittedly, body mass may still have an observed direct impact on wages if weight affects productivity on the job (which, in most data sets, is immeasurable) or if discrimination (also immeasurable) exists. To disentangle these direct and indirect effects we propose to model wages of individuals while jointly explaining accumulation of education and work experience, the decisions to work, to marry, and to have children, and the evolution of body mass over time.

Observed wages of employed individuals provide us with the distribution of accepted wage offers. We would like to know whether variations in particular individual characteristics significantly explain variation in observed wages. However, two potential sources of bias compromise evaluation of the role of these characteristics. The first is selection; the second is endogeneity.

Labor economics informs us that we need to account for the decision to work in order to understand which individual characteristics explain variations in observed wages. That is, individuals who chose to work for wages are a self-selected group of people: only those with wages above an individual reservation wage will choose to work. Reservation wages are determined by both observed and unobserved individual characteristics. For example, a college educated new mother may be quite capable of earning a good wage (i.e., based on her observed education and work experience, etc.), but, given her desire (i.e., an unobserved - by the econometrician - characteristic) to be at home with her new baby, the minimum wage at which she would enter employment is quite high. Other women with the same observed characteristics and a lower reservation wage might work. This selection into working will result in biased coefficients on explanatory variables if the selection into employment is not modeled jointly with the observed wages.

In addition to selection, which produces a non-random group of people for whom wages are observed, many of the characteristics that explain variation in wages and employment are endogenous. These include educational attainment, work experience, marital status, and number of children. That is, unobserved characteristics that explain these (time-varying) decisions may also explain differences in wages of individuals who choose to work. In order to compute an unbiased effect of these individual characteristics on observed wages, we must account for any unobservables that influence them as well as wages. For example, someone with high self-esteem may be more likely to marry and more likely to earn high wages. We want to disentangle causation from spurious correlation.

We use data from the National Longitudinal Survey of Youth (NLSY, 1979 cohort) and construct a research sample of individuals who are followed annually from the ages of 18-26 in 1983 through the ages of 37-45 in 2002. These twenty years of data on individual decision-making and body mass evolution provide a quite comprehensive picture of life changes from young adulthood to middle age. While there has been much research focusing on the health of children, adolescents, the near elderly, and the elderly, relatively little research focuses on the health and productivity of prime age individuals who constitute the bulk of our nation's workforce.

Because we model many individual decisions and outcomes (e.g., education, employment, marriage, children, wages, and body mass) that are potentially correlated through unobserved permanent and time-varying individual characteristics, we use an estimation framework that simultaneously explains variation in the multiple behaviors by variation in both observed and unobserved factors. We model the unobserved factors using a discrete non-linear random effects method that does not require us to make assumptions about the distribution of these unobservables. After estimating unbiased effects of variables of interest, we are able to simulate the effects of changes in body mass during the late teens on later life outcomes. In particular, we direct our attention to understanding the effects of body mass on the productivity of employed individuals as measured by wages.

2 Review of the Relevant Literature

An association between obesity and labor market outcomes, particularly wages, has been documented in the economic literature. The majority of these studies estimate a reduced-form static model of the relationship between body mass and wages. A few exceptions explore the underlying mechanisms behind the relationship (Harper, 2000; Baum and Ford, 2004; Bhattacharya and Bundorf, 2004; Carpenter, 2006; Han, Norton, and Stearns, 2009; Han, Norton, and Powell, 2009). Harper (2000) shows a positive effect of being physically attractive on the probability of working in managerial or professional specialty and clerical occupations for women. However, physical attractiveness is not found to be associated with sorting into customer-oriented occupations and also no wage differences are found between non-attractive and attractive women in customer-oriented jobs in the same study. Baum and Ford (2004) examine four potential pathways linking obesity to labor market outcomes: less productivity due to health problems from obesity (measured by health limitations), less investment in human capital by obese workers (measured by work experience), employer distaste for obese employees due to high health care cost (measured by employer provision of health insurance), and consumer distaste for obese workers (measured by classification of occupation as customer-related). Bhattacharya and Bundorf (2004) report no statistically significant wage differential between obese and non-obese individuals by employer provided health insurance coverage. Carpenter (2006) shows that the employment rate increased 4% for obese women and 2% for obese men compared to their respective non-obese counterparts after a 1993 court case, Cook vs. Rhode Island, in which a federal appeals court ruled that obesity is covered under the Rehabilitation Act of 1973 and the Americans with Disabilities Act. Han, Norton, and Powell (2009) examine the direct effect of body mass on wages and the indirect effects operating through education and occupation choice. They find that education is the main pathway for the indirect effect. Greater body mass for both women and men in their late teenage years decreases the stock of education acquired by the early thirties which affects wages. The total wage penalty associated with body mass is underestimated by 18% for women. They also find that occupations requiring interpersonal skills with presumably more social interactions show a larger negative relationship between body mass and wages for women.

Only a few of the studies attempt to address the potential endogeneity of body mass, typically measured by a body mass index (BMI) or an obesity indicator (Averett and Korenman, 1996; Pagan and Davila, 1997; Behrman and Rosenzweig, 2001; Cawley, 2004; Baum and Ford, 2004; Conley and Glauber, 2005; Norton and Han, 2008). Instrumental variable techniques require that the body mass measure be replaced by a variable that is correlated with body mass in the current period, but uncorrelated with wages in the current period. Instrumental variables (IVs) used in the previous literature include a lag of respondents' own body weight or BMI (Averett and Korenman, 1996; Conley and Glauber, 2005), or siblings' or children's BMI (Cawley, 2000; Cawley, 2004). The lag of current BMI is not a valid instrument if there is any serial or inter-temporal correlation in the wage residuals. Likewise, children's body weight is not a valid instrument if unobserved heterogeneity in the wage residual associates with both children's body weight and the mother's employment behavior. Siblings' BMI also is not a valid instrument if siblings share unobserved endowment factors that influence earnings. Norton and Han (2008) use genetic variation among young adults to identify their model (using multiple instruments). They find no statistically significant effect of adolescents' BMI on wages in young adulthood.

To our knowledge, there is only one economic study that estimates the effect of body mass on wages in a structural framework (Tosini, 2008). This paper tries to disentangle the direct and indirect effect of body mass on wages by modeling the probability of marriage, spousal incomes, and education. Using the National Longitudinal Survey of Youth 1979, Tosini solves and estimates the individual optimization problem and provides estimates of the policy-invariant structural parameters of the individual's per-period utility function, along with (own and spouse) wage distributions and marriage offer distributions. Results from a dynamic model show that characteristics formed before leaving school explain approximately one-fifth of the cross-sectional variation in obesity at age 30. Results also show that white women who are most likely to become obese receive 56% lower wages. Furthermore, the author finds that obese women are less likely to be married, and the incomes of their spouses are likely to be 9% lower than non-obese women.

Regardless of the estimation techniques in the previous economic studies, most studies report gender differences in the association between obesity and wages. Only women consistently show a statistically significant negative association of BMI or obesity with hourly wages (Averett and Korenman 1996; Cawley 2004; Baum and Ford 2004; Conley and Glauber 2005; Han, Norton, and Stearns 2009). BMI is also associated with women's total household income by affecting their spouses' earnings and occupational prestige (Conley and Glauber, 2005). Some studies also report racial differences in the association between body mass and labor market outcomes for women. For example, Cawley (2004) reports that only white women's hourly wages are associated with their body mass.

Some studies assess the association of obesity on labor market outcomes at the extensive margin by measuring its effect on the probability of employment or the different effect by different job sectors. Cawley (2000) finds no statistically significant effect of obesity on the amount of paid work and limitations on types of paid work. Morris (2007) estimates a negative relationship between obesity and the probability of employment for British people for both genders. Paraponaris and colleagues (2005) report that a one standard deviation increase of BMI from the mean at age 20 raises the percentage of time spent unemployed during the working years and lowers the probability of employment after a period of unemployment for both genders. Pagan and Davila's (1997) study reports that both obese men and women are less likely to sort into managerial, professional and technical occupations among fourteen Census occupation categories.

There are also a few papers estimating the effect of obesity on educational achievement. Some studies report no effect of obesity on grade point average among adolescents (Crosnoe and Muller, 2004), scores on Peabody Individual Achievement Tests among pre-teen children (Kaestner and Grossman, 2009), and grade progression and drop out status (Kaestner, Grossman, and Yarnoff, 2009) among adolescents. In contrast, Sabia (2007) reports that white female adolescents have a grade point average penalty for being obese, whereas non-white female and male adolescents do not. However, Sabia (2007) uses parent-reported self-classification for obesity as an IV for adolescent BMI, which is not likely to be a valid IV if parents' self-classification for obesity reflects the level of their self-esteem or time preference and will not be excluded from their children's educational achievement.

We extend the literature in several dimensions. First, we analyze the effects of body mass on wages using yearly observations on a cohort of individuals followed for twenty consecutive years. This point of reference allows for a better understanding of both body mass and wage dynamics and provides a perspective that differs from repeated cross-sectional analyses. We are able to quantify the effects of (and determinants of) body mass as an individual ages, and broaden the interpretation from one of aggregate time effects to individual behaviors. Second, we jointly model, along with the evolution of body mass and wages, several individual behaviors that may be affected by body mass and that also explain observed wage variation. Hence, we are able to decompose the correlation between body mass and wages reported in the literature into indirect and direct causal influences. Third, we allow body mass to influence wages differently at different points of support of the wage distribution. Similarly, we allow determinants of body mass to have different effects at different points of the support of its distribution. We do so by estimating the density of both wages and a body mass index, rather than explaining only one moment (e.g., the mean) of each distribution. We are able to estimate the conditional densities for wages and body mass jointly with endogenous behaviors that determine both wages and body mass, and hence allow for permanent and time-varying observables and unobservables that affect all outcomes.

3 Description of the Research Sample

The National Longitudinal Survey of Youth (NLSY) provides data on a 1979 cohort of 12686 individuals aged 17 to 21 followed annually through 1994. These individuals (and an additional cohort of adolescents that we do not include) continue to be followed every two years since 1996. From this original sample, we construct a research sample of 8526 individuals in 1983. Our sample includes those who have not attrited by 1983 and who have responses for important variables in our analysis. We then follow those individuals through 2002 or until they attrit from the NLSY survey. Table 1 displays the research sample size by year and the percent of individuals who attrit each year.[1] The research sample contains 125,055 person-year observations.

Table 1
Empirical Distribution of Research Sample

Year	Sample Size	Number of Attriters	Attrition Rate
1983	8,526	-	-
1984	8,526	241	2.82
1985	8,285	277	3.34
1986	8,008	320	3.99
1987	7,688	286	3.72
1988	7,402	169	2.28
1989	7,233	182	2.51
1990	7,051	145	2.05
1991	6,906	152	2.20
1992	6,754	107	1.58
1993	6,647	142	2.13
1994	6,505	267	4.10
1995	6,238	214	3.43
1996	6,024	212	3.51
1997	5,812	236	4.06
1998	5,576	122	2.18
1999	5,454	321	5.88
2000	5,133	86	1.67
2001	5,047	281	5.56
2002	4,766	-	-

Number of person-year observations: 125,055

Since the evolution of body mass as individuals age is important in this study, we depict the trends in body mass over time in Figure 1. The body mass index (BMI) is an alternative measure of body fat based on height and weight and applies to both adult men and women.[2] Average body mass increases by age for both genders, with the mean increasing

[1] We restrict the initial 1983 sample to include individuals who are observed for at least two consecutive periods. Hence, attrition does not occur between 1983 and 1984. In fact, the 1983 data serve as initial conditions for the subsequent periods of observation. Additionally, we have no need to model attrition at the end of 2002 since this is the last year of data that we use.

[2] Specifially, BMI equals weights in kilograms divided by height in meters squared. A BMI less than or equal to 18.5 indicates underweight; between 18.5 and 25, normal weight; greater than or equal to 25 and less than 30, overweight; and 30 or greater, obese.

from 22.2 and 23.1 at age 20 to 27.8 and 28.1 at age 40, for women and men respectively. More importantly, the 75th percentile of the BMI distribution is increasing as is the body mass of people in the right tail of the distribution.[3]

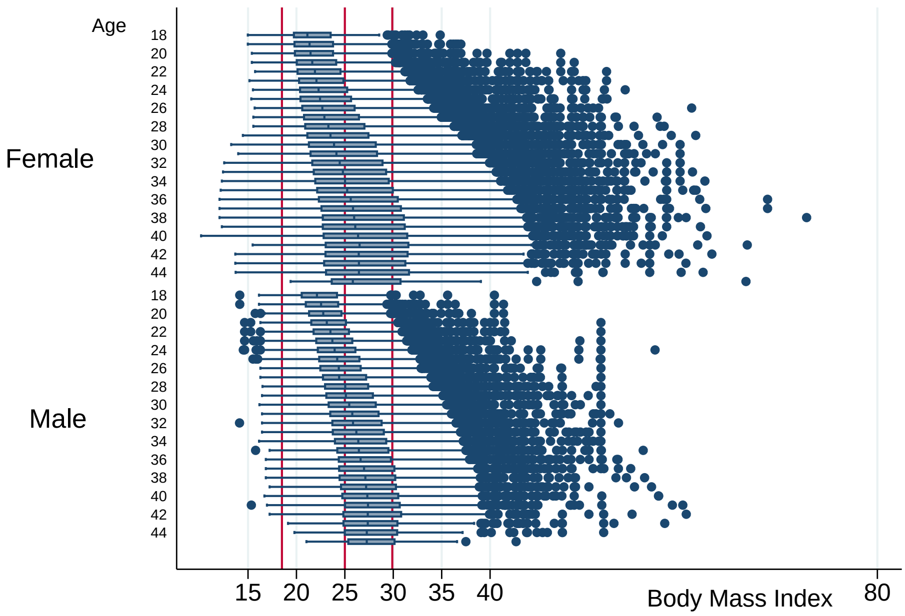


Figure 1: Distribution of Body Mass as Individuals Age, by Gender

The NLSY data provide a unique understanding of individual body mass dynamics over time because the data follow the same individuals for such a long time (e.g., over 20 years in some cases) relative to most data sets. Figure 2 displays the weight gain of individuals through their 20s, 30s, and 40s relative to their weight at age 30. Those individuals who are overweight at age 30 are about 15 percent heavier than their age 20 weight, relative to those who were normal weight at age 30 (who are only 5 or 6 percent heavier than their weight at age 20). By age 40, normal age-30 weight individuals are about 11 percent heavier than 10 years earlier. Interestingly, overweight men at age 30 are about 10 percent heavier by age 40, while overweight women at age 30 have gained about 13 percent by the time they reach their 40s.

In addition to understanding the evolution of body mass, we attempt to explain an individual's wage profile (as he ages) as a function of his body mass. Figure 3 displays wages

[3] The vertical lines in Figure 1 indicate normal, overweight, and obese thresholds. The dark shaded regions indicate the interquartile range. The light shaded regions extend up to 1.5 times the interquartile range. Points on either side of the shaded areas represent remaining outliers.

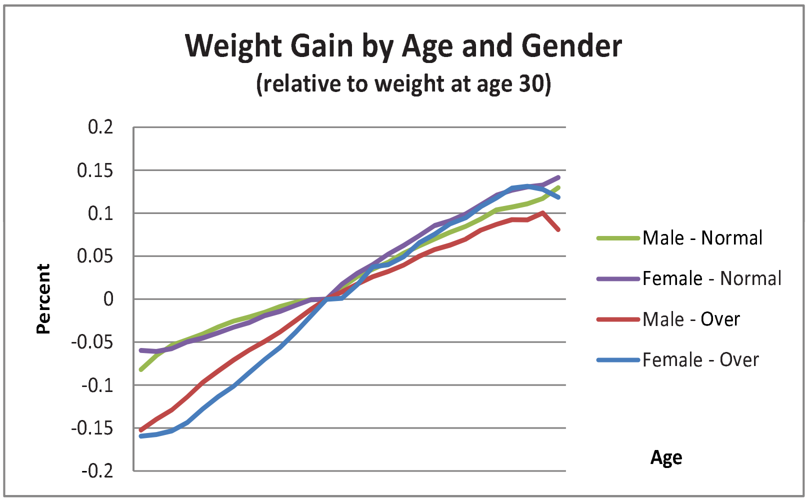


Figure 2: Weight Gain by Age and Gender (relative to age-30 weight)

by years of work experience for both males and females in full and part time positions. Clearly, if individuals are heavier as they age, but are also gaining work experience as they age, then if total work experience leads to higher wages, we will also see that those with larger body mass also have higher wages. Hence, in Figures 4 and 5 we depict full-time wages as total experience increases by body mass status. Obese males receive lower wages than either normal or overweight males. Both overweight and obese females make lower wages than normal weight females as work experience increases.

Since work experience influences wages, and work experience increases with age as does body mass, it is important to understand individual decisions to work. Hence, employment in full and part time positions is modeled in order to allow for both observed and unobserved differences in individuals that might be correlated with both employment behavior and body mass. Similarly, wages vary by educational attainment. If body mass affects years of schooling and degree attainment, then school enrollment as one ages should be modeled. Table 2 displays these probabilities by age while Figures 6 and 7 depict them.

To the extent that marital status affects employment behavior and body mass as individuals age, we account for endogenous changes in marriage. Figure 8 depicts marriage rates by age. The number of children in one's household also affects employment decisions.

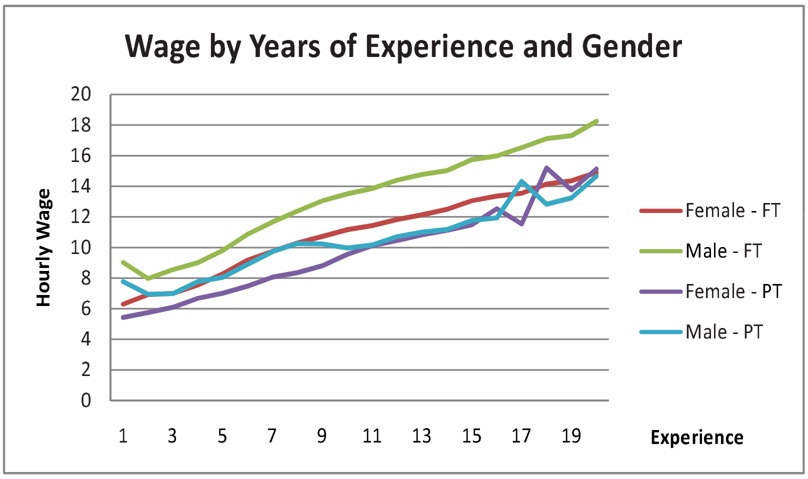


Figure 3: Wage by Years of Experience and Gender

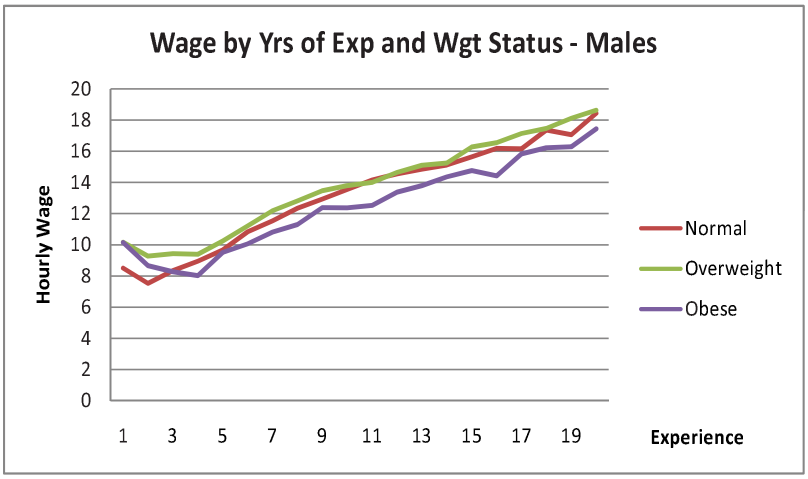


Figure 4: Wage by Years of Experience and Weight Status, Males

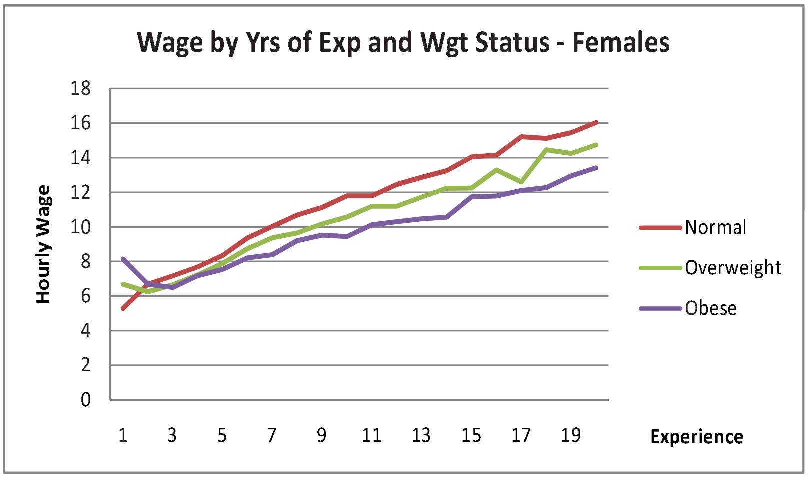


Figure 5: Wage by Years of Experience and Weight Status, Females

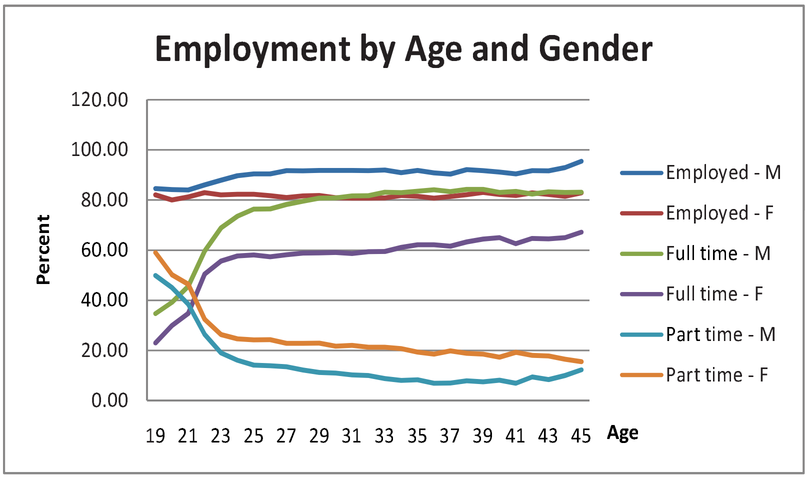


Figure 6: Employment by Age and Gender

Table 2
Empirical Distribution of Behaviors by Age

	Married		Enrolled		Employed		Full Time		Part Time	
Age	M	F	M	F	M	F	M	F	M	F
19	5.0	14.2	44.6	50.6	84.6	82.0	34.7	23.0	49.9	59.0
20	8.0	20.8	45.7	43.7	84.2	80.0	39.2	29.9	45.1	50.2
21	13.4	25.1	41.1	40.0	84.0	81.2	45.6	34.8	38.4	46.4
22	18.9	32.3	34.6	29.7	86.0	82.9	59.6	50.5	26.4	32.4
23	25.8	38.6	27.3	23.2	87.9	82.0	68.9	55.7	19.0	26.3
24	31.6	43.3	22.4	21.0	89.7	82.3	73.5	57.7	16.1	24.6
25	37.9	47.2	21.1	19.4	90.4	82.3	76.3	58.1	14.1	24.2
26	42.5	50.1	19.9	18.8	90.4	81.7	76.4	57.4	13.9	24.3
27	46.2	52.2	18.4	17.6	91.7	81.0	78.2	58.2	13.5	22.8
28	49.5	54.3	17.0	16.2	91.6	81.6	79.5	58.8	12.2	22.8
29	52.3	55.5	16.3	15.5	91.8	81.8	80.7	58.9	11.2	22.9
30	54.1	55.8	15.6	15.8	91.8	80.9	80.8	59.1	11.0	21.7
31	56.0	57.0	14.3	15.2	91.8	80.7	81.6	58.7	10.2	22.0
32	57.5	57.8	13.0	14.0	91.7	80.7	81.7	59.4	10.0	21.3
33	58.8	58.2	12.3	12.7	91.9	80.8	83.1	59.5	8.8	21.3
34	59.8	58.4	10.8	11.8	90.9	81.8	82.9	61.1	8.0	20.7
35	60.8	58.8	9.5	11.0	91.8	81.5	83.5	62.2	8.3	19.3
36	61.5	59.2	8.5	10.1	90.8	80.7	84.0	62.2	6.9	18.5
37	61.6	59.7	7.9	9.3	90.3	81.4	83.3	61.6	7.0	19.8
38	62.8	60.2	7.3	8.2	92.1	82.1	84.2	63.3	7.9	18.8
39	63.0	60.6	7.6	7.8	91.7	83.0	84.2	64.4	7.5	18.5
40	63.7	60.1	7.6	8.1	91.1	82.2	83.0	65.0	8.1	17.3
41	63.9	59.6	7.8	7.5	90.4	81.8	83.4	62.6	6.9	19.2
42	64.7	60.4	7.2	6.6	91.7	82.8	82.3	64.7	9.4	18.0
43	65.8	61.2	7.5	4.9	91.6	82.2	83.2	64.5	8.4	17.8
44	67.8	59.7	7.7	4.1	92.9	81.5	83.0	65.0	10.0	16.5
45	75.4	62.1	7.7	3.4	95.4	82.8	83.1	67.2	12.3	15.5

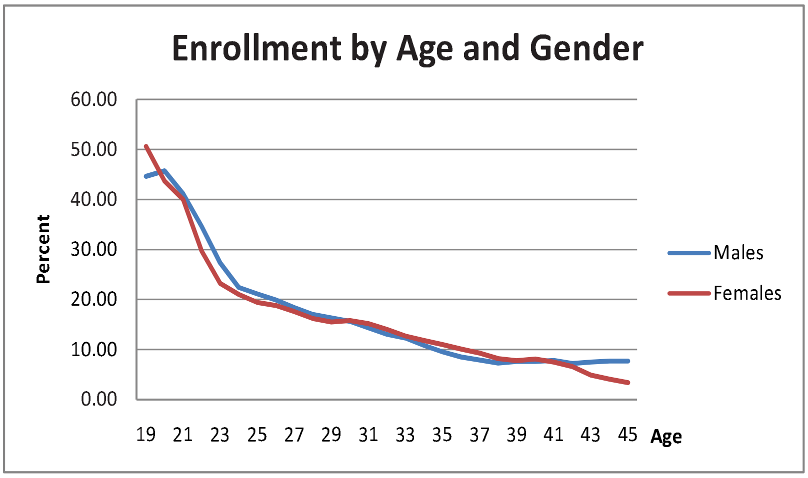


Figure 7: Enrollment by Age and Gender

Figure 9 depicts the probability of acquiring at least one child as one ages by gender and marital status. In addition to the effects children have on employment behavior, child bearing imposes physical changes on women that may not be temporary and children impose both time and financial requirements that may alter caloric intake and expenditure.

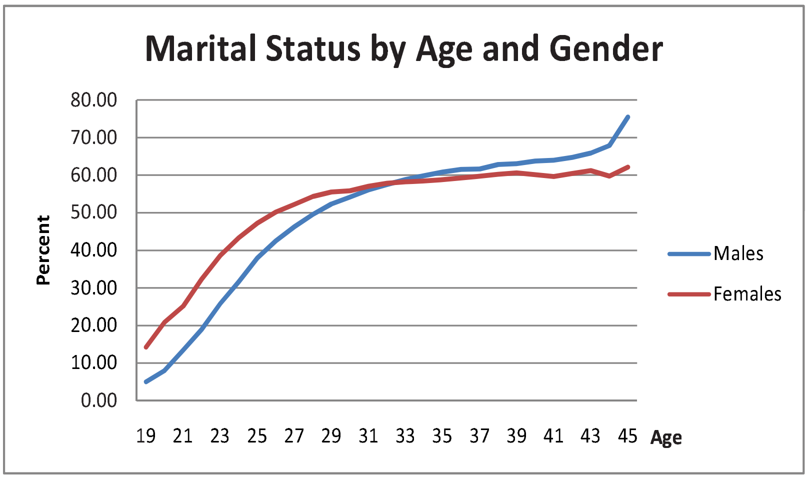


Figure 8: Marital Status by Age and Gender

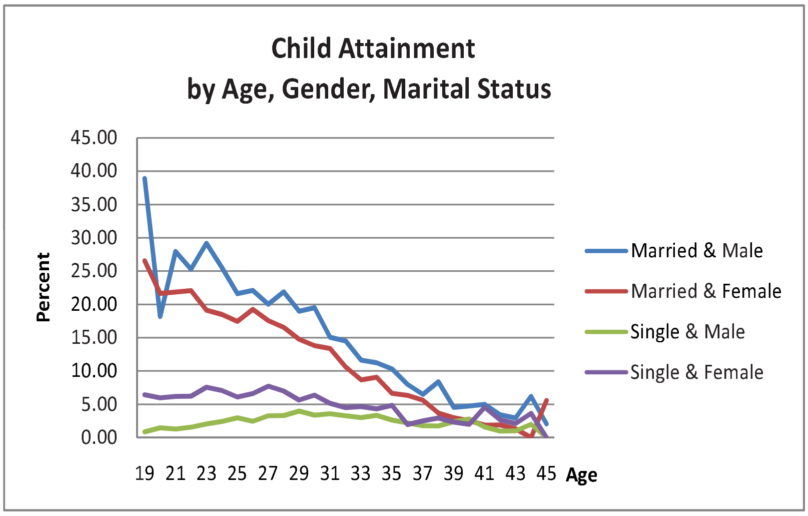


Figure 9: Child Attainment by Age, Gender, and Marital Status

4 Empirical Framework

Recent work by Tosini (2008) similarly seeks to unravel the observed correlation between wages and body mass of white women. His work is unique in that he solves and estimates the optimization problem of the individual and provides estimates of the policy-invariant structural parameters of the individual's per-period utility function, along with (own and spouse) wage distributions and marriage offer distributions. Despite the advantages of recovering these primitives and being able to predict behavior under alternative policy scenarios, this empirical approach limits the breadth of the analysis.

Our approach is to use the theory of decisionmaking to inform the specification of the structural equations of the individual's problem: per-period decisions regarding education, employment, marriage, and children, observed wages, and body mass transitions. We then estimate these equations jointly, and allow for both permanent and time-varying unobserved individual heterogeneity through the use of discrete factor random effects (Heckman and Singer, 1983 and Mroz, 1999). This empirical approach allows us 1.) to estimate models using all individuals in our sample (e.g., males and females of all races), 2.) to include more exogenous and endogenous explanatory variables (e.g., more detailed descriptions of the history of individual decisions), 3.) to consider the continuous evolution of body mass rather than discrete categories as several authors do, 4.) and to explore the possibility that variables of interest may have different marginal effects at different points of support of the wage and body mass distributions (e.g., by using conditional density estimation (Gilleskie and Mroz, 2004)). We seek to confirm the causal pathways of body mass on wages of white women documented by Tosini and verify the apparent lack of correlation between body mass and wages of men and other races found by Cawley and others. We do so using data from the National Longitudinal Survey of Youth, which allows us to follow individuals over time from the age of 18 up to the age 45 in some cases.[4]

In each year t after age 18, an individual obtains a wage offer drawn from the population distribution of wages. The individual also observes his or her spouse's wage if married.[5] Wages, w_t, depend on education and employment experience, as described by Mincer (1974), as well as marital status (Korenman and Neumark, 1991), number of children, and body mass (Cawley, 2004) entering period t.

The individual then jointly decides 1.) whether or not to attend school, 2.) whether to be non-employed, part-time employed, or full-time employed, 3.) whether or not to be married, and 4.) whether or not to acquire (or lose) a child (or children) living in the household. We let indicator variables define which alternatives are chosen. That is, $s_t = 1$ if the individual attends school in period t and $s_t = 0$, otherwise. The employment indicator takes on the value $e_t = 0$ if the individual does not work in period t, $e_t = 1$ if he works part time (less than 1375 hours per year), and $e_t = 2$ if he works full time (1375 hours or more per year). We indicate the marriage decision by $m_t = 1$ if the individual is married in year t, and $m_t = 0$, otherwise. The number of children in the household may increase or decrease due to pregnancy (singleton or multiples), marriage, divorce, age of child, or child

[4]We also model attrition from the research sample and allow this behavior to be correlated with unobserved individual heterogeneity.

[5]Spouse income is treated as exogenous. While we model the marriage decision, which may be influenced by body mass, we do not model the potential correlation between an individual's body mass and her spouse's income (Tosini, 2008).

mortality.[6] The variable $k_t = 0$ indicates that no children are acquired in year t, and values of $k_t = 1$ and $k_t = -1$ indicate that at least one child is acquired or lost in year t.

These yearly decisions (i.e., school attendance, employment, marriage, and children) produce stock variables upon entering period t that summarize the history of the decisions. The vectors of these history variables are denoted: educational history (S_t), work experience (E_t), marital history (M_t), and household child accumulation (K_t). These vectors include both duration values as well as indicators of behavior or outcomes in the last period ($t-1$) and polynomials of the continuous values.

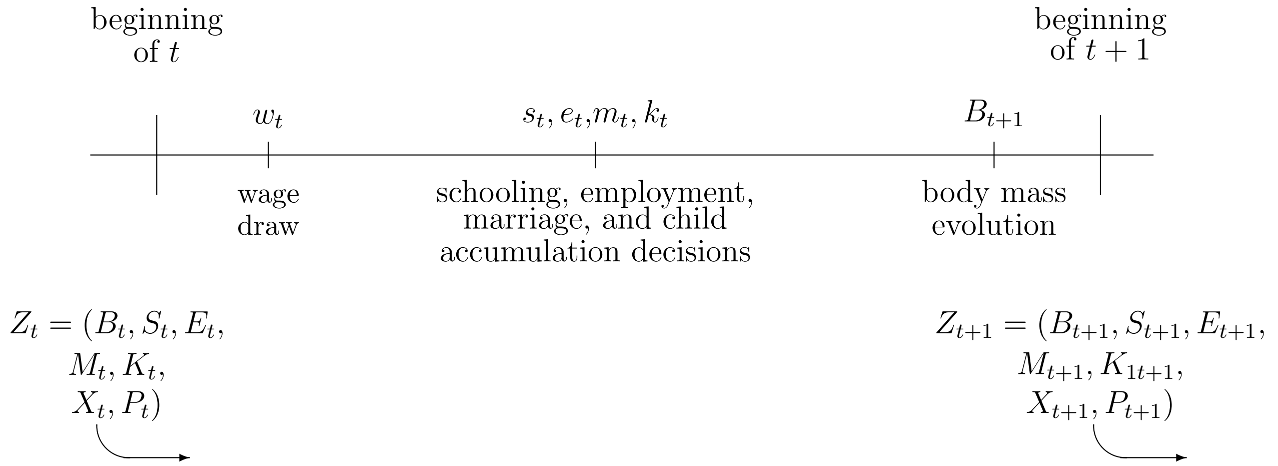
We allow body mass at the beginning of a period (B_t) to affect marital status (perhaps through marriage opportunities) and child accumulation (perhaps through health channels). It may also affect the wage distribution through unobserved determinants of wage such as productivity or discrimination. Given the dynamic nature of body mass transitions and the possible influence of current body mass on future health and productivity expectations, current body mass may affect current schooling and employment decisions. Having made these "beginning-of-period" decisions (i.e., education, employment, marriage, and child accumulation) that affect the per-period budget and time constraints, individuals then allocate income and time to caloric intake and caloric expenditure (i.e., eating and exercising). These latter activities are not observed in our data, but the input decisions determine "end-of-period" body mass. Because the input decisions depend on the education, employment, marital, child outcomes, the body mass transition is therefore a function of education, employment, income (own wages and spouse's wages if married), marital status, and number of children in period t.

Other information known at the beginning of year t includes individual exogenous characteristics (e.g., age, gender, race, spouse's income) denoted by the vector X_t. Variables that capture county- or state-level price and supply conditions such as tuition, average wage and employment information, welfare amounts, child care development funds, restaurant sales,

[6] A reason for a change in number of children is available in the data. For example, the survey records whether a child was born, died, adopted, etc. The number of children recorded from year to year reveals additions and losses of more than one child in a non-trivial number of cases. We are motivated, therefore, to model the change in number of children in the household rather than pregnancy. To the extent that children affect employment decisions and body mass transitions, we believe this could be due to both pregnancy as well as children acquired (or lost) through another channel (e.g., adoption, marriage, death). Both mechanisms place demands on time, finances, and energy.

and costs of different food items are denoted by the vector P_t. We denote, for descriptive purposes only, the variables in P_t pertaining to specific decisions by a subscript representing that decision; that is, $P_t = (P_t^s,\ P_t^e,\ P_t^m,\ P_t^k,\ P_t^b)$. The vector of information known at the beginning of period t is denoted $Z_t = (B_t, S_t, E_t, M_t, K_t, X_t, P_t)$.

The timeline below depicts the decisionmaking and outcomes per period (e.g., one year), and the vector of information available at the beginning of each period.



Variables that explain these decisions are described in Table 3 for males and females. The exogenous individual variables are summarized for the 8526 individuals in our research sample in 1984. The endogenous variables are summarized over all person-observations in the sample over the 1984-2002 period. The exogenous price and supply-side variables are described in Table 4.

Table 3
Description of Individual Explanatory Variables

Variable name	Male (N=4207) Mean	Male (N=4207) Std Dev	Female (N=4319) Mean	Female (N=4319) Std Dev
Exogenous individual variables in year 1984 X_t				
Black race	0.306	0.461	0.308	0.462
Hispanic race/ethnicity	0.178	0.382	0.172	0.377
Asian race	0.047	0.212	0.054	0.226
Rural residence	0.179	0.384	0.176	0.381
Residence type missing	0.107	0.309	0.05	0.218
Northeast region	0.195	0.396	0.178	0.383
North central region	0.237	0.426	0.241	0.428
South region	0.352	0.478	0.386	0.487
Region missing	0.011	0.106	0.007	0.083
AFQT score - median by gender	2.561	29.614	4.867	27.297
AFQT score missing	0.041	0.199	0.025	0.157
Highest level of eduction of mother (years)	11.118	3.140	10.935	3.112
Mom's highest education missing	0.066	0.248	0.048	0.215
Highest level of eduction of father (years)	11.293	3.844	11.083	3.839
Dad's highest education missing	0.171	0.377	0.164	0.370
Endogenous individual variables over all person-years				
Body mass B_t				
BMI in t	26.088	4.376	25.406	5.954
Underweight: BMI in t $\leq$ 18.5	0.007	0.082	0.038	0.190
Normal weight: 18.5 $\leq$ BMI in t $<$ 25	0.446	0.497	0.546	0.498
Overweight: 25 $\leq$ BMI in t $<$ 30	0.389	0.488	0.233	0.423
Obese: BMI in t $\geq$ 30	0.158	0.365	0.183	0.387
Education history S_t				
Enrolled in t-1	0.179	0.383	0.171	0.376
Years enrolled in school missing	0.017	0.129	0.012	0.108
Years enrolled in school entering t	13.679	2.293	13.834	2.413
Years enrolled $<$ 12 entering t	0.039	0.194	0.029	0.164
Years enrolled $\geq$ 12 entering t	0.961	0.194	0.971	0.164
Years enrolled $\geq$ 16 entering t	0.238	0.426	0.248	0.432
Freshmen year of college in t	0.014	0.117	0.014	0.117
Employment history E_t				
Employed in t-1	0.906	0.291	0.816	0.388
Employed full time in t-1	0.761	0.426	0.572	0.495
Employed part time in t-1	0.145	0.352	0.244	0.430
Years employed entering t	10.567	5.795	9.648	5.649
Years full time employed entering t	7.869	5.812	5.948	5.251
Years part time employed entering t	2.699	2.305	3.700	2.868
Marital history M_t				
Married in t-1	0.469	0.499	0.511	0.500
Years married entering t if married in t-1	3.392	4.965	3.930	5.334
Years newly single entering t if single in t-1	0.227	1.028	0.434	1.551
Child history K_t				
Number of children entering t	0.784	1.136	1.278	1.235
Acquire any children in t-1	0.085	0.279	0.090	0.286
Lose any children in t-1	0.025	0.156	0.022	0.146

Table 4
Description of Exogenous Price and Supply-Side Variables

Variable name	Variation	Mean	Std Dev	Min	Max
Schooling variables P_t^s					
Two-year college semester tuition (hundreds)	state	12.145	9.175	0.100	52.370
Two-year college tuition missing indicator		0.040	0.195	0	1
Four-year college semester tuition (hundreds)	state	19.928	10.751	2.480	71.540
Four-year college tuition missing indicator		0.035	0.183	0	1
Graduate school semester tuition (hundreds)	state	19.928	12.155	3.690	73.720
Graduate school tuition missing indicator		0.144	0.351	0	1
Employment variables P_t^e					
Total employment (100 thousands)	state	6.052	4.679	0.260	19.660
Manufacturing employment	state	8.015	5.579	0.090	22.255
Service employment	state	17.854	15.327	0.538	68.753
Total earnings (millions)	state	237.404	204.472	7.681	947.313
Manufacturing earnings	state	43.282	33.204	0.336	155.744
Service earnings	state	62.909	62.327	1.117	308.139
Employment data missing		0.034	0.182	0	1
Marriage and Children variables P_t^m and P_t^k					
Monthly AFDC payment (hundreds)	state	5.217	1.698	1.471	11.867
Monthly AFDC payment missing indicator		0.149	0.356	0	1
Child care funds (millions)	state	0.274	0.818	0.002	7.726
Child care funds missing indictor		0.490	0.500	0	1
Per capita income (thousands)	state	21.446	3.426	12.688	38.180
Total population (millions)	state	11.036	8.528	0.454	35.025
Consumption variables P_t^b					
Mean price of food	county	1.596	0.299	1.052	3.212
Mean price of junkfood	county	3.987	0.564	2.356	6.601
Mean price of cigarettes	county	16.842	7.919	2.382	51.853
Mean price of beer	county	4.037	1.155	1.478	9.076
Mean price of wine	county	5.437	0.940	3.362	8.300
Mean price of liquor	county	9.039	1.692	2.302	13.994
Retail sales in food stores (millions)	county	20.28	15.977	0.808	59.957
Retail sales in restaurants (millions)	county	11.347	9.458	0.416	42.428
Cost of living	county	1.097	0.212	0.729	2.355
Price index	county	1.386	0.237	1.02	1.852
Food prices and sales data missing		0.034	0.182	0	1

Note: All variables vary over time. Dollar amounts are in year 2000 dollars.

Before specifying the wage equation, let us describe the probabilities of the observed outcomes from the joint schooling, employment, marriage, and children decisions. The error terms that capture the unobserved determinants of each decision, u_t, are decomposed into a permanent individual component (μ), a time-varying individual component (ν_t), and an idiosyncratic component (ϵ_t). The serially-uncorrelated idiosyncratic terms are Extreme Value distributed each period, producing logit and multinomial logit probabilities of observed decision outcomes. The log odds ratio of being enrolled in school in period t ($s_t = 1$) relative to not being in school ($s_t = 0$) is

$$\begin{aligned}\ln\left[\frac{p(s_t=1)}{p(s_t=0)}\right] &= \gamma_0 + \gamma_1 B_t + \gamma_2 S_t + \gamma_3 E_t + \gamma_4 M_t + \gamma_5 K_t \\ &\quad + \gamma_6 P_t^s + \gamma_7 P_t^e + \gamma_8 P_t^m + \gamma_9 P_t^k + \gamma_{10} P_t^b \\ &\quad + \gamma_{11} X_t + \rho^1 \mu + \omega^1 \nu_t\end{aligned} \tag{1}$$

The log odds ratio of being non-employed ($e_t = 0$) or employed part-time ($e_t = 1$) relative to being employed full-time ($e_t = 2$) in period t is

$$\begin{aligned}\ln\left[\frac{p(e_t=d)}{p(e_t=2)}\right] &= \delta_{0d} + \delta_{1d} B_t + \delta_{2d} S_t + \delta_{3d} E_t + \delta_{4d} M_t + \delta_{5d} K_t \\ &\quad + \delta_{6d} P_t^s + \delta_{7d} P_t^e + \delta_{8d} P_t^m + \delta_{9d} P_t^k + \delta_{10d} P_t^b \\ &\quad + \delta_{11d} X_t + \rho_d^2 \mu + \omega_d^2 \nu_t \\ &\quad d = 0, 1\end{aligned} \tag{2}$$

The log odds ratio of being married in period t ($m_t = 1$) relative to not being married ($m_t = 0$) is

$$\begin{aligned}\ln\left[\frac{p(m_t=1)}{p(m_t=0)}\right] &= \alpha_0 + \alpha_1 B_t + \alpha_2 S_t + \alpha_3 E_t + \alpha_4 M_t + \alpha_5 K_t \\ &\quad + \alpha_6 P_t^s + \alpha_7 P_t^e + \alpha_8 P_t^m + \alpha_9 P_t^k + \alpha_{10} P_t^b \\ &\quad + \alpha_{11} X_t + \rho^3 \mu + \omega^3 \nu_t\end{aligned} \tag{3}$$

The log odds ratio of acquiring at least j children in period t ($k_t = j$) relative to none ($k_t = 0$) is

$$\begin{aligned}\ln\left[\frac{p(k_t=j)}{p(k_t=0)}\right] &= \beta_{0j} + \beta_{1j} B_t + \beta_{2j} S_t + \beta_{3j} E_t + \beta_{4j} M_t + \beta_{5j} K_t \\ &\quad + \beta_{6j} P_t^s + \beta_{7j} P_t^e + \beta_{8j} P_t^m + \beta_{9j} P_t^k + \beta_{10j} P_t^b \\ &\quad + \beta_{11j} X_t + \rho_j^4 \mu + \omega_j^4 \nu_t \\ &\quad j = -1, 1\end{aligned} \tag{4}$$

Note that these four probabilities are functions of the same explanatory variables since the decisions are jointly made. They are correlated through both the permanent unobserved individual heterogeneity (μ), which enters each equation with different effects, and the time-varying unobserved individual heterogeneity (ν_t) that enters similarly.

Conditional on an individual's employment outcome in period t, we (the econometrician) observe his accepted wage. According to Mincer's seminal work, wages are a function of education and work experience. Wages are also a function of productivity. Productivity is generally not observed, and certainly difficult to measure. But productivity is affected by time and financial demands, which are influenced by marital status and children in the household. We include the latter as potential explanations of wage variation. Productivity may also be influenced by one's physical health. Body mass is one indicator of physical health and we include it as a possible determinant of wages. Significance of body mass in explaining wages may also capture discrimination by employers. For these reasons our period t wage equation includes the history of education, employment, marriage, and children as well as body mass entering the current period. We also include characteristics of the demand-side of the employment market at the state level (denoted P_t^e), aggregate trends (denoted by a cubic in a linear year indicator), and regional year interactions to pick up variation in skill prices over locations and time.[7] Observed log wages in period t, conditional on being employed in period t, are specified as

$$\begin{aligned} \ln(w_t \mid e_t \neq 0) \quad = \quad & \eta_0 + \eta_1 B_t + \eta_2 S_t + \eta_3 E_t + \eta_4 \mathbf{1}[e_t = 1] + \eta_5 M_t + \eta_6 K_t + \\ & \eta_7 X_t + \eta_8 P_t^e + \rho^5 \mu + \omega^5 \nu_t + \epsilon_t^w \ . \end{aligned} \tag{5}$$

We observe wages of those individuals who are employed in period t. However, in the NLSY data, wages are missing for some employed individuals. In a typical year, about 6 percent of wages are missing. In 1995, 1997, 1999, and 2001, however, wages are missing for all individuals in the sample because they were not surveyed that year. We are able to construct values for other variables during these non-surveyed years given the nature of the information. For example, while we do not observe whether someone was married in 1995, we do observe their marital status in 1994 and 1996. We make assumptions during years of

[7]We include a cubic of the year variable in all equations modeled over the twenty year period.

missing data for only a small number of observations. If an assumption would be too much of a stretch we delete that individual from our research sample.

Weight and height are observed in most years with the exception of 1983, 1984, 1991, and the non-survey years of 1995, 1997, 1999, and 2001. We linearly interpolate or extrapolate values of weight in years that we do not observe weight. We assume that height is the same across all years an individual is observed. Hence, we can construct values of the body mass index for all individuals in our research sample. We assume that body mass transitions follow a Markov process such that

$$\begin{aligned} B_{t+1} &= \phi_0 + \phi_1 B_t + \phi_2 S_{t+1} + \phi_3 E_{t+1} + \phi_4 M_{t+1} + \phi_5 K_{t+1} \\ &\quad + \phi_6 P_t^b + \phi_7 X_t + \rho^6 \mu + \omega^6 \nu_t + \epsilon_t^b \ . \end{aligned} \tag{6}$$

Observe that the unobserved permanent and time-varying individual heterogeneity that affects the schooling, employment, marriage, and child accumulation decisions also influence wages in period t and body mass at the end of period t. Because the schooling, employment, marriage, and child accumulation decisions (s_t, e_t, m_t and k_t) are made jointly at the beginning of the period, all the variables representing supply side conditions (P_t^s, P_t^e, P_t^m , P_t^k) appear in each of Equations 1-4 in order to capture cross-price effects. Similarly, individuals are forward looking and anticipate making decisions about caloric intake and expenditure throughout the year. Hence, the vector P_t^b affects each of those per-period decisions. The body mass transition at the end of the period is a function of the observed endogenous decisions during the period and the supply-side variables that affect body mass inputs (P_t^b).

This dynamic specification and the fact that our analysis begins in 1983 when some of the endogenous variables are non-zero implies that we need to model several initial conditions. The endogenous state variables entering the first period (1984) include: initial years schooling (cts: 7-16), initial marital state (logit: 0,1), initial years married if married (cts: 1-4), initial years single if single (cts: 1-4), initial number of children (cts: 0-7), initial employment state (mlogit: ft, pt, not emp), initial full time experience (cts: 0-5), initial part time experience (cts: 0-5), and initial BMI (cts). For identification we need to include variables in the reduced form equations that explain these initial outcomes that do not influence the subsequent per-period outcomes (conditional on the endogenous history variables). We also allow the permanent unobserved individual heterogeneity to explain these initial conditions.

Given this framework, below is a list of things we can do:

1. Estimate Equation 5 under the assumption that the endogenous right hand side variables are exogenous and evaluate the effect of B_t on w_t (with and without fixed effects).

2. Replace all endogenous right hand side variables in Equation 5 with their reduced form arguments and evaluate the effect of B_t on w_t (with and without fixed effects).

3. Estimate equations explaining variation in all endogenous input variables (Equations 1-4 and 6) and use their predicted values in estimation of Equation 5, and evaluate the effect of B_t on w_t (with and without fixed effects). We can calculate BMI's direct, indirect, and total effects here.

4. Estimate equations for all endogenous variables jointly allowing for flexible unobserved correlation in both the permanent and time-varying individual dimension and evaluate effects of B_t on w_t. We can calculate BMI's direct, indirect, and total effect here.

5. Estimate equations for all endogenous variables jointly using conditional density estimation (CDE) to model wages and BMI in order to determine if BMI has a different effect at different points of support of the wage distribution. Similarly, we can evaluate whether inputs have a different effect at different points of support of the BMI distribution.

5 Empirical Results - preliminary

Appendix Tables 1-7 present results from task one above (without individual fixed effects). These results provide an upward-biased effect of BMI on wages because body mass is treated as exogenous.

Table 5 presents selected coefficient estimates of the effect of BMI on wages when individual fixed effects are included in order to control for permanent unobserved individual heterogeneity.

Table 5
Preliminary Estimation Results: ln(Wages)

Variable	Model 1		Model 2		Model 3		Model 4	
BMI in t	**-0.008**	(0.002)	**-0.008**	(0.002)	**-0.008**	(0.002)	**-0.003**	(0.002)
Underweight: BMI in t $\leq$ 18.5	**-0.052**	(0.021)	**-0.036**	(0.018)	**-0.035**	(0.018)	-0.046	(0.014)
Overweight: 25 $\leq$ BMI in t $<$ 30	-0.009	(0.013)	-0.004	(0.011)	-0.006	(0.011)	0.008	(0.008)
Obese: BMI in t $\geq$ 30	-0.031	(0.023)	-0.007	(0.021)	-0.010	(0.020)	-0.007	(0.015)
BMI in t $\times$ Black race	**0.005**	(0.002)	**0.004**	(0.002)	**0.004**	(0.002)	0.004	(0.003)
BMI in t $\times$ Hispanic race/ethnicity	0.002	(0.003)	0.002	(0.002)	0.001	(0.002)	0.003	(0.003)
BMI in t $\times$ Asian race	0.000	(0.004)	0.001	(0.004)	0.001	(0.004)	-0.002	(0.005)
Model Includes:	X_t, B_t		X_t, B_t, S_t, E_t, M_t, K_t		X_t, B_t, S_t, E_t, M_t, K_t, P_t^e		X_t, B_t, S_t, E_t, M_t, K_t, P_t^e, fixed effects	

All models include a cubic time trend and time trend - regional location interactions.

Rather than simply recover the effect of body mass on the average wage, we intend to estimate the density of wages conditional on observable and unobservable variables. We do so by using the conditional density estimation technique (Gilleskie and Mroz, 2004), which allows the effect of an explanatory variable to be different at different points of support of the wage distribution.

Specifically, we begin by splitting the sample observations into k intervals. That is, we discretize the support of the dependent variable. We do this by choosing boundary points that place an equal number of observations in each interval (i.e., 1/kth of the sample falls into each bin or interval) such that w_1 is the 10th percentile if $K = 10$. The probability of being in the kth interval, conditional on the explanatory variables x, is

$$p[w_{k-1} \leq W \leq w_k|x] = \int_{w_{k-1}}^{w_k} f(w|x)dw \ .$$

We can define the discrete time hazard function capturing the probability of being in the kth interval conditional on not being in a previous interval as

$$\lambda(k,x) = p[w_{k-1} \leq W \leq w_k|x, W \geq w_{k-1}] = \frac{\int_{w_{k-1}}^{w_k} f(w|x)dw}{1 - \int_{w_0}^{w_{k-1}} f(w|x)dw} \ .$$

Using this hazard representation, we have

$$p[w_{k-1} \leq W \leq w_k|x] = \lambda(k,x) \prod_{j=1}^{k-1} [1 - \lambda(j,x)]$$

We can recover any moment of the distribution once we have estimated the density. For example, the expected value of the wage conditional on the explanatory variables is

$$E[W|x] = \sum_{k=1}^{K} \overline{w}(k|K)\lambda(k,x) \prod_{j=1}^{k-1} [1 - \lambda(j,x)]$$

where $\overline{w}(k|K)$ is the mean of the observed wages, w, within the kth interval.

It remains to estimate $\lambda(k,x)$. The unconditional probability of an observed wage being in the kth interval given that it is not in an earlier interval is $\frac{1}{K-(k-1)}$. Define $\alpha_k = -\ln(K-k)$ for $k < K$. Then the unconditional probability is

$$logit(\alpha_k) = \frac{e^{\alpha_k}}{1 + e^{\alpha_k}}.$$

That is, if we estimate a logit probability equation with the α's as the only explanatory variables, we get back the probability of being in that interval exactly given the way we have defined the intervals.

To estimate the conditional hazard, we first replicate each of the person-year observations $K - 1$ times. We then define a dependent variable indicating whether the wage of a particular person/year falls into each of the $K - 1$ intervals or not. We interact the transformed interval indicator (i.e., the α's) fully with the individual explanatory variables. We then estimate one logit equation. This hazard is jointly estimated with other equations in the full model (i.e., Equations 1-5). Once the conditional hazard is estimated we can use it to recover the mean wage conditional on the observables (and unobservables). The marginal effects of the explanatory variables on the mean account for differences in effects at different points of support of the wage distribution. To the extent that marginal effects of variables of interest vary over the BMI distribution, we similarly use conditional density estimation to understand body mass over time.

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Appendix

Table A1
Estimation Results: ln(Wages)

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
BMI in t	-0.001	0.001	***	-0.006	0.001	***
Underweight: BMI in t $\leq$ 18.5	-0.151	0.026	***	-0.025	0.011	***
Overweight: 25 $\leq$ BMI in t $<$ 30	0.035	0.007		-0.010	0.007	
Obese: BMI in t $\geq$ 30	-0.021	0.013	***	-0.011	0.012	
Enrolled in t-1	-0.170	0.006	***	-0.138	0.006	***
Years enrolled in school entering t	0.043	0.002	***	0.046	0.002	***
Years enrolled in school missing	0.594	0.029	***	0.634	0.030	***
Years enrolled $<$ 12 entering t	0.061	0.012	***	0.072	0.015	***
Years enrolled $\geq$ 16 entering t	0.160	0.010	***	0.145	0.009	***
Employed in t-1	0.215	0.017	***	0.186	0.013	***
Employed part time in t-1	-0.128	0.007	***	-0.103	0.005	***
Years employed entering t	0.024	0.001	***	0.049	0.001	***
Years part time employed entering t	-0.038	0.001		-0.035	0.001	***
Married in t-1	0.102	0.007	***	0.011	0.006	**
Years married entering t if married in t-1	0.009	0.001	***	0.002	0.001	***
Years newly single entering t if single in t-1	0.004	0.002	***	-0.002	0.001	***
Number of children entering t	-0.009	0.003		-0.011	0.002	***
Acquire any children in t-1	0.006	0.008	**	0.004	0.008	
Lose any children in t-1	-0.025	0.014	***	-0.058	0.016	***
Black race	0.039	0.035		-0.083	0.035	***
Asian race	0.000	0.067		-0.061	0.072	
Hispanic race/ethnicity	-0.035	0.040	***	-0.045	0.039	
Age in years - 18	0.058	0.007	***	0.019	0.006	***
Age - 18 squared/100	-0.333	0.055	***	-0.154	0.054	***
Age - 18 cubed/1000	0.050	0.014	***	0.020	0.014	
Black $\times$ age	-0.038	0.010	***	0.002	0.010	
Black $\times$ age^2/100	0.246	0.083	***	0.011	0.081	
Black $\times$ age^3/1000	-0.053	0.021		-0.005	0.020	
Asian $\times$ age	0.002	0.020		-0.004	0.020	
Asian $\times$ age^2/100	-0.039	0.175		0.108	0.163	
Asian $\times$ age^2/100	0.006	0.045		-0.029	0.040	
Hispanic $\times$ age	-0.012	0.011		0.016	0.011	
Hispanic $\times$ age^2/100	0.090	0.098		-0.176	0.095	**
Hispanic $\times$ age^2/100	-0.024	0.025	***	0.048	0.024	***
Rural residence	-0.119	0.006		-0.079	0.006	***
Residence type missing	-0.021	0.014	***	-0.042	0.014	***
Northeast region	-0.057	0.015	***	-0.003	0.014	
North central region	-0.053	0.013		-0.041	0.012	***
South region	-0.012	0.010	***	0.003	0.010	
Region missing	-0.221	0.052		-0.160	0.047	***
Time trend (1=1984)	0.011	0.007	***	0.008	0.007	
Time trend squared/100	0.222	0.097	**	0.317	0.094	***
Time trend cubed/1000	-0.068	0.037	***	-0.136	0.036	***
Constant	1.503	0.146	***	1.580	0.143	***

Table A2a
Estimation Results: Employment Status (relative to full time) - Males

Variable name	Part time Coeff	Part time Std Err		Non-employed Coeff	Non-employed Std Err	
BMI in t	-0.014	0.008	**	0.017	0.011	
Underweight: BMI in t $\leq$ 18.5	0.437	0.151	***	0.934	0.213	***
Overweight: 25 $\leq$ BMI in t $<$ 30	-0.039	0.046		-0.180	0.070	***
Obese: BMI in t $\geq$ 30	0.016	0.094		-0.108	0.140	
Enrolled in t-1	0.731	0.040	***	0.678	0.065	***
Years enrolled in school entering t	-0.062	0.014	***	-0.016	0.020	
Years enrolled in school missing	-0.492	0.183	***	-0.553	0.275	***
Years enrolled $<$ 12 entering t	-0.301	0.077	***	0.226	0.113	***
Years enrolled $\geq$ 16 entering t	-0.367	0.067	***	-0.431	0.103	***
Employed in t-1	-2.761	0.065	***	-5.683	0.081	***
Employed part time in t-1	1.745	0.036	***	2.969	0.071	***
Years employed entering t	-0.072	0.007	***	-0.140	0.009	***
Years part time employed entering t	0.174	0.008	***	0.115	0.011	***
Married in t-1	-0.393	0.052	***	-0.455	0.087	***
Years married entering t if married in t-1	-0.010	0.007		-0.022	0.010	***
Years newly single entering t if single in t-1	0.010	0.013		-0.021	0.020	
Number of children entering t	0.028	0.020		0.036	0.029	
Acquire any children in t-1	0.074	0.062		0.235	0.101	***
Lose any children in t-1	0.090	0.087		-0.135	0.136	
Black race	-0.329	0.194	**	-0.252	0.306	
Asian race	-0.320	0.391		-0.296	0.656	
Hispanic race/ethnicity	-0.393	0.237	**	-0.462	0.393	
Age in years - 18	-0.334	0.043	***	-0.196	0.073	***
Age - 18 squared/100	2.488	0.380	***	2.158	0.632	***
Age - 18 cubed/1000	-0.483	0.097	***	-0.457	0.159	***
Black $\times$ age	0.174	0.059	***	0.251	0.093	***
Black $\times$ age^2/100	-1.126	0.513	***	-1.709	0.800	***
Black $\times$ age^3/1000	0.191	0.132		0.273	0.203	
Asian $\times$ age	0.122	0.125		0.158	0.205	
Asian $\times$ age^2/100	-0.990	1.127		-1.117	1.786	
Asian $\times$ age^2/100	0.244	0.295		0.217	0.455	
Hispanic $\times$ age	0.115	0.074		0.162	0.120	
Hispanic $\times$ age^2/100	-0.707	0.660		-0.975	1.054	
Hispanic $\times$ age^2/100	0.101	0.174		0.148	0.272	
Rural residence	0.041	0.043		0.203	0.069	***
Residence type missing	0.173	0.072	***	0.024	0.112	
Northeast region	-0.162	0.099		0.082	0.137	
North central region	-0.113	0.085		0.075	0.129	
South region	-0.207	0.069	***	-0.239	0.103	***
Region missing	-0.826	0.190	***	-1.557	0.202	***
Time trend (1=1984)	-0.028	0.046		0.099	0.069	
Time trend squared/100	-1.205	0.634	**	-3.309	0.945	***
Time trend cubed/1000	0.400	0.241	**	1.134	0.352	***
Constant	-0.682	0.747		-5.696	0.974	***

Table A2b
Estimation Results: Employment Status (relative to full time) - Females

Variable name	Part time Coeff	Std Err		Non-employed Coeff	Std Err	
BMI in t	0.002	0.005		0.009	0.006	
Underweight: BMI in t $\leq$ 18.5	0.015	0.065		0.104	0.090	
Overweight: 25 $\leq$ BMI in t $<$ 30	-0.075	0.039	**	-0.049	0.054	
Obese: BMI in t $\geq$ 30	-0.147	0.073	***	-0.101	0.096	
Enrolled in t-1	0.281	0.037	***	0.179	0.052	***
Years enrolled in school entering t	-0.019	0.011	**	-0.055	0.014	***
Years enrolled in school missing	-0.563	0.172	***	-1.133	0.225	***
Years enrolled $<$ 12 entering t	0.158	0.082	**	0.520	0.103	***
Years enrolled $\geq$ 16 entering t	-0.307	0.052	***	-0.024	0.073	
Employed in t-1	-3.263	0.056	***	-6.408	0.070	***
Employed part time in t-1	2.179	0.028	***	3.229	0.056	***
Years employed entering t	-0.085	0.005	***	-0.147	0.007	***
Years part time employed entering t	0.133	0.005	***	0.050	0.008	***
Married in t-1	0.435	0.038	***	0.567	0.055	***
Years married entering t if married in t-1	-0.013	0.004	***	-0.034	0.006	***
Years newly single entering t if single in t-1	0.019	0.009	***	0.018	0.012	
Number of children entering t	0.029	0.013	***	0.018	0.017	
Acquire any children in t-1	0.162	0.044	***	0.439	0.055	***
Lose any children in t-1	0.103	0.084		0.183	0.112	
Black race	0.352	0.195	**	0.918	0.275	***
Asian race	-0.554	0.414		0.610	0.565	
Hispanic race/ethnicity	-0.168	0.221		0.547	0.320	**
Age in years - 18	-0.212	0.038	***	0.127	0.057	***
Age - 18 squared/100	2.134	0.320	***	0.108	0.478	
Age - 18 cubed/1000	-0.528	0.080	***	-0.105	0.118	
Black $\times$ age	-0.041	0.056		-0.113	0.078	
Black $\times$ age^2/100	-0.052	0.476		0.207	0.656	
Black $\times$ age^3/1000	0.038	0.120		0.015	0.164	
Asian $\times$ age	0.162	0.116		-0.017	0.158	
Asian $\times$ age^2/100	-1.456	0.952		-0.587	1.308	
Asian $\times$ age^2/100	0.371	0.235		0.225	0.325	
Hispanic $\times$ age	0.097	0.064		-0.032	0.092	
Hispanic $\times$ age^2/100	-1.286	0.550	***	-0.400	0.776	
Hispanic $\times$ age^2/100	0.376	0.140	***	0.173	0.196	
Rural residence	0.008	0.033		0.075	0.046	
Residence type missing	0.092	0.062		0.126	0.087	
Northeast region	0.041	0.083		0.078	0.116	
North central region	-0.160	0.071	***	-0.039	0.100	
South region	-0.340	0.058	***	-0.272	0.082	***
Region missing	-0.018	0.207		-0.912	0.249	***
Time trend (1=1984)	0.031	0.040		0.162	0.055	***
Time trend squared/100	-1.368	0.534	***	-2.548	0.732	***
Time trend cubed/1000	0.524	0.202	***	0.926	0.275	***
Constant	0.988	0.669		-0.274	0.855	

Table A3
Estimation Results: Enrolled in School

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
BMI in t	-0.024	0.010	***	0.011	0.007	
Underweight: BMI in t $\leq$ 18.5	-0.249	0.231		0.146	0.093	
Overweight: 25 $\leq$ BMI in t $<$ 30	-0.024	0.064		-0.013	0.061	
Obese: BMI in t $\geq$ 30	0.269	0.130	***	-0.083	0.112	
Enrolled in t-1	4.820	0.046	***	4.306	0.041	***
Years enrolled in school entering t	0.297	0.018	***	0.328	0.015	***
Years enrolled in school missing	1.350	0.269	***	1.992	0.252	***
Years enrolled $<$ 12 entering t	2.073	0.099	***	2.037	0.099	***
Years enrolled $\geq$ 16 entering t	-0.843	0.081	***	-0.759	0.070	***
Number of children entering t	0.041	0.023	**	0.164	0.019	***
Acquire any children in t-1	0.113	0.079		-0.038	0.067	
Lose any children in t-1	0.419	0.128	***	0.345	0.128	***
Employed in t-1	-0.642	0.086	***	-0.257	0.062	***
Employed part time in t-1	0.426	0.060	***	0.091	0.051	**
Years employed entering t	0.046	0.011	***	-0.009	0.008	
Years part time employed entering t	-0.075	0.012	***	-0.036	0.009	***
Black race	-0.851	0.302	***	-0.219	0.272	
Asian race	-0.155	0.600		-1.155	0.578	***
Hispanic race/ethnicity	-0.681	0.354	**	-0.125	0.319	
Age in years - 18	-0.258	0.065	***	-0.193	0.060	***
Age - 18 squared/100	1.814	0.583	***	1.289	0.538	***
Age - 18 cubed/1000	-0.444	0.154	***	-0.280	0.144	**
Black $\times$ age	0.287	0.091	***	0.074	0.083	
Black $\times$ age^2/100	-2.266	0.799	***	-0.506	0.748	
Black $\times$ age^3/1000	0.578	0.208	***	0.097	0.199	
Asian $\times$ age	0.051	0.188		0.315	0.172	**
Asian $\times$ age^2/100	-0.242	1.685		-2.309	1.496	
Asian $\times$ age^2/100	0.077	0.444		0.501	0.389	
Hispanic $\times$ age	0.317	0.106	***	0.097	0.097	
Hispanic $\times$ age^2/100	-2.699	0.937	***	-0.927	0.871	
Hispanic $\times$ age^2/100	0.681	0.245	***	0.260	0.232	
Rural residence	0.066	0.061		-0.033	0.054	
Residence type missing	0.061	0.106		-0.040	0.101	
Northeast region	-0.105	0.135		-0.129	0.128	
North central region	0.004	0.121		0.003	0.112	
South region	-0.175	0.097	**	-0.178	0.090	***
Region missing	-0.207	0.218		0.216	0.288	
Time trend (1=1984)	-0.033	0.066		-0.188	0.062	***
Time trend squared/100	2.704	0.931	***	2.413	0.874	***
Time trend cubed/1000	-1.354	0.355	***	-1.157	0.338	***
Constant	-1.079	0.995		-7.002	1.069	***

Table A4
Estimation Results: Married

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
BMI in t	0.018	0.009	***	-0.009	0.006	
Underweight: BMI in t $\leq$ 18.5	-0.203	0.228		-0.199	0.086	***
Overweight: 25 $\leq$ BMI in t < 30	0.107	0.053	***	0.024	0.053	
Obese: BMI in t $\geq$ 30	-0.024	0.108		-0.077	0.097	
Enrolled in t-1	-0.307	0.053	***	-0.459	0.051	***
Years enrolled in school entering t	0.056	0.016	***	0.070	0.014	***
Years enrolled in school missing	0.651	0.233	***	0.929	0.230	***
Years enrolled < 12 entering t	0.253	0.101	***	0.173	0.107	
Years enrolled $\geq$ 16 entering t	0.193	0.077	***	0.020	0.069	
Employed in t-1	0.727	0.083	***	0.013	0.058	
Employed part time in t-1	-0.637	0.058	***	0.104	0.046	***
Years employed entering t	0.031	0.009	***	0.044	0.007	***
Years part time employed entering t	-0.058	0.009	***	-0.023	0.008	***
Married in t-1	4.700	0.056	***	4.690	0.050	***
Years married entering t if married in t-1	0.110	0.008	***	0.103	0.006	***
Years newly single entering t if single in t-1	0.102	0.013	***	0.056	0.010	***
Number of children entering t	-0.006	0.023		0.003	0.018	
Acquire any children in t-1	0.555	0.075	***	0.289	0.063	***
Lose any children in t-1	-0.221	0.107	***	-0.110	0.115	
Black race	0.078	0.312		-0.201	0.273	
Asian race	-0.085	0.618		-0.134	0.529	
Hispanic race/ethnicity	0.581	0.347	**	0.094	0.304	
Age in years - 18	0.256	0.058	***	0.115	0.053	***
Age - 18 squared/100	-2.125	0.487	***	-1.216	0.453	***
Age - 18 cubed/1000	0.455	0.122	***	0.260	0.115	***
Black × age	-0.189	0.086	***	-0.139	0.077	**
Black × age^2/100	1.544	0.713	***	0.886	0.648	
Black × age^3/1000	-0.352	0.177	***	-0.151	0.163	
Asian × age	-0.052	0.180		0.081	0.151	
Asian × age^2/100	0.332	1.542		-1.298	1.263	
Asian × age^2/100	-0.011	0.395		0.437	0.317	
Hispanic × age	-0.186	0.100	**	-0.092	0.088	
Hispanic × age^2/100	1.424	0.852	**	0.715	0.757	
Hispanic × age^2/100	-0.346	0.218		-0.154	0.193	
Rural residence	0.147	0.050	***	0.171	0.046	***
Residence type missing	0.246	0.088	***	0.132	0.084	
Northeast region	-0.209	0.107	**	0.129	0.111	
North central region	0.015	0.097		0.105	0.097	
South region	-0.014	0.078		0.145	0.079	**
Region missing	-0.398	0.183	***	0.184	0.248	
Time trend (1=1984)	0.082	0.053		0.018	0.052	
Time trend squared/100	-1.268	0.746	**	0.548	0.720	
Time trend cubed/1000	0.489	0.281	**	-0.180	0.273	
Constant	-4.095	0.825	***	-1.596	0.878	**

Table A5a
Estimation Results: Child Accumulation (relative to none) - Males

Variable name	Gain 1 Coeff	Gain 1 Std Err		Gain 2+ Coeff	Gain 2+ Std Err		Lose 1 Coeff	Lose 1 Std Err		Lose 2+ Coeff	Lose 2+ Std Err	
BMI in t	0.013	0.009		-0.025	0.021		-0.050	0.017	***	-0.025	0.022	
Underweight: BMI in t $\leq$ 18.5	-0.453	0.275	**	-0.133	0.523		0.017	0.429		-1.269	1.035	
Overweight: 25 $\leq$ BMI in t $<$ 30	0.002	0.051		0.116	0.128		0.084	0.107		0.007	0.132	
Obese: BMI in t $\geq$ 30	-0.201	0.105	**	0.280	0.252		0.387	0.206	**	-0.086	0.266	
Enrolled in t-1	-0.107	0.052	***	0.242	0.126	**	0.395	0.108	***	0.482	0.135	***
Years enrolled in school entering t	0.006	0.017		-0.082	0.041	***	-0.105	0.034	***	-0.169	0.046	***
Years enrolled in school missing	-0.175	0.232		-1.861	0.583	***	-1.796	0.482	***	-2.520	0.642	***
Years enrolled $<$ 12 entering t	0.356	0.094	***	0.308	0.210		0.126	0.188		-0.050	0.256	
Years enrolled $\geq$ 16 entering t	0.032	0.077		-0.196	0.204		-0.302	0.176	**	0.024	0.232	
Employed in t-1	0.475	0.093	***	0.684	0.191	***	0.099	0.155		-0.487	0.185	***
Employed part time in t-1	-0.220	0.062	***	-0.396	0.138	***	0.223	0.109	***	0.546	0.134	***
Years employed entering t	-0.012	0.009		-0.046	0.018	***	-0.026	0.014	**	0.027	0.020	
Years part time employed entering t	-0.014	0.010		0.014	0.021		0.013	0.017		-0.026	0.023	
Married in t-1	2.193	0.050	***	1.313	0.130	***	0.678	0.109	***	0.553	0.135	***
Years married entering t if married in t-1	-0.082	0.007	***	-0.194	0.024	***	-0.063	0.010	***	-0.139	0.014	***
Years newly single entering t if single in t-1	0.176	0.016	***	0.181	0.023	***	0.136	0.026	***	-0.025	0.046	
Number of children entering t	-0.200	0.022	***	-0.468	0.073	***	0.468	0.030	***	1.036	0.032	***
Acquire any children in t-1	0.259	0.051	***	0.253	0.179		0.738	0.091	***	-0.016	0.111	
Lose any children in t-1	0.513	0.104	***	1.808	0.118	***	1.193	0.142	***	0.632	0.249	***
Black race	0.534	0.363		1.407	0.902		0.297	0.684		-0.355	1.145	
Asian race	-0.480	0.775		-3.199	2.568		0.429	1.296		-2.460	2.473	
Hispanic race/ethnicity	0.583	0.391		-0.411	1.309		0.761	0.774		-1.415	1.569	
Age in years - 18	0.104	0.068		0.270	0.194		-0.077	0.136		0.276	0.211	
Age - 18 squared/100	-0.279	0.556		-1.155	1.489		0.616	1.025		-2.000	1.575	
Age - 18 cubed/1000	-0.092	0.139		0.208	0.348		0.000	0.232		0.458	0.359	
Black $\times$ age	0.061	0.100		-0.010	0.234		0.136	0.174		0.248	0.276	
Black $\times$ age^2/100	-1.343	0.832		-0.315	1.844		-1.127	1.328		-2.103	2.054	
Black $\times$ age^3/1000	0.415	0.212	**	0.037	0.444		0.207	0.308		0.497	0.471	
Asian $\times$ age	0.226	0.211		0.995	0.611		-0.002	0.338		1.130	0.622	**
Asian $\times$ age^2/100	-2.286	1.746		-7.658	4.473	**	0.274	2.631		-10.543	4.778	***
Asian $\times$ age^2/100	0.622	0.438		1.735	1.003	**	-0.107	0.619		2.586	1.106	***
Hispanic $\times$ age	0.029	0.108		0.192	0.331		-0.095	0.202		0.446	0.370	
Hispanic $\times$ age^2/100	-0.883	0.905		-1.047	2.571		0.717	1.581		-3.720	2.714	
Hispanic $\times$ age^2/100	0.309	0.231		0.146	0.615		-0.198	0.375		0.879	0.615	
Rural residence	0.004	0.047		0.128	0.116		0.060	0.093		-0.169	0.124	
Residence type missing	0.038	0.091		-0.230	0.258		0.067	0.170		0.230	0.221	
Northeast region	-0.083	0.107		0.007	0.270		-0.106	0.226		0.428	0.292	
North central region	0.123	0.096		0.150	0.245		-0.133	0.206		0.238	0.259	
South region	-0.100	0.076		0.060	0.195		0.045	0.158		-0.013	0.209	
Region missing	-0.317	0.180	**	0.065	0.468		0.713	0.336	***	-0.808	0.586	
Time trend (1=1984)	0.198	0.053	***	0.154	0.136		0.369	0.118	***	0.387	0.158	***
Time trend squared/100	-2.725	0.744	***	-2.534	1.843		-3.955	1.550	***	-2.749	2.042	
Time trend cubed/1000	0.992	0.282	***	0.887	0.688		1.307	0.566	***	0.618	0.750	
Constant	-5.259	0.819	***	-6.180	2.147	***	-3.346	1.626	***	-1.322	2.292	

Table A5b
Estimation Results: Child Accumulation (relative to none) - Females

Variable name	Gain 1 Coeff	Gain 1 Std Err		Gain 2+ Coeff	Gain 2+ Std Err		Lose 1 Coeff	Lose 1 Std Err		Lose 2+ Coeff	Lose 2+ Std Err	
BMI in t	0.01	0.006	**	-0.032	0.025		0.014	0.01		-0.032	0.021	
Underweight: BMI in t $\leq$ 18.5	-0.216	0.086	***	-0.218	0.347		0.34	0.179	**	0.488	0.289	**
Overweight: 25 $\leq$ BMI in t < 30	0.189	0.048	***	0.444	0.191	***	-0.159	0.088	**	0.125	0.175	
Obese: BMI in t $\geq$ 30	0.038	0.09		0.387	0.358		-0.32	0.153	***	0.25	0.306	
Married in t-1	1.525	0.045	***	1.047	0.179	***	0.029	0.101		-0.198	0.194	
Years married entering t if married in t-1	-0.088	0.006	***	-0.108	0.024	***	-0.047	0.008	***	-0.046	0.016	***
Years newly single entering t if single in t-1	0.059	0.011	***	0.058	0.032	**	0.054	0.016	***	0.054	0.029	**
Number of children entering t	-0.215	0.018	***	-0.459	0.068	***	0.45	0.025	***	0.85	0.043	***
Acquire any children in t-1	0.218	0.046	***	0.039	0.241		0.578	0.096	***	0.369	0.163	***
Lose any children in t-1	1.012	0.092	***	2.258	0.177	***	0.354	0.142	***	0.44	0.281	
Enrolled in t-1	-0.378	0.049	***	0.2	0.179		0.838	0.102	***	0.604	0.175	***
Years enrolled in school entering t	0.029	0.014	***	0.034	0.047		-0.05	0.022	***	0.014	0.036	
Years enrolled in school missing	0.073	0.211		-0.989	0.793		-0.933	0.427	***	-0.275	0.741	
Years enrolled < 12 entering t	0.399	0.091	***	1.35	0.274	***	0.261	0.184		0.638	0.274	***
Years enrolled $\geq$ 16 entering t	-0.013	0.066		-0.199	0.25		-0.482	0.134	***	-0.495	0.243	***
Employed in t-1	-1.158	0.05	***	-0.818	0.194	***	0.368	0.096	***	0.601	0.178	***
Employed part time in t-1	0.706	0.042	***	0.533	0.17	***	-0.165	0.084	***	-0.078	0.154	
Years employed entering t	0.046	0.007	***	-0.022	0.023		-0.037	0.009	***	-0.032	0.017	**
Years part time employed entering t	-0.042	0.008	***	-0.002	0.028		0.039	0.011	***	-0.009	0.021	
Black race	1.358	0.264	***	-0.508	1.22		0.855	0.764		2.138	1.339	
Asian race	0.563	0.556		-1.873	2.952		-3.289	2.537		-5.36	6.555	
Hispanic race/ethnicity	0.752	0.313	***	-1.839	1.64		0.294	0.948		1.808	1.59	
Age in years - 18	0.154	0.059	***	-0.044	0.256		-0.212	0.15		0.244	0.28	
Age - 18 squared/100	-0.945	0.519	**	2.325	2.247		2.557	1.065	***	-2.122	2.039	
Age - 18 cubed/1000	0.038	0.138		-0.949	0.598		-0.522	0.233	***	0.655	0.452	
Black × age	-0.153	0.078	***	0.413	0.344		-0.158	0.183		-0.701	0.323	***
Black × age^2/100	0.195	0.691		-4.156	2.936		1.151	1.33		5.618	2.365	***
Black × age^3/1000	0.123	0.184		1.107	0.766		-0.275	0.297		-1.237	0.53	***
Asian × age	-0.127	0.164		0.517	0.737		0.67	0.527		0.465	1.237	
Asian × age^2/100	0.892	1.457		-4.396	5.65		-4.024	3.45		-0.203	7.464	
Asian × age^2/100	-0.218	0.392		1.181	1.341		0.768	0.714		-0.22	1.445	
Hispanic × age	-0.083	0.092		0.66	0.445		-0.076	0.225		-0.627	0.398	
Hispanic × age^2/100	0.133	0.815		-6.029	3.677		0.646	1.632		5.47	3.036	**
Hispanic × age^2/100	0.075	0.217		1.623	0.931	**	-0.153	0.362		-1.375	0.709	**
Rural residence	0.041	0.042		0.213	0.159		0.245	0.076	***	0.031	0.149	
Residence type missing	0.128	0.081		-0.074	0.345		0.333	0.133	***	0.39	0.243	
Northeast region	-0.176	0.105	**	0.761	0.451	**	-0.277	0.241		-0.411	0.441	
North central region	-0.047	0.091		0.332	0.395		0.055	0.191		-0.571	0.347	**
South region	-0.154	0.075	***	0.343	0.333		-0.028	0.151		-0.174	0.274	
Region missing	-0.101	0.263		1.482	0.897	**	0.2	0.601		0.756	0.877	
Time trend (1=1984)	0.237	0.05	***	0.109	0.216		0.145	0.136		0.303	0.215	
Time trend squared/100	-2.543	0.714	***	-1.291	2.831		-2.807	1.491	**	-4.532	2.635	**
Time trend cubed/1000	0.889	0.276	***	0.556	1.077		0.95	0.524	**	1.556	0.948	**
Constant	-3.349	0.89	***	-4.161	3.624		-8.322	1.814	***	-6.567	2.853	***

Table A6
Estimation Results: ln Wages conditional on being employed

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
BMI in t	-0.004	(0.003)		-0.008	(0.002)	***
Underweight: BMI in t $\leq$ 18.5	-0.141	(0.038)	***	-0.035	(0.018)	**
Overweight: 25 $\leq$ BMI in t $<$ 30	0.038	(0.012)	***	-0.006	(0.011)	
Obese: BMI in t $\geq$ 30	-0.014	(0.022)		-0.010	(0.020)	
BMI in t $\times$ Black race	0.011	(0.003)	***	0.004	(0.002)	*
BMI in t $\times$ Hispanic race/ethnicity	-0.002	(0.003)		0.001	(0.002)	
BMI in t $\times$ Asian race	0.001	(0.005)		0.001	(0.004)	
Married in t-1	0.094	(0.010)	***	0.013	(0.009)	
Years married entering t if married in t-1	0.009	(0.001)	***	0.001	(0.001)	
Years newly single entering t if single in t-1	0.003	(0.004)		-0.002	(0.003)	
Number of children entering t	-0.008	(0.005)	*	-0.008	(0.005)	*
Acquire any children in t-1	0.007	(0.007)		0.004	(0.008)	
Lose any children in t-1	-0.020	(0.014)		-0.051	(0.017)	***
Enrolled in t-1	-0.112	(0.011)	***	-0.100	(0.010)	***
Years enrolled in school entering t	0.021	(0.005)	***	0.030	(0.004)	***
Years enrolled in school missing	0.292	(0.065)	***	0.328	(0.069)	***
Years enrolled $<$ 12 entering t	0.070	(0.022)	***	0.116	(0.023)	***
Years enrolled $\geq$ 16 entering t	0.143	(0.022)	***	0.117	(0.020)	***
Employed in t-1	0.188	(0.019)	***	0.177	(0.014)	***
Employed part time in t-1	-0.136	(0.008)	***	-0.108	(0.007)	***
Years employed entering t	0.021	(0.003)	***	0.041	(0.002)	***
Years part time employed entering t	-0.035	(0.003)	***	-0.033	(0.002)	***
Black race	-0.104	(0.075)		-0.026	(0.056)	
Asian race	-0.016	(0.138)		-0.036	(0.118)	
Hispanic race/ethnicity	0.077	(0.088)		0.003	(0.068)	
Age in years - 18	0.062	(0.007)	***	0.027	(0.007)	***
Age - 18 squared/100	-0.038	(0.006)	***	-0.021	(0.006)	***
Age - 18 cubed/1000	0.006	(0.001)	***	0.003	(0.002)	**
Black $\times$ age	-0.046	(0.010)	***	-0.006	(0.010)	
Black $\times$ age^2/100	0.027	(0.008)	***	0.006	(0.008)	
Black $\times$ age^3/1000	-0.006	(0.002)	***	-0.002	(0.002)	
Asian $\times$ age	0.004	(0.024)		-0.012	(0.020)	
Asian $\times$ age^2/100	-0.006	(0.021)		0.015	(0.016)	
Asian $\times$ age^2/100	0.001	(0.005)		-0.004	(0.004)	
Hispanic $\times$ age	-0.012	(0.012)		0.017	(0.012)	
Hispanic $\times$ age^2/100	0.010	(0.010)		-0.017	(0.010)	*
Hispanic $\times$ age^2/100	-0.003	(0.003)		0.004	(0.003)	*
Rural residence	-0.112	(0.011)	***	-0.079	(0.011)	***
Residence type missing	-0.020	(0.017)		-0.042	(0.015)	***
Northeast region	0.013	(0.020)		0.059	(0.020)	***
North central region	-0.068	(0.022)	***	-0.075	(0.021)	***
South region	-0.060	(0.020)	***	-0.070	(0.020)	***
Region missing	-0.137	(0.069)	**	0.017	(0.061)	
AFQT score - median by gender	0.002	(0.000)	***	0.004	(0.000)	***
AFQT score squared	-0.001	(0.000)	***	0.000	(0.000)	***
AFQT score cubed	0.000	(0.000)	***	0.000	(0.000)	***
AFQT score missing	-0.008	(0.027)		-0.033	(0.037)	
Height in meters	0.259	(0.067)	***	0.120	(0.065)	**

Table A6 - continued
Estimation Results: ln Wages conditional on being employed

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
Total employment (100 thousands)	0.001	(0.002)		0.007	(0.002)	***
Manufacturing employment	0.016	(0.006)	***	-0.006	(0.006)	
Service employment	-0.023	(0.007)	***	-0.029	(0.007)	***
Total earnings (millions)	0.000	(0.000)		-0.001	(0.000)	***
Manufacturing earnings	-0.002	(0.001)	**	0.000	(0.001)	
Service earnings	0.005	(0.001)	***	0.007	(0.001)	***
Time trend (1=1984)	0.009	(0.006)	*	0.007	(0.005)	
Time trend squared/100	-0.097	(0.060)	*	-0.089	(0.060)	
Time trend cubed/1000	0.052	(0.020)	*	0.033	(0.020)	*
Time trend × Northeast region	0.003	(0.002)		0.007	(0.002)	***
Time trend × Northcentral region	0.004	(0.002)	**	0.008	(0.002)	***
Time trend × South region	0.001	(0.002)		0.004	(0.002)	**
Constant	1.154	(0.153)	***	1.279	(0.132)	***

Table A7
Estimation Results: Body Mass Index at $t+1$

Variable name	Male Coeff	Male Std Err		Female Coeff	Female Std Err	
BMI in t	0.975	0.002	***	0.979	0.002	***
Underweight: BMI in t $\leq$ 18.5	0.249	0.058	***	0.009	0.033	
Overweight: 25 $\leq$ BMI in t $<$ 30	0.046	0.015	***	0.076	0.020	***
Obese: BMI in t $\geq$ 30	0.096	0.029	***	0.164	0.036	***
Married in t	0.087	0.015	***	0.181	0.019	***
Years married at end of t if married in t	-0.004	0.002		-0.014	0.002	***
Years newly single at end of t if single in t	0.006	0.005		0.009	0.004	***
Number of children at end of t	-0.007	0.006	***	-0.031	0.006	***
Acquire any children in t	0.047	0.018	***	-0.212	0.023	***
Lose any children in t	-0.135	0.030		-0.096	0.041	***
Enrolled in t	-0.003	0.015	***	-0.006	0.020	
Years enrolled in school at end of t	-0.010	0.002	***	-0.005	0.003	**
Years enrolled in school missing	-0.237	0.039		-0.146	0.053	***
Freshmen year of college in t	-0.007	0.041		0.054	0.054	
Employed in t	-0.009	0.019		-0.050	0.017	***
Employed part time in t	0.003	0.015	***	0.039	0.015	***
Black race	-0.188	0.080		-0.127	0.108	
Asian race	0.024	0.161		0.065	0.225	
Hispanic race/ethnicity	-0.033	0.096	***	0.095	0.127	
Age in years - 18	-0.078	0.016	***	-0.046	0.021	***
Age - 18 squared/100	0.435	0.134	***	0.346	0.182	**
Age - 18 cubed/1000	-0.077	0.034	***	-0.080	0.046	**
Black $\times$ age	0.063	0.023	***	0.105	0.031	***
Black $\times$ age^2/100	-0.397	0.195		-0.873	0.260	***
Black $\times$ age^3/1000	0.071	0.050		0.197	0.066	***
Asian $\times$ age	0.012	0.048		-0.015	0.063	
Asian $\times$ age^2/100	-0.108	0.425		0.152	0.525	
Asian $\times$ age^2/100	0.030	0.111		-0.041	0.132	
Hispanic $\times$ age	0.042	0.028		0.004	0.037	
Hispanic $\times$ age^2/100	-0.377	0.239		-0.027	0.312	
Hispanic $\times$ age^2/100	0.088	0.062		0.005	0.080	
Rural residence	-0.003	0.013		0.003	0.017	
Residence type missing	-0.023	0.024	**	0.044	0.031	
Northeast region	0.048	0.025		-0.012	0.034	
North central region	0.026	0.018		0.01	0.024	
South region	0.019	0.018		-0.004	0.024	
Region missing	-0.003	0.050	***	0.048	0.091	
Time trend (1=1984)	0.047	0.013	***	0.057	0.018	***
Time trend squared/100	-0.384	0.175		-0.679	0.233	***
Time trend cubed/1000	0.097	0.066	***	0.225	0.088	***
Constant	1.107	0.160		0.627	0.242	***