In Search of the Glass Ceiling:
Gender and Earnings Growth among U.S. College Graduates in the 1990s

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Gender-typical educational choices and lower rates of earnings growth, or the "glass ceiling," are widely believed to explain why older women earn far less than observably similar men. Using large panels drawn from the NSF National Survey of College Graduates and other data representative of college-educated workers from the 1990s, I search for differential growth rates predicted by both human capital and discrimination models. To the contrary, this study finds similar average rates of earnings growth for women and men across numerous specifications, suggesting that the gender gap in earnings is determined by factors already present early in the career; however, changes in educational choices explain only a tiny fraction of between-cohort narrowing of the gender gap. Further exploration reveals slower earnings growth by women within only two groups: The first is young mothers, who experience slower earnings growth during the early career relative to men the same age, but then more than compensate with faster growth later in their careers. The second is the group of women with exceptionally high earnings levels; relative to men the same age with similarly high levels of attainment, women are underrepresented among workers winning the largest promotions. This phenomenon affects a very small, but potentially influential, subset of women facing a glass ceiling at the very top of the career ladder.

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Introduction

The well-known fact that the gender gap in earnings tends to be larger among older workers than among the young is sometimes attributed to gender differences in the rate of accumulation of human capital due to family responsibilities (e.g. O'Neill 2003), and sometimes to the cumulative effects of discrimination over the course of a career (e.g. Ferber & Kordick 1978, Wood, Corcoran and Courant 1993). Both of these models are consistent with gender gaps that grow with age. One version of the discrimination hypothesis postulates that a "glass ceiling" blocks the entry of women into the very highest level of the occupational hierarchy (Barreto, Ryan and Schmitt 2009). Others use glass ceiling terminology to refer to barriers that slow the career progress of typical working women throughout their careers (Reskin and Padavic 1994). All of these models predict that, on average, men experience faster earnings growth than women.

In a controversial paper, Morgan (1998) suggests a third possible explanation for the relationship between age and the gender gap in earnings.[1] Piecing together evidence from the sparse data available at the time, she reports that among engineers in the 1980s women did not fall behind men of their cohort as they aged. Rather, she finds that gender differentials in starting salaries were large among older cohorts, but small in later cohorts. The persistence of these cohort effects can fully explain the observed correlation between age and gender gaps in her data, even as gender gaps remain relatively constant within a given cohort of engineers over time (Morgan, 1998). Under this "cohort model" model, earnings growth rates are similar for women and men on average, and factors already apparent early in the career are an important determinant of later gender gaps in earnings.

Recent work based on synthetic cohort data reveals that the cohort model describes U.S. labor markets well, not only among engineers, but also within representative samples of all college graduates (Weinberger and Joy 2007), or all full-time workers (Welch 2000, Weinberger and Kuhn 2010).[2] However, several open questions cannot be answered without panel data following large numbers of individual workers—both young and old—over sufficiently long intervals of time: Are the patterns observed in synthetic cohort data similar to those observed in

[1] This paper was published under the provocative topic heading "Research Disputing Conventional Views on Gender," and inspired a heated exchange in subsequent issues of the American Sociological Review: Alessio and Andrzejewski (2000) and Morgan (2000).

[2] A "synthetic cohort" compares a sample of individuals to a later sample of different individuals with the same range of birthdates. A synthetic cohort restricted to full-time workers is subject to changes in composition across observations. This is especially true for women, who are less likely than men to work full-time continuously. Panel data allow a researcher to follow a fixed group of individuals over time.

matched panels with a fixed group of workers followed over time? How are the earnings growth rates of female college graduates related to contemporaneous family responsibilities over the life cycle? And, are the patterns observed on average similar to those observed at different centiles of the earnings growth rate distribution, or of the earnings distribution? A high level of detail about college majors and higher degree attainment will also help to answer the following question: How much of the between-cohort improvement in women's relative earnings can be attributed to between-cohort changes in educational choices? The contribution of this research is to turn attention away from the size of the gender gap in earnings, and towards understanding its evolution within each cohort of women over time.

I combine information from several sources, including the nationally representative NSF National Survey of College Graduates (with a short panel of annual earnings data from 1989 and 1993) and four panels drawn from the NSF SESTAT Surveys of scientists and engineers (with annual earnings from 1989-1999, or hourly earnings from 1989-1996). The shortest panel is representative of U.S. college graduates as of the 1990 Census, and includes detailed information on income, college major and higher degrees for more than 40,000 individuals. The longer panels are selected subsets of the shorter, with the advantage of detailed data on contemporaneous family formation and labor force participation. In these panels earnings growth is measured over a ten-year interval for nearly 2000 women and 9000 men, or over a seven-year interval for more than 4000 women and 13000 men.

Earlier research has made it abundantly clear that women are less likely than men to choose the most remunerative technical college majors, and that this pattern has been quite persistent (Blau and Ferber 1986, Eide 1994, Brown and Corcoran 1997, Weinberger 1998, 1999, 2001, Carrell, Page and West 2010). In all previous cross-section studies, gender differences in college major choices explain a substantial portion of the gender gap in earnings among college graduates (Blau and Ferber 1986, Brown and Corcoran 1997, Weinberger 1998, 1999, 2001, Black et. al. 2008). However, little of the narrowing of the gender gap in pay among young college graduates between 1979 and 1986 can be explained by changes in the distribution of college majors (Datcher-Loury 1997). In 1985 data, a gender gap in hourly earnings can be seen even among young full-time workers 1-2 years after college graduation, conditional on detailed college major, institution attended, and other factors (Weinberger 1998, 1999). This gap is present even before gender differences in family responsibilities or labor market experience

begin to emerge. An even larger gender gap in earnings, conditional on college major, can be seen among older college graduates (Weinberger and Joy 2007, Black et. al. 2008).

Previous research based on data from the National Survey of College Graduates utilizes the detailed information available in the base year cross-section to estimate the proportion of the gender wage gap due to usually unobserved dimensions of human capital, particularly actual labor market experience and the choice of college major (Black et. al. 2008). However, the true impact of a retrospective measure of labor force experience is impossible to estimate in cross-section data. In a final footnote, Black et. al. (2008, p 656, footnote 29) noted that: "…it is possible that women who have high labor force attachment are disproportionately among the most talented women (along dimensions that are not measured in our data), and we may be therefore underestimating wage gaps for women generally when we focus on this group." In other words, it is possible that labor force attachment and current earnings potential are jointly determined by factors that were already present when an individual entered the labor force—including both individual characteristics, and features of the labor market at the time.

To gain a better understanding of the evolution of gender wage gaps, it is necessary to use panel data, following individuals over time**.** Only panel data permit evaluation of the relationship between each individual's earnings growth path and contemporaneous events affecting that individual, as well as meaningful comparison of a given cohort's gender wage gap at the outset versus the conclusion of a time interval.

Data and Measures

This study utilizes data from the 1993 National Survey of College Graduates (NSCG), conducted by the U.S. Census Bureau for the National Science Foundation. The sample for the 1993 survey was drawn from 1990 Census respondents who indicated they were college graduates.[3] Responses to both the 1993 survey questions (including 1993 earnings) and selected1990 Census questions (including 1989 income) are included in the NSCG panel. The panel is representative of all U.S. born, full-time, full-year college-educated white workers aged

[3] More details are provided in the Data Appendix section. The author thanks Nirmala Kannankutty at the NSF National Center for Science and Engineering Statistics for comprehensive explanation of the NSCG and SESTAT sampling frames.

23-52 in 1989 (27-56 in 1993, 33-62 in 1999).[4] A subsample of this panel is followed for ten years, 1989-1999. Follow-up surveys conducted in 1995, 1997 and 1999 as part of NSF's SESTAT system provide detailed information on labor force participation and family formation over the ten year interval. From the group of individuals resurveyed in 1999, two panels are constructed. The smaller 10-year panel (which will be referred to as SESTAT-BA) is a representative sample of individuals with bachelor's degrees in a large number of selected majors.[5] The larger 10-year panel (which will be referred to as SESTAT-BA+) also includes individuals with higher degrees. These longer SESTAT panels includes information on contemporaneous family responsibilities and labor force participation for 5,000 full-time workers with bachelor's degrees, and 10,000 full-time workers with bachelor's, master's, law or medical degrees, over the ten-year period 1989-1999. An even larger pair of panels, hSESTAT-BA and hSESTAT-BA+, describe 9,000 workers with bachelor's degrees, and 17,000 workers with bachelor's, master's, law or medical degrees, over the seven-year period 1989-1996. The short NSCG panel follows 40,000 college graduates with all undergraduate majors, and all combinations of higher degrees, over the period 1989-1993.

Because these surveys are not yet familiar in the labor economics literature, some of the regression results are compared to those obtained using familiar Census samples (Ruggles et al. 2004), and an extensive Data Appendix describes the properties of each of the five panels, both relative to each other and in comparison with better-known samples of college graduates.

Variables used in this study include sex, age, educational attainment, college major, measures of labor force attachment, parenting status, and indicators of career progress.[6] Educational attainment as of 1988 (one year before the initial earnings observation) is based on complete educational histories collected in the 1993 survey. All panels are restricted to individuals who completed their education by 1988. Estimates of gender gaps in earnings levels include controls for the contemporaneous number of hours worked per week.

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[4] The study is restricted to white workers born in the U.S. to avoid the confounding factors of between-cohort changes in racial discrimination and selection into immigrant status. Gender differences in college major choices and labor force participation are most pronounced among white graduates (Weinberger 1998, Weinberger and Joy 2007). The sample is also restricted to individuals who earned a bachelor's degree by age 30, to improve comparability between the older and younger members of the sample.

[5] The SESTAT-BA panel includes only individuals with no higher degrees, and was sampled by the NSF based on college major (not necessarily occupation) in computer science, engineering, math, science, or social science, and restricted to individuals with no new college degrees after 1988. Everyone in this group was targeted to be included in each NSF resurvey.

[6] Sample means are reported in Appendix Tables A-1 and A-2.

The measures of annual earnings growth used in the panel analysis are based on 1989 annual income matched with annual salary or income at a later point in time: annual salary of full-time workers as reported in the 1993 or 1999 follow-up surveys, or 1996 annual income of full-time, year-round workers as reported in the 1997 follow-up survey.[7] Hourly earnings growth is based on hourly earnings computed in 1989 and 1996 for all workers who reported working at least half the year either part-time or full-time.[8]

To avoid measurement issues, most of the earnings growth analysis includes only individuals employed full-time at the time of observation.[9] While this is not a representative sample of all employed workers, the full-time worker analysis does not completely miss the role of varying levels of labor force participation. For example, in the SESTAT panel, 30 percent of the women employed full time in both 1989 and 1999 did not work full-time over the entire ten year period. The analysis can therefore discern differences in full-time earnings growth between those who worked full-time continuously versus those who did not. The most important advantage of this approach is that penalties for part-time work are not confounded with true earnings potential.

Extensive robustness checks compare results based on growth in annual earnings among workers employed full-time in both 1989 and 1999 to those based on hourly earnings growth among workers employed either part-time or full-time in both 1989 and 1996.

Gender Gaps by Age in a Cross-Section Analysis

[7] As is true of most data made available to researchers, the exact income of very high earners is topcoded. Topcodes affect less than 1 percent of women and 4 percent of men in 1989 and 1993 observations, but affect 3 percent of women and 5 percent of men in the 1999 observation of the SESTAT-BA bachelor's degree panel, and 4 percent of women and nearly 9 percent of men in the 1999 observation of the SESTAT-BA+ panel including master's degrees, doctors and lawyers. The proportion varies across groups—for example one third of male doctors have topcoded 1989 earnings. A simulation exercise toward the end of the paper bounds the impact of topcoding on growth estimates.

[8] Observations with annual full-time earnings reported to be less than $2000 (in 1989 dollars), or hourly earnings computed to be less than $1 (in 1989 dollars), were dropped from the analysis. A small number of individuals with very low or very high 1993 earnings about 1% of the sample, had their true 1993 earnings data replaced by $40,000 to protect confidentiality. In these cases, the imputed values convey absolutely no information about true 1993 earnings, so this group of individuals was dropped from the analysis of growth between 1989 and 1993. (Retaining this portion of the sample while assigning high earnings to all men in this category had very little impact on the results). Observable earnings range from $8840 to $150000 in 1993, and from $0 to $140000 (topcoded) in 1989. In the 1989-1993 growth analysis, those with 1989 earnings below the inflation-adjusted 1993 floor were dropped to avoid biasing growth estimates upward. Hourly earnings were computed as (annual income)/(hours per week*weeks per year), restricted to those who worked at least 26 weeks.

[9] Part-time workers tend to earn less per hour, and the causal relationship between part-time work and earnings is not well understood.

Table 1 presents a series of cross-section earnings regressions for 1989 only, using various subsamples from the different data sources. The estimates presented in Table 1 are intended to be descriptive. Rather than test any particular hypotheses, these regressions describe the relationship between age and the gender gap at a particular point in time. The Table 1 regressions confirm that the results of this measurement are not particularly sensitive across the subsamples of the NSCG used in different portions of the later panel analysis, and illustrate the importance of improved measures of educational attainment available in the NSCG data, compared to the basic educational attainment data contained in the Census.

In each Table 1 specification, gender earnings gaps are estimated separately for each of three age groups. Formally:

$$\begin{aligned}\ln(\text{annual earnings}_i) = \; & f(\text{age}_i, \text{educational attainment}_i, \text{hours worked}_i) \\ & + \beta_1 * (\text{indicator=1 if } i \text{ is a woman aged 23-32 in 1989}) \\ & + \beta_2 * (\text{indicator=1 if } i \text{ is a woman aged 33-42 in 1989}) \\ & + \beta_3 * (\text{indicator=1 if } i \text{ is a woman aged 43-52 in 1989}) \\ & + \varepsilon_i\end{aligned}$$

The dependence of earnings on age is allowed the greatest possible flexibility with a set of dummy variables spanning each of the 30 possible years of age. Therefore the gender gap estimates (β_1, β_2, and β_3) describe the average earnings of women in a given cohort relative to men exactly the same age. The specification of educational attainment varies from column to column of Table 1, as more detailed controls are included in successive regressions. Controls for broad categories of number of hours worked per week are added to account for the level of effort provided, conditional on working full-time.[10] In every Table 1 specification, the estimated values of all three gender coefficients (β_1, β_2, β_3) are negative and statistically significant at the 1 percent level, and the gender differential in the oldest cohort is three to four times larger than in the youngest.

The first two columns of Table 1 present estimates of gender wage gaps using representative samples of college graduates from the Census (column 1) and the National Survey of College Graduates (column 2). The estimates are very similar, confirming that these samples are truly

[10] Categories of hours/week controls are 35-39, 41-48, and 49 or more, with 40 the omitted category.

comparable.[11] This cross-sectional analysis confirms that gender gaps are larger for the older cohorts, within the full representative sample of all white U.S. born college-educated full-time workers in the 23-52 age range.

In columns 3 and 4 of Table 1, first broad and then detailed controls for pre-labor market credentials including majors, minors, and fields of graduate degrees are introduced. The more detailed controls explain only slightly more of the gender gap than the small number of broad controls, suggesting diminishing returns to incorporating even better controls for unobserved investments. It is worth noting that the coefficient estimates for the middle age range of columns (2) and (4) are very close to corresponding estimates based on a nonparametric matching technique (Black, et. al. 2008).[12] Specifications in columns 5 and 6 show the stability of the estimates to sample restrictions imposed in the 1989-1999 panels. In column 5, the samples are restricted to include only bachelor's level college graduates, and in columns 6 and 7, restricted to the SESTAT-BA and SESTAT-BA+ samples used in the ten-year panel analysis.[13] In all three of the restricted samples, the estimated gender gaps are quite similar to those for the full sample of all college-educated full-time full-year workers. In each of the six specifications, the gender gap faced by the oldest cohort is at least three times as large as that faced by the youngest. Given the very limited ability of even highly detailed controls for types and levels of education to attenuate the inter-cohort differences in the gender wage gap, it seems unlikely that differences in the pre-labor market educational choices of women can explain why older cohorts of women face larger gaps.

Further evidence that the relationship between age and the gender gap is not driven by changes in the composition of college majors over time is presented in Table 2. Here, the cross-section regression described in Table 1, column 5 is performed separately for each broad college major category. The same pattern emerges within nearly all fields: Gender gaps are small among young workers (no more than 12 percent) and larger among older workers (30-45

[11] To improve comparability with both the Census and the 1993 earnings measure, the NSCG earnings measure was topcoded at the Census level. If this topcode is relaxed, the gender gap estimates for young workers are unaffected, but the estimated gender gap is larger among older workers. For example, the estimate for age group 43-52 in Table 1, column 2 grows from -0.446 (0.015) to -0.472 (0.015), and the column 3 estimate grows from -0.349 (0.015) to -0.375 (0.015).

[12] Black, Haviland, Sanders and Taylor (2008, Table 5, Panels A and B) used a restricted version of the same data set, and estimated the gender gap among white college graduates age 25-60 to be –0.282 with controls for age and level of highest degree (compared to the column 2 estimate –0.286 for age range 33-42), falling to –0.184 when controls for detailed field of degree were added (compared to the column 4 estimate –0.195 for age range 33-42).

[13] Sample means for each subsample can be found in Appendix Table 1.

percent), with only two exceptions. The two exceptions are computer science, where gender gaps are small (or favor women) for all ages, and the predominantly female health professions, where gender gaps are not much larger among older than younger women. These two exceptions involve less than 10 percent of the full sample. For the vast majority of bachelor's level college graduates, older women face far larger gender gaps than younger women *with the same college major*. Women's college major choices cannot explain why older cohorts of women earn so much less than similarly educated men.

Evolution of Gender Gaps as a Cohort Ages

The cross-section analysis of Tables 1 and 2 cannot distinguish whether the smaller gender gaps among younger workers will tend to grow as this cohort ages. There are two ways to address this question. The first is to examine a later cross-section of the same group of workers, and the other is to estimate an earnings growth regression. Both of these approaches reveal that, except for the youngest workers, the estimated gender gaps do not grow as a cohort ages.

Both Figure 1 and Table 3 take the first approach. Figure 1 follows the subset of the full NSCG sample with full-time earnings observed in both 1989 and 1993. The slope of each line segment describes the rate of change in average annual earnings between 1989 (point at left-hand end of segment) and 1993 (point at right hand end of segment), for men (thick solid) or women (dashed) in each of eight 5-year age cohorts. This figure illustrates that while men's earnings growth paths tend to follow the familiar Mincerian path, flattening with age, women's earnings growth paths do not. Except for the youngest age groups, the women's slopes are steeper than the men's. This figure also includes a set of thin solid segments reflecting a simulation designed to estimate the earnings of each group of women under the counterfactual that all cohorts of women retained the same distribution of undergraduate college majors as the oldest cohort.[14] This provides a visual confirmation of the result described earlier: very little of the between-cohort narrowing of the gender earnings gap can be explained by changes over time in college major choices.

[14] In this simulation, the sample of women was "reweighted" to have the same proportions of broad majors as the oldest cohort. For example, among women age 23-32, those with education majors were counted as 3.11 observations, those with business majors were counted as one-fourth (0.24) of an observation, and those with engineering majors were counted as only one-twentieth (0.06) of an observation.

Regression analysis of the 10-year panel reveals similar patterns. Table 3 describes repeated cross-section regressions that follow the Table 1, Column 6 sample from 1989 to 1999. In this table, cohorts are followed diagonally—for example, the cohort aged 23-32 in 1989 is aged 33-42 in 1999, one row down and one column over. The repeated cross-section regressions of columns 1 and 2 include all full-time workers, while those of columns 3 and 4 are restricted to the SESTAT-BA matched panel of workers employed full-time in both 1989 and 1999. The two pairs of regressions can be compared to each other to facilitate understanding of patterns of selection into or out of the labor market over the 10-year interval. For example, the women who were in the sample both years had similar 1989 earnings, and slightly higher 1999 earnings, than the full sample of women described in columns 1 and 2. This confirms that the larger gender gaps observed among older women in the cross-section are not due to the selective exit of high-initial-salary women from the full-time labor force. In fact, the opposite appears to be true. The low 1999 earnings levels among persistent older women were already anticipated by low 1989 earnings; faster earnings growth rates actually narrowed the gender gap within the matched panel of older women followed from 1989 to 1999.[15] An explanation for this narrowing will be explored in a later section of the paper, entitled "Contemporaneous Factors and Gender Differences in Earnings Growth."

Returning to the question of the role played by changing educational choices in the between-cohort narrowing of the gender earnings gap, columns 5 and 6 of Table 3 add detailed educational attainment controls to the regressions of columns 3 and 4. Again, the gender gap faced by the oldest women remains 2-3 times as large as that faced by the youngest cohort of women in each year. Consistent with the evidence presented earlier, differences in educational choices cannot explain why the two older cohorts, aged 33-52 in 1989, face larger wage gaps than the two younger cohorts, aged 33-52 in 1999. For example, women in the 33-42 age range in 1989 faced a 21 percent gap, while women aged 33-42 in 1999 faced only a 12 percent gap, relative to men the same age with the same college major. As the 1989 cross-section results of

[15] Following individuals rather than cohorts (from column 3 to 4) confirms that the career progress of the typical woman employed full-time in both 1989 and 1999 either matched or surpassed that of men, relative to analysis based on repeated cross-section data. However, this observation begs the question of whether this set of women (employed full-time in both 1989 and 1999) accurately represents the set of opportunities faced by the typical woman who might possibly enter the labor force. Of particular concern is the possibility that persistence to the 1999 observation might depend on the initial earnings growth trajectory, as well as on the initial earnings level. Further analysis finds no evidence of disproportionate attrition by women with slower rates of early earnings growth. The model and regressions to address this issue are presented in the data appendix.

Tables 1 and 2 and the simulation results in Figure 1 have already suggested, differences in college major cannot explain why older cohorts of college-educated women face larger gaps.

Another way to illustrate the point that women's earnings grew at least as quickly as men's during this time period is to estimate an earnings growth regression. A simple specification is described here, with extensive robustness checks to follow in a later section of the paper. Under the usual Mincer specification, the rate of earnings growth is decreasing in age (or work experience). Many other factors that affect earnings levels will be constant within individuals. Here we test the hypothesis that the rate of earnings growth is lower for women than for men, conditional on age, using the SESTAT-BA panel of bachelor's level college graduates employed full time in both 1989 and 1999 (but not necessarily working full-time, or at all, in the years in between). This is the same sample used in Table 3, columns 2-4. Measuring earnings growth as the annual average change in log earnings,[16] yields the following estimated relationship:

$$\text{Growth} = \underset{(0.002)}{0.001}*\text{female} - \underset{(0.000)^{**}}{0.002}*(\text{age}-32) + \underset{(0.001)^{**}}{0.024} \qquad \text{Equation 1}$$

The positive coefficient on female suggests it is unlikely that the true rate of earnings growth is lower for women than men in this sample of college educated workers, employed full-time in both 1989 and 1999.[17]

The robustness of the non-negative coefficient on "female" in the earnings growth regression is confirmed in numerous alternative specifications reported in Table 4a. In each column, a slightly different sample is used. Column 1 uses the same SESTAT-BA panel of bachelor's level graduates as Equation 1 above, estimating relative growth rates between 1989 and 1999, but with a more flexible specification of the relationship between age and the growth rate. Column 2 restricts to the subset of SESTAT-BA with a 1989-1993 growth measure available. Column 3 expands the sample to all NSCG panel observations eligible for inclusion in the column2 sample, whether or not they persisted beyond the 1993 survey. Columns 4-5 are parallel to columns 1-2, but based on the more inclusive SESTAT-BA+ panel. Column 6 uses the full NSCG panel of

[16] The per year, cpi adjusted growth rate is computed as : Growth=(ln(1999 real salary)-ln(1989 income))/10 or (ln(1993 real salary)-ln(1989 income))/4. (Unfortunately, data are not available for either 1989 salary nor 1993 annual income, but a comparable annual income measure is available in 1996). Except where noted, growth regressions are unweighted.

[17] The rate of growth is actually somewhat higher for women, but the coefficient is very small relative to the constant term, and is neither statistically nor economically significant. The gender coefficient is the same (0.001 with standard error 0.001) when age fixed effects are included, rather than a linear age term—see Table 4.

white college educated workers employed full-time in both 1989 and 1993, including college graduates with all undergraduate majors, as well as those with higher degrees. Column 7 removes the restriction to white graduates, and Column 8 uses the parallel panel drawn from the PSID. In each of the first 8 specifications (1-a through 8-a), per-year growth in log annual earnings is estimated to be at least as large for women as for men the same age. This result is not specific to the SESTAT samples, but holds for representative samples of all U.S. college graduates as well. Similar results can be seen in specifications 9a through 14a of Table 4b, based on per year growth between 1989 and 1996 in either annual or hourly earnings among either full-time or both part-time and full-time workers. The gender growth coefficient is close to zero, or slightly positive, in each of these 14 panels.[18] Overall, a conservative interpretation of these results is that the average rate of earnings growth was not lower for women than for men among college graduates in the 1990s.

The regressions displayed in the second portion of Tables 4a (specifications 1-b through 8-b) and 4b (specifications 9-b through 14-b) corroborate the robustness of another pattern observed in Table 3: In some specifications relative growth rates are lower among the youngest women, but older women's growth rates tend to be equal to or higher than men's among full-time workers the same age.[19] This pattern of faster growth among older women is consistent with both supply-side human capital models in which women have more energy to devote to work or make new investments in skills towards the end of their child-rearing years (Becker 1985, Mincer and Polachek 1974, Polachek 1975, Weiss and Gronau 1981), and also with demand-based models in which new antidiscrimination legislation improves women's opportunities, canceling out some of the effects of previous discrimination (Blau and Kahn 2000) or in which technical change drives increasing relative demand for women's (extra-curricular, or "soft") skill sets (e.g. Blau and Kahn 1997, 2006, Weinberg 2000, Borghans, ter Weel, and Weinberg 2006,

[18] An additional control for "Consistently Part-Time Worker" in the column 9 and 12 specifications shows no tendency for this group to fall behind other women in hourly earnings growth. Restricting the remainder of the analysis to the full-time panels is therefore unlikely to overstate women's earnings growth rates.

[19] Similar findings of rapid earnings growth among older women have been reported in many previous studies (Mincer and Polachek 1974, Polachek 1975, O'Neill & Polachek 1993, Blau & Kahn 2000, Weinberger and Kuhn 2010). Note that the careful Light and Ureta (1995) study of earnings growth among very young workers includes only individuals age 24 in the initial observation, followed to their early thirties, and therefore corresponds to only a tiny portion of the youngest group in this study (age range 23-32 in the initial observation, followed to age range 33-42).

Bacolod and Blum 2009). "Falling behind" is not a viable explanation for the lower earnings of older college-educated women.

This finding is not consistent with explanations of older workers' gender wage gaps based on lower rates of human capital accumulation among women, nor with those based on the cumulative effects of discrimination leading to ever-widening gaps in earnings over the course of a career.

Evolution of Gender Gaps within Sub-sectors of the Labor Force

The "glass ceiling" imagery is so pervasive that it is worth exploring further to see whether it applies within some segments of the college-educated labor force. In this section numerous checks explore whether women's earnings growth was equal to (or faster than) men's within different sub-sectors of the college educated labor market during the 1990s.

Regressions presented in Table 5 confirm that women's earnings growth was at least as high as men's among college-educated workers with both bachelor's and higher degrees, and for women of all ages. The even-numbered columns of Table 5 show that estimated gender differences in earnings growth are not affected by inclusion of controls for field of highest degree. Table 6 further emphasizes the robustness of similar earnings growth rates for women and men, finding that this is true in nearly all bachelor's degree fields (engineering, math or science, social sciences, business, humanities, education or health), as well as three popular professions (doctor, lawyer, and manager). In fact, the only case in which women's earnings did not keep pace with men's is among those with bachelor's degrees in computer science, a field with high wages and rapid earnings growth for both men and women during the early 1990s.[20]

Table 6 shows, surprisingly, that even among lawyers, women in the NSCG sample had faster earnings growth than men. This finding seems to directly contradict the Wood, Corcoran and Courant (1993) study, which found a large, unexplained gender differential in career progress favoring men among lawyers. However, further analysis with Census data solves the mystery. The regressions displayed in Table 7 are cross-section earnings regressions using 1980, 1990, and 2000 Census data with the sample restricted to lawyers only. These reveal very different growth outcomes for the cohort of lawyers followed by Wood, Corcoran and Courant

[20] Earnings growth for both men and women in computer science was so rapid during this time that the youngest women in this group experienced faster growth than women (or men) in any other field. Also, note the very low gender differentials in earnings *levels* among computer science graduates estimated in Table 2.

(1993), when compared to the cohort represented in the NSF NSCG data. Within the cohort of lawyers who were in their thirties during the 1980 census, the gender gap tripled by the 1990 Census. Within the later cohort, who were in their thirties during the 1990 Census, the gender gap did not grow at all before the 2000 census. While the cohort model did not describe the labor market for lawyers in the 1980s, it seems to do so in the 1990s. The search for evidence of glass-ceiling-related differences in earnings growth will be resumed in a later section of the paper, focusing on differences among those at the very top of the earnings hierarchy.

Contemporaneous Factors and Gender Differences in Earnings Growth

In previous studies, researchers have tried to find reasons for women's lower earnings levels at a given age. My study is different. Here, I am attempting to understand why older women experience *faster* earnings growth than men or other women, despite their persistently low *levels* of average earnings. The first explanation that comes to mind is that older women have decreasing levels of parental responsibility, and are therefore able to devote more hours and energy to work, or to learning new skills (e.g. Mincer and Polachek 1974). Regressions displayed in Tables 8a and 8b show that this type of explanation can account for most of older women's faster earnings growth in both the SESTAT-BA and SESTAT-BA+ samples.

Table 8a, Column 1 displays the now familiar pattern: small gender differences in earnings growth among younger workers, and larger differentials favoring women among older workers. In Column 2, controls are included for changes in hours worked per week between 1989 and 1999. There is virtually no change in the estimated gender coefficients.[21] There is also almost no effect when a control is included for labor force attachment between 1989 and 1999 (Column 3).[22] Stronger labor force attachment has the expected positive correlation with earnings growth, but cannot explain the observed pattern of gender differentials in earnings growth. In other words, while a correlation between labor force attachment and earnings growth can be detected, this relationship has little impact on the magnitude of the overall gender gap among full-time workers. Column 4 tests the hypothesis, suggested by Light and Ureta (1995), that labor market

[21] Note that, while increasing hours is associated with a higher rate of earnings growth, decreasing hours by the same proportion appears to be associated with a more dramatically lower rate of earnings growth. This might be due to either a kink, or to measurement issues. Neither of these coefficients should be interpreted as a causal effect of hours on the rate of earnings growth.

[22] This control takes the form of an indicator of whether or not the worker was employed full-time over the entire 1989-1999 period (vs. observed working part-time or not at all in some intervening year). An interaction term between gender and "not full-time all years" has a coefficient that is not statistically different from zero.

interruptions have the greatest impact earlier in the career. The observed relationship suggests similar costs to early and late interruptions in this sample. Notably, the gender coefficients are not sensitive to this set of controls. Only one factor appears to explain a significant portion of the gender differential among older women: women who had children at home in 1989 but not in 1999 experienced particularly fast earnings growth over this period (Column 5).[23] In column 6, a more refined version of the "empty nest" specification suggests that, in addition to the fast growth seen when children leave home, a portion of older women's earnings growth can be attributed to children growing older (and presumably requiring less care).[24] After including this more complete set of controls for changes in family structure between 1989 and 1999, older women and men have nearly identical rates of earnings growth. Neither the column 5 nor column 6 regressions estimate a statistically significant impact of becoming a new mother, conditional on returning to full-time work by 1999. Table 8b presents virtually identical results for the larger SESTAT-BA+ sample. While decreasing levels of parenting responsibility seems to contribute to the strong earnings growth among older women, new parenting responsibility is statistically unrelated to the falling behind observed among the youngest women when individuals are followed over a ten-year interval. These findings strengthen the argument that differences in gender gaps established in the early part of the career play a dominant role in determining the gender gap in earnings throughout the career. Gender differences in contemporaneous measures of individual behavior absolutely do not predict growth in the average gender earnings gap between 1989 and 1999.[25]

Another piece of evidence about the relationship between family responsibilities and the lower earnings of older women is presented in Table 9a, where earnings growth rates are computed separately for mothers and non-mothers, relative to men the same age.[26] For each sample examined, Columns 1-3 show that earnings growth rates are statistically equal for non-mothers and men at every age, but that earnings growth is statistically faster among older mothers and slower among younger mothers (although the earnings growth of younger mothers does not significantly lag behind the earnings growth of other young women in the column 1 age

[23] Note that the commonly observed drop in earnings following childbirth apparently has only transitory effects, since those women who became mothers within this ten-year interval but then returned to full-time work had nearly the same average rate of earnings growth as non-mothers and those who had children at home in both 1989 and 1999.
[24] Means of the parenting responsibility variables, by cohort, are presented in Appendix Table 3.
[25] The same set of regressions using the SESTAT-BA+ sample has nearly identical results. See Table 8+.
[26] Here, mothers are defined as those who have children in any observation 1989-1999.

group).[27] In fact, the rate of earnings growth is fastest within the two groups least likely to have worked full-time over the entire 1989-1999 interval—mothers in the age ranges 33-42 or 43-52. Taking the longer view, Columns 4 and 5 show that, over the course of a career, earnings growth is statistically equal for mothers, non-mothers, and men.[28] Becoming a mother does tend to temporarily reduce earnings growth among younger workers, but over time mothers catch up so that differences cancel out to yield growth rates that are comparable to, or even surpass, men's.

Table 9b repeats the same exercise, but using the expanded panels of both part-time and full-time workers observed working in 1989 and 1996. Here, we see that hourly earnings growth rates are statistically equal for non-mothers and men at every age, and statistically faster among the oldest mothers. However, growth in hourly earnings among young mothers in this group is not statistically lower than growth among either men or other women the same age.

Average differentials in both levels and slopes are described graphically in Figures 2 and 3. The visual depiction clarifies that the differences in earnings growth rates between mothers, men and other women are very small relative to the size of persistent gender gaps in earnings levels. Figure 4 presents an inflation-adjusted version of the Figure 3 statistics. Here, it is also evident that the size of the gender gap is much larger for the older cohorts, and that the rate of falling behind among young women is far too small to evolve into the magnitude of disadvantage faced by the members of the oldest cohort throughout their careers.

The Glass Ceiling at Last?

The analysis presented so far provides strong evidence that the earnings potential of the typical woman does not fall farther behind that of the typical man as their careers progress. However, the glass ceiling metaphor sometimes refers to gender differentials at the top, rather than among typical workers. Evidence of a glass ceiling blocking women's entry into management can be seen in specific organizations (Strober and Jackman 1994, Ransom and Oaxaca 2005). In this section, I describe evidence of gender differences in earnings growth among exceptionally well-paid workers. Even if very small numbers of women are involved, the

[27] There is not a statistically significant difference between the coefficients on "mother" and "non-mother" in the column 1 specification for the youngest women.

[28] Evidence presented in Weinberger and Kuhn (2010) suggests that the slopes of age-relative earnings trajectories are fairly stable across cohorts, even as relative earnings levels shift, so aggregating growth rates across cohorts can produce a meaningful statistic.

consequences could be substantial if barriers block women's entry to particularly influential positions.

In a related study using panel data following a cohort of MBA graduates from the University of Chicago Graduate School of Business (GSB), Bertrand, Goldin, and Katz (2010) found that the average earnings of men grow far more quickly than the average earnings of women during the first 10 years after MBA graduation. The detailed survey data set describing this highly selected sample is ideal for the purpose of understanding gender differentials in promotion to influential jobs. (To illustrate how highly selected the sample is relative to typical U.S. MBA graduates, only 5 percent of the nationally representative sample of MBAs described earlier in this paper earns more than the median salary of GSB MBA graduates, matched for age, gender and experience).[29] A key finding of Bertrand, Goldin and Katz (2010) is that the gender differential in average earnings grows much more dramatically than the gender differential in median earnings, bolstering the view that a small subset of jobs at the very top of the earnings distribution play an important role in women's lower earnings growth among GSB MBAs. The fact that these jobs confer high levels of status, power and responsibility means that understanding the promotion process is important, even if the number of affected women is very small.

This observation leads to the hypothesis that glass ceiling effects might be observed among workers at the upper end of two different distributions: those enjoying both high salary levels *and* a high rate of earnings growth. Figure 5, and Table 10, describe the results of this analysis. Figure 5 displays the average 1989 to 1999 rate of earnings growth at different centiles of the growth rate distribution among women and men at each of the five quintiles of the 1995 salary

[29] Compared to the nationally representative samples of MBAs described in Table 6, columns 9 and 10, both men and women in the GSB MBA sample work about 10 hours more per week, and earn substantially more money. After inflation-adjusting the GSB median earnings conditional on gender and years since MBA graduation (Bertrand, Goldin, and Katz, 2009, Table 2), it is possible to estimate that, among those with no more than 5 years post-MBA experience, only 5 percent of men and 4 percent of women in the nationally representative samples of MBAs earn more than the median salary of GSB graduates, conditional on gender and experience. (In the larger sample of all college graduates with no more than 5 years experience beyond the highest degree, only 3 percent of men and 2 percent of women earn more than the median salary of GSB graduates, conditional on gender and experience). Interestingly, among MBA graduates with between 6 and 9 years of experience, 4 percent of men but 13 percent of women in the nationally representative MBA sample earn more than the median salary of GSB graduates matched for gender and experience. This suggests that the earnings of female GSB graduates grow slowly relative to women with MBAs from less prestigious institutions, as well as relative to their male former classmates.

distribution.[30] In Figure 5, women's earnings growth exceeds men's in 23 of the 25 comparisons; the two exceptions are for the highest centiles of the growth distribution among workers with the highest earnings levels. This figure clearly shows that in the lower 4 quintiles of salary level, women enjoy higher growth rates not just on average, but across the entire growth rate distribution. However, among workers at very high salary levels, men appear to be disproportionately likely to earn the very largest promotions over a ten-year interval. Regressions displayed in Table 10 confirm the statistical significance of this relationship; at high salary levels, women are underrepresented among those earning the largest promotions. This relationship is statistically significant overall, and also for the subsample of younger workers (Table 10, column 4, female*high salary interaction terms, specifications a-c).[31] *In fact, it appears that the slower rate of growth observed earlier, on average, among young women is entirely confined to a small subset of young women with very high earnings levels*; Figure 6 illustrates this result. Specification 4-d indicates that older women with very high earnings are also underrepresented among those on the fastest growth paths in this sample of older workers, but this result is not statistically significant. Regardless of the level of statistical significance, the results based on older workers are only suggestive because a large fraction of the older men and women in the group with high 1995 salary have topcoded 1999 earnings.[32] Further investigation of this phenomenon will require large panels with non-topcoded earnings data.

Until an appropriate source of non-topcoded data is identified, some insight can be gained from a simple simulation. To bound the impact of topcoding on the Table 10 estimates, specifications (1-c)-(4-d) were estimated using a counterfactual earnings growth measure replacing topcoded men's 1999 earnings with twice the topcode (an upper bound on the average earnings of topcoded men) and using actual rather than topcoded 1989 earnings.[33] The results of

[30] Salary level was measured using the 1995 observation because it is near the midpoint of the 1989-1999 interval. It is important to use an independent observation to determine the salary level, unaffected by any error in the 1989 or 1999 earnings measures used to compute the growth rate measure.

[31] Specifications 1-a through 4-a impose the assumption that the baseline age-earnings-growth profile shifts by a constant amount among workers with high salary, while 1b through 4b allow a more flexible relationship between age, 1995 salary and the 1989-1999 growth rate.

[32] In the 33-52 age group, about 40 percent of both men and women earning more than $85,000 per year in 1995 had topcoded earnings in 1999. (In fact, of the 653 individuals with topcoded earnings in the sample of 10,085, 60 percent were men aged 33-52 who earned more than $85,000 per year in 1995). Among both men and women with lower 1995 earnings, fewer than 2 percent faced 1999 topcodes.

[33] A similar simulation for comparison to Table 9 shows similar effects on mothers and nonmothers of all ages, slightly reducing estimates of earnings growth for all groups of women relative to men, with no change in patterns describing mothers relative to other women.

this exercise show almost no change in estimated coefficients for the lower salary groups. However, in this thought experiment, both older and younger women at high salary levels are less likely than men with equally high salaries to receive large promotions. The estimated female*high salary interaction terms are statistically significant (and stronger than the corresponding Table 10 estimates) for all four columns among young women.[34] Among older women, this thought experiment produces statistically significant negative coefficients on female*high salary interaction terms at the 75th, 85th and 95th quantiles.[35] The truth likely lies somewhere in between this simulation and the Table 10 estimates, but this result suggests that estimates based on non-topcoded data would find glass-ceiling effects among older high-achieving women. Meanwhile, the low prevalence of topcoded earnings among young workers leaves no question that young women with very high earnings for their age face a measurable disadvantage in future promotions relative to men the same age at the same salary level.

Discussion and Avenues for Future Research

The highly visible CONSAD Report (2009) on the status of women in the U.S. labor force attributes the majority of the current gender earnings gap to women's choices, including gender-typical educational choices and the allocation of time between career development and family care. The research on which the CONSAD Report is based, however, relies primarily on data that cannot elucidate the dynamic processes leading to adult earnings outcomes. In the research presented here, analysis of large, rich panel data sets reveals the small role played by both pre-labor-market educational choices and contemporaneous family responsibilities in the evolution of the persistent, large gender gap among older workers as well as the smaller, but equally persistent, gender gap among younger workers.

Recent media reports have raised concerns about highly educated, successful career women who "opt-out" of the labor force to spend time caring for children, despite the absence of statistical evidence that this is a widespread phenomenon (Boushey 2005, 2008). The evidence presented here suggests that by the time they reach their 40's or 50's, highly educated mothers are as likely as other women the same age to participate in the labor force, to work full-time, and

[34] The estimated coefficients are -0.015 (0.005) at the 50th, -0.043 (0.006) at the 75th, -0.071 (0.010) at the 85th, and -0.090 (0.014) at the 95th quantiles.
[35] The estimated coefficients are -0.024 (0.005) at the 75th, -0.041 (0.005) at the 85th, and -0.069 (0.016) at the 95th.

to be persistent labor force participants. In addition, older mothers are progressing in their careers at rates comparable to or even exceeding the career progress of women who have no children. However, this research shows that low relative earnings continue to affect older women, regardless of whether they are mothers.

Mulligan and Rubinstein (2008) suggested that the older cohorts of employed women are more negatively selected on unobservable characteristics, resulting in low productivity and pay. It is difficult to reconcile this view with evidence presented here that even within groups quite homogeneous in educational attainment (such as college graduates with business degrees), the gender gap in earnings is at least three times as large when the older cohort is compared to the younger cohort. It seems unlikely that within nearly every academic field of study the best and brightest of the older cohort withdrew from the labor market. The Mulligan and Rubinstein model does not seem to be a good fit to describe the labor market for college graduates.

This study presents evidence suggesting that women who appear poised to join the ranks of the highest paid workers are less likely than men with comparable early attainments to receive the largest promotions. This pattern appears to apply to all highly successful women, both mothers and non-mothers. However, further research based on large panels of non-topcoded data is required.

One overarching policy question is whether the between-cohort reduction in the gender earnings gap might be reversed if government policies are relaxed, or whether supply-side changes in women's choices and behaviors—including college major choices, pursuit of higher degrees, and the allocation of time between career development and family care—led to increased productivity and market-driven increases in women's pay. The evidence presented here suggests that between-cohort narrowing of the gender gap in pay was primarily driven by factors other than the observable choices or behaviors of individual women. Demand-side increases in employers' preference for female workers, conditional on educational credentials, led to higher starting salaries among female recent college graduates. The reasons for this shift—whether the growing demand for women's labor was due to government policies, social change, or technological changes that enhanced the relative value of (extracurricular) skills typically embodied by women—are not addressed by this research. What is clear is that the benefits associated with improved labor market opportunities persisted throughout the careers of younger cohorts, regardless of later patterns of family formation.

An analysis of gender differences in earnings profiles by Weinberger and Kuhn (2010) covers a far longer time frame than the NSCG or SESTAT data used here. Using Census and CPS synthetic cohorts spanning 1960-2004 (and all education levels), both the between-cohort shifts in the gender gap and a slight within-cohort narrowing of the gap as each cohort ages are shown to be long-standing patterns. The detailed panel data analysis presented in this paper follows individuals over time to rule out selective attrition as an explanation of the synthetic cohort results, and clarifies that changes in early educational investments cannot explain the between-cohort shifts. These findings, taken together, point toward reevaluating traditional explanations for the existence and persistence of gender gaps in earnings, and for the tendency of gender gaps to be larger among older workers.

The finding that earnings growth rates are similar for men and women must be interpreted in the context of persistently lower levels of earnings for women of all cohorts. This study finds that, among college graduates in most fields, women in their forties earn 30-45 percent less than observably similar men the same age, conditional on educational credentials and number of hours worked per week. The unique contribution of this study is to document that, for the typical woman, this large gender gap in earnings seems to have very little to do with "falling behind" over the course of the career. While there is evidence of some widening of the gender gap among young workers, this seems to be largely confined to the early years of a career. When followed over a longer time span, mothers tend to fall behind when young but experience a compensating burst of faster growth later in life. Non-mothers have earnings growth rates that are very close to men's throughout the career. This results in a lifetime rate of growth that is similar for mothers, women who are not mothers and men. Therefore, the key issue to pursue is why young women tend to begin their careers earning so much less than men with similar educational credentials. Study of career dynamics among very young workers might be a particularly fruitful avenue for research to understand the underpinnings of persistent gender gaps in outcomes.

If the between-cohort shifts in the gender gap are not due to changes in women's college major or family choices, research focus must shift to the demand side. Regardless of whether driven by falling levels of discrimination or by technological change, a fully satisfying answer must explain not only why younger women enjoy higher relative wages but also why older women do not. I propose that one possible model consistent with the observed patterns includes

complementarity between youth and entry to certain career paths. A door that was initially closed to women can only be opened to the young, while older women can never pass through. If this is the case, then factors such as falling discrimination or growing demand for women's "soft-skills" might confer particular advantages to young cohorts of women while older women—even those with healthy endowments of currently valuable skills—might never realize their full potential.

Summary and Conclusion

Although gender differences in labor force attachment and educational choices are widely considered to be a leading reason for older women's lower earnings, this empirical analysis of career trajectories suggests that other explanations are far more important. This study of NSCG and SESTAT panel data demonstrates that, during the 1990s, typical college-educated women experienced wage growth that kept pace with, or even exceeded, men's. When compared to men with exactly the same educational credentials, women begin and end the 1990s earning less, but do not fall farther behind as they age. This pattern is surprising because it contradicts the predictions of two schools of thought that are generally considered to represent opposing points of view about the source of the gender gap in earnings. In one view, the gap results primarily from gender differences in the rate of human capital accumulation, while others view cumulative effects of labor market discrimination as an important factor. In both models, the disadvantage experienced by a typical woman is expected to grow with age. However, the evidence discovered here is to the contrary.

These results are very robust. Lower earnings levels, but similar rates of earnings growth, can be seen among college graduates in nearly every field. In this sample, women in their 40s earn 30-45 percent less per hour than men while those in their 20s earn 5-10 percent less than men with identical educational credentials. The analysis performed here rules out the possibility that between-cohort changes in women's college major choices are driving the between-cohort reduction in the gender earnings gap. In fact, the same between-cohort patterns can be seen within homogeneous groups of workers with the same college major.

Carefully specified regressions utilizing the detailed indicators of contemporaneous labor force attachment and changes in childcare responsibilities available in the SESTAT panels reveal that mothers, nonmothers and men all have similar average rates of earnings growth between

1989 and 1999. This analysis finds that over the life cycle of mothers, earnings growth rates are relatively lower during the early years, but then substantially exceed those of men or women who are not mothers as the children grow older and leave home, yielding an average growth rate similar to that of both childless women and men over the lifetime.

Analysis of different centiles of the salary-level and growth rate distributions reveals that many of the patterns observed on average are quite robust. However, among fast-track workers at very high salary levels, women are underrepresented among those with very high growth rates. This evidence suggests a "glass ceiling" with direct relevance to the number of women likely to reach the very top echelon of influential positions.

This study finds evidence of a glass ceiling that slows the progress of the most successful women relative to observably similar men. At the same time, the typical college-educated woman in the labor market today appears to follow a career track that is parallel to (but below that of) similarly educated men in the same cohort. The combined findings of this analysis and Weinberger and Kuhn (2010) present a picture in which labor market opportunities are improving for successive cohorts of college-educated women, with pre-labor market educational investments and realized labor force attachment explaining very little of the between-cohort change in earnings levels. Cohort effects already evident at an initial observation predict the size of the gender gap in earnings many years later, suggesting that mid-career interruptions are far less important than early career processes that lead to gender gaps in earnings among young workers of each cohort. Factors already present in the early career predict later gender gaps in earnings.

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Data Appendix

The 1993 National Survey of College Graduates (NSCG) is a survey of a representative sample of 1990 Census respondents who indicated that they were college graduates as of the 1990 Census survey date. This survey was conducted jointly by the Census and NSF. Information collected in the 1993 survey was merged with selected information from the 1990 Census long form, including 1989 income, hours worked per week and the number of weeks worked during 1989. Hence, the combination of labor market information as of the 1993 survey date with 1990 Census data from the same individual provides a short panel representative of all U.S. college graduates who earned a degree before the 1990 Census date.

From the set of all 1993 respondents, the NSF selected individuals representing members of the science and engineering workforce for inclusion in the "SESTAT" system of data. Two other surveys are combined with the NSCG to create the full SESTAT cross-sectional snapshot of the science and engineering workforce.[36] Follow-up surveys of selected 1993 NSCG respondents in 1995, 1997, and 1999 were used by the NSF to include in successive SESTAT cross-sections, combined with data from the complementary surveys. However, individuals who might have been covered by one of the two other surveys (for example, NSCG respondents who earned a higher degree in a science-related field after 1990) were dropped from the group of NSCG respondents to be resurveyed. The SESTAT panels I constructed include individuals who were surveyed in both 1993 and 1999, and attained no higher degrees between 1988 and 1999. The sample from which the longer panels are drawn is representative of individuals who were deemed to be part of the science and engineering workforce, who had completed their education before the 1990 Census, and were therefore not likely to be excluded from further participation in the longitudinal study. Appendix Table A-1 describes the relationship between the NSCG cross-section sample and the set of individuals remaining at each step of selection into each of the two panels covering 1989-1999.

The first panel (SESTAT-BA) is representative of white individuals in the 1989 age range 23-52 who earned a bachelor's degree in a field categorized as science, math, computer science, engineering or social science before 1989, attained no higher degrees between 1988 and 1999, and worked full-time in both 1989 and 1999.

The second panel (SETAT-BA+) is more difficult to describe. It is also restricted to white individuals in the 1989 age range 23-52 who attained no higher degrees between 1988 and 1999, and worked full-time in both 1989 and 1999. It includes a broader set of respondents who earned a bachelor's, master's, law or medical degree (before 1989). It contains the first panel, but also other individuals who were considered interesting to the NSF either because their bachelor's degree major was in a field related to science (but not among those in the traditional science, math, computer science, engineering or social science categories), or because their 1993 occupation was related to science, or because the field of the master's degree was of interest to the NSF. This panel does not contain Ph.D.'s because only a strangely selected few were followed until 1999 (the complementary Survey of Doctorate Recipients is intended to cover Ph.D. scientists). Within the SESTAT-BA+ panel, more than 80 percent of the sample, and more than 90 percent of doctors and lawyers, hold a bachelor's degree in science, math, computer science, engineering or social science. The disadvantage of this panel is that it is not as clear exactly which subset of the college-educated population it represents because the sampling algorithm is very complex. The advantage for a study of the glass ceiling is that it is larger, and contains a higher proportion of workers with very high salaries, followed over a ten-

[36] These other surveys capture information on doctorates, and the most recent bachelor's and master's degree graduates. Individuals in the NSCG who later earned another science or engineering degree, or a Ph.D., were no longer resurveyed because the other surveys captured this type of individual for the SESTAT snapshot.

year interval. Relative to the full NSCG or SESTAT-BA, the members of the SESTAT-BA+ sample have somewhat higher average earnings, but earnings growth rates are similar to those of the SESTAT-BA panel.

Appendix Table A-2 describes means of selected variables in the 1989 base year, comparing the full NSCG sample, and its bachelor's degree only subset, to the SESTAT-BA and SESTAT-BA+ samples.[37] Given the strong representation of science and engineering majors, it is not surprising that the SESTAT panels have somewhat higher earnings than the corresponding NSCG samples of all college graduates.

The last two columns of Appendix Table A-2 are labeled hSESTAT-BA+ . This is the larger of two panels describing growth in hourly earning between 1989 and 1996. The hSESTAT-BA and hSESTAT-BA+ panels are drawn in virtually the same fashion as SESTAT-BA and SESTAT-BA+. The only difference is that the restriction: "full-time or part-time and employed at least half the year with hourly earnings data in 1989 and 1996" replaces the previously more restrictive rule: "full-time with annual earnings data in 1989 and 1999." The resulting samples are larger, due to the less selective restriction on work intensity, and also because they avoid the attrition that took place between the 1997 and 1999 surveys. Although shorter than the 1989-1999 panels, these panels with hourly earnings measures available provide an opportunity to confirm that results based on annual earnings of full-time workers are similar to results based on hourly earnings of both part-time and full-time workers. These also provide an opportunity to examine the extent to which mothers are underrepresented in the full-time panels.

Individual women are coded as mothers if they indicated that they had ever given birth as of the 1990 Census, or if they reported having children of any age in the 1993, 1995, 1997 or 1999 surveys. Appendix Table A-3 describes the proportion of women who are mothers (in each age cohort) among all survey respondents who persisted to the 1997 or 1999 resurvey, and within subsets of workers included in the 1989 cross-section or the SESTAT-BA+ and hSESTAT-BA+ panels. Not surprisingly, these comparisons show that mothers are underrepresented among younger women in the SESTAT-BA+ panel of women employed full time in both 1989 and 1999. Among women in the 33-42 age range in 1989 who also responded to the 1999 survey, about 75 percent were mothers (by 1999), but only 57 percent of the SESTAT-BA+ panel members were mothers. However, mothers in the 43-52 age range in 1989 were approximately proportionately represented in both the SESTAT-BA+ and hSESTAT-BA+ panels. This suggests that, among panel members, about 15-20 percent of mothers in the 1989 age range 43-52 might be labor force reentrants. Another interesting observation is that within the youngest age group, those who became mothers by 1999 were only slightly underrepresented among those in the hourly earnings panel or the cross-section of those working full-time in 1989. It is the restriction to full-time work in two different years that eliminates a substantial fraction of the youngest mothers from the SESTAT-BA+ panel, because many members of this group had not yet become mothers as of the initial observation.

Appendix Table A-4 describes the distribution and timing of contemporaneous family responsibilities in great detail. This part of the analysis is restricted to the longest panels, SESTAT-BA and SESTAT-BA+, covering the time span 1989 through 1999. The statistics presented here confirm that half of the mothers in the younger group were not mothers in the initial observation. Mothers in the middle age group were most likely to have children at home in both 1989 and 1999, while mothers in the oldest age group were most likely to have an empty nest with children no longer in the home as of 1999.

[37] For more extensive statistics descriptive of the full NSCG, including the distribution of college major choices among men and women from different cohorts, please see Black, et. al. (2008).

Appendix Table A-5 presents descriptive statistics on average annual income among panel members at the initial and final observations. To understand how annual earnings in the NSCG, SESTAT BA and SESTAT BA+ cross-section data and panels compare to those in more familiar samples, contemporaneous samples were drawn from Panel Study of Income Dynamics (PSID) and U.S. Census data for comparison. The cross-section Census data are sampled to include white, U.S. born college graduates employed full-time and full-year. The PSID mini-panel includes all college graduates employed full-time full-year in both 1990 and 1992. These years were chosen both because they are close to the time frame spanned by the 1989-1993 NSCG panel, and because 1991, 1992 and 1993 are the only years in which measures of the previous year's annual labor income (distinct from asset income) are available in the individual-level public use file. The PSID panel has two advantages in addition to being familiar and nationally representative: it is possible in the PSID to construct a clean measure of hourly earnings, and earnings are not top-coded.[38] To facilitate comparison to estimates using other data, a comparable topcoding procedure is applied to the PSID in some specifications.

Appendix Table A-5 shows that means of annual earnings among full-time workers in the PSID are similar to those in the NSCG, SESTAT BA and SESTAT BA+ samples, and that nominal earnings growth rates are higher for women than for men in every single subsample examined. Appendix Table A-5 also displays a comparison between earnings among college graduates in the National Longitudinal Survey of Youth (NLSY) and the corresponding NSCG subsample. Here, the scale of the NSCG becomes apparent, with more than 20 times as many observations within the subset of the age range covered by the NLSY. While unweighted NLSY earnings are somewhat lower than those in the corresponding NSCG sample, rates of change over time are similar: Men's earnings grow by 29 percent in the NSCG and 30 percent in the NLSY, while women's earnings grow by 33 percent in the NSCG and 35 percent in the NLSY. This exercise demonstrates that there is nothing unusual about the NSCG earnings measures that might be spuriously driving the results about women's faster earnings growth.

The remainder of the Data Appendix concerns the relationship between early career success and persistence in the SESTAT BA and SESTAT BA+ panel samples of workers employed full-time in both 1989 and 1999. The concern to be addressed here is that the high relative rates of earnings growth among women in these panels might be driven by the disproportionate selection of women with slow earnings growth out of the sample, resulting in the absence of an observed 1989-1999 earnings growth rate for this slower-growth group of women, hence biasing the estimates of women's growth rates upward.

The estimated model allows selection into the sample to be a function of the rate of early earnings growth, gender, and the interaction between the two. This model is tested both conditional on persistence to the 1999 survey (examining the relationship between earnings growth, gender, and selection to the full-time labor market sample), and unconditional (examining the combination of these factors plus persistence from the 1993 survey through the 1999 resurvey). The rate of early earnings growth is measured in two different ways, based on observed growth rates over the interval 1989-1993 or 1989-1995. (The second of these probably provides a less noisy measure of early growth rates, but can only test the hypothesis conditional on persistence to 1995). A positive coefficient on the interaction term (Female*Early Growth

[38] Regression estimates are nearly identical for a subsample with topcodes treated in a manner similar to the NSCG panel, so these are not reported. For example, using the topcoded PSID sample—with 1990 earnings topcoded and 1992 high earners dropped--coefficients differ only by a small fraction of the standard error from those estimated with the full PSID sample in Table 4, Specification 6-b. For each age group, the topcoded sample leads to a slightly lower estimate of women's relative growth rates, suggesting that the NSCG treatment of high earners (topcoded in 1989 and dropped in 1993) does not bias the gender growth coefficients upward.

Rate) would suggest that women with lower rates of earnings growth disproportionately drop out of the sample.

Appendix Table A-6 presents the results for selection into the SESTAT-BA sample, while Appendix Table A-7 presents the results for selection into the SESTAT-BA+ sample. All specifications show that women are more likely than men to leave the full-time labor market sample. In other words, the coefficient on "female" is negative and statistically significant in each specification. The unconditional specifications (columns 1-4) show no correlation between the early growth rate and persistence in the panel. In some specifications there is a statistically significant positive correlation between the early growth rate and working full-time, conditional on persistence to the 1999 resurvey. However, this pattern is not particularly pronounced among women, and there in no specification showing a statistically significant positive coefficient on the interaction term Female*Early Growth Rate. In other words, there is no evidence of relatively greater sample attrition by women with slow rates of early earnings growth.

Appendix Table Table A-1 --Details of selection into the SESTAT-BA and SESTAT-BA+ Panels

		Selection into SESTAT-BA Panel		Selection into SESTAT-BA+ Panel	
Row #		men	women	men	women
1	Table 1, Column 2 Sample (White, Age 23-52, U.S. Born, Employed Full-time Full-Year in 1989 with Income at least $2000)	32,132	13,065	32,132	13,065
2	Restricted to bachelor's degree only (Table 1, Column 5)	20,895	8,850	n/a	n/a
3	Restricted to pre-1989 college major in eng, cs, math, sci, soc sci (not 1993 occupation, nor other possibly scientific major)	10,502	2,774	n/a	n/a
4	…and surveyed (& responded) after 1993 (conditional)	7,155	1,912	n/a	n/a
5	Surveyed (& responded) after 1993 (unconditional)	n/a	n/a	13,643	3,770
6	…and no new higher degrees as of 1995	7,057	1,871	13,260	3,646
7	…and responded after 1995	6,614	1,746	12,489	3,447
8	…and no new higher degrees as of 1997	6,528	1,709	12,376	3,393
9	…and responded in 1999	4,928	1,288	9,490	2,615
10	…and no new higher degrees as of 1999	4,876	1,261	9,422	2,582
11	…and working full-time in 1999	4,514	918	8,683	1,907
12	…and 1999 salary data nonmissing	4,486	910	8,628	1,891

Appendix Table A-2

Sample	NSCG All College Grads FT in 1989		NSCG BA/BS only FT in 1989		SESTAT BA Panel FT in 1989 & 1999		SESTAT BA+ Panel FT in 1989 & 1999		hSESTAT BA+ panel employed 1989 & 1996	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Highest Degree Bachelor's in Selected Fields*	23 %	16 %	35 %	22 %	100%	100%	52%	50%	51%	50%
Graduate Degree	33 %	28 %	0	0	0	0	37%	39%	38%	39%
Undergraduate Major Science Related	42%	26%	38%	23%	100%	100%	90%	85%	89%	85%
MBA	4%	2%	0	0	0	0	5%	2%	4%	2%
Other Master's Degree	21%	22%	0	0	0	0	25%	30%	25%	32%
Ph.D.	4%	2%	0	0	0	0	0	0	0	0
Law Degree	4%	3%	0	0	0	0	5%	6%	5%	4%
Medical Doctor	3%	1%	0	0	0	0	4%	2%	4%	3%
Other Professional Degree	1%	1%	0	0	0	0	0	0	0	0
Age in 1989	37	35	36	34	36	34	37	36	37	36
1989 income (std. dev.)	$48,000 (29,000)	$32,000 (17,000)	$44,000 (27,000)	$29,000 (14,000)	$47,000 (25,000)	$32,000 (17,000)	$50,000 (28,000)	$36,000 (20,000)	$49,000 (28,000)	$31,000 (19,000)
Full-time in 1989, 1993,1995&1997					78%	72%	78%	71%	69%	43%
% change in hours/week					5%	5%	4%	4%	6%	11%
Sample Size	32132	13065	20895	8850	4486	910	8628	1891	13111	4352

All means are weighted by the inverse probability of selection into the base year sample.

*Selected fields include Engineering, Math, Statistics, Computer Science and Physical, Biological or Social Sciences.

Appendix Table A-3
Proportion of Women who are mothers, among survey respondents and labor force participants.

	(1)	(2)	(3)	
1989 Age	23-32	33-42	43-52	
1999 Age	33-42	43-52	53-62	
All 1999 Respondents				**Sample Description**
Mother	0.75	0.75	0.78	Persisted to the 1999 resurvey
Number of Observations	1866	2106	881	and met all SESTAT-BA+
Full-time Base Year				criteria other than employment and earnings.
Mother	0.69	0.57	0.72	Subset Employed Full-time 1989
Number of Observations	1172	999	411	with earnings observed
SESTAT-BA+				
Mother	0.59	0.57	0.76	Subset Employed Full-time 1989
Number of Observations	787	813	291	and 1999 with earnings observed
All 1997 Respondents				
Mother	0.73	0.74	0.78	Persisted to the 1997 or 1999 resurvey
Number of Observations	2453	2672	1091	and met all hSESTAT-BA+
Employed Base Year				criteria other than employment and earnings.
Mother	0.71	0.70	0.77	Subset Employed 1989
Number of Observations	2247	2185	908	With hourly earnings observed
hSESTAT-BA+				
Mother	0.66	0.68	0.78	Subset Employed 1989 and 1996
Number of Observations	1757	1854	741	with hourly earnings observed

Appendix Table A-4
Means of Parenting Responsibility Measures, by cohort

	(1)	(2)	(3)	Detailed Explanation
1989 Age	23-32	33-42	43-52	
1999 Age	33-42	43-52	53-62	
SESTAT-BA				
Mother	0.56	0.59	0.77	(Positive Census fertility, or kids at home 93, 95, 97 or 99)
Mother in 89, Empty nest in 99	0.02	0.10	0.50	(Mom at initial observation, and no kids at home 1999)
New Mother in 99, No kids in 89	0.31	0.06	0.00	(Not Mom at initial observation, and kids at home 1999)
Mother in 89, Still kids at home 99	0.22	0.42	0.26	(Mom at initial observation, and kids at home 1999)
Mother in 89, Young kids home 99	0.17	0.14	0.00	(Mom at initial observation, kids home 1999, some age <12)
Mother in 89, only Teens 12+ home 99	0.05	0.21	0.08	(Mom at initial observation, kids 1999, none 0-11, some<18)
Mother in 89, only Older teens 18+ 99	0.00	0.07	0.17	(Mom at initial observation, kids at home 1999, all age 18+)
Observed as Young Mother	0.35	0.00	0.00	(Mom at initial observation & 1989 age 23-32, or mom by 32)
Observations	463	338	109	
SESTAT-BA+				
Mother	0.59	0.57	0.76	(Positive Census fertility, or kids at home 93, 95, 97 or 99)
Mother in 89, Empty nest in 99	0.02	0.10	0.50	(Mom at initial observation, and no kids at home 1999)
New Mother in 99, No kids in 89	0.33	0.07	0.01	(Not Mom at initial observation, and kids at home 1999)
Mother in 89, Still kids at home 99	0.23	0.40	0.23	(Mom at initial observation, and kids at home 1999)
Mother in 89, Young kids home 99	0.18	0.15	0.00	(Mom at initial observation, kids home 1999, some age <12)
Mother in 89, only Teens 12+ home 99	0.05	0.18	0.06	(Mom at initial observation, kids 1999, none 0-11, some<18)
Mother in 89, only Older teens 18+ 99	0.00	0.07	0.16	(Mom at initial observation, kids at home 1999, all age 18+)
Observed as Young Mother	0.34	0.00	0.00	(Mom at initial observation or by age 32, if 1989 age 23-32)
Observations	787	813	291	

Note: "Mom at initial observation" is defined as either reporting positive fertility in the 1990 Census, or reporting children older than 5 at home in 1993.

Appendix Table A-5
Mean Annual Nominal Earnings of Full-Time Workers (unweighted)
Comparisons between SESTAT, NSCG, PSID and NLSY matched panels

	1989	1990	1992	1993	1999	N	% change (Nominal)	% change (Nominal)/ # Years
Men age 23-52 in 1989								
PSID topcoded		47,960	53,800			690	0.12	0.06
PSID		52,790	59,420			705	0.13	0.06
SESTAT BA	45,470				72,050	4486	0.58	0.06
SESTAT BA (if full-time 1993)	45,350			53,500		3573	0.18	0.06
NSCG	48,140			57,000		30256	0.18	0.06
SESTAT BA+	49,220				76,440	8628	0.55	0.06
SESTAT BA+ (if full-time 1993)	49,270			58,410		6792	0.19	0.05
Women age 23-52 in 1989								
PSID topcoded		33,820	39,970			274	0.18	0.09
PSID		34,270	41,230			276	0.20	0.10
SESTAT BA	33,170				57,250	910	0.73	0.07
SESTAT BA (if full-time 1993)	32,710			41,140		676	0.26	0.06
NSCG	33,510			43,060		10915	0.28	0.07
SESTAT BA+	36,490				61,800	1891	0.69	0.07
SESTAT BA+ (if full-time 1993)	36,370			46,230		1402	0.26	0.06
Men Age 25-32 in 1989								
NSCG	37,710			48,630		7588	0.29	0.07
NLSY	36,640			47,680		333	0.30	0.08
Women Age 25-32 in 1989								
NSCG	30,400			40,300		3685	0.33	0.08
NLSY	28,420			38,310		206	0.35	0.09

Appendix Table A-6--Relationship between Early Earnings Growth Rates and Persistence to the SESTAT-BA Panel.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Persistence to SESTAT-BA 1989-1999 Panel among Eligible 1993 Respondents				Persistence to SESTAT-BA 1989-1999 Panel Conditional on Persistence to the 1999 Survey			
Female	-0.090	-0.098	-0.093	-0.097	-0.111	-0.108	-0.107	-0.104
	(0.017)**	(0.018)**	(0.017)**	(0.018)**	(0.017)**	(0.018)**	(0.016)**	(0.016)**
Early Growth Rate	-0.125	-0.107	0.048	0.053	0.146	0.150	0.206	0.198
	(0.089)	(0.089)	(0.112)	(0.111)	(0.079)	(0.079)	(0.087)*	(0.086)*
Female* Early Growth	-0.148	-0.127	-0.069	-0.043	-0.477	-0.449	-0.025	0.007
	(0.206)	(0.204)	(0.242)	(0.241)	(0.243)	(0.241)	(0.228)	(0.226)
Observations	9809	9809	8149	8149	4693	4693	5666	5666
R-squared	0.01	0.02	0.01	0.01	0.03	0.04	0.02	0.03
Early Growth Rate Time Interval	1989-1993	1989-1993	1989-1995	1989-1995	1989-1993	1989-1993	1989-1995	1989-1995
Includes controls for region, hours per week, math/sci or eng/cs major, 5-year age group	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses
* significant at 5%; ** significant at 1%
Dependent Variable: Indicates inclusion in SESTAT-BA Panel.
Columns 1-4 Sample: The subset of the Table 1, Column 5 sample with highest degree bachelor's in science, math, computer science, engineering or social science, and early earnings growth observed.
Columns 5-8 Sample: The subset of the Columns 1-4 sample who were respondents to the 1999 resurvey and earned no higher degrees as of the 1999 resurvey (Row 10, Column 1-2 sample of eligible 1999 respondents).
Early Growth Rates computed as: (log(cpi adjusted full-time 1993 salary)-log(full-time, full-year 1989 income))/4
and: (log(cpi adjusted full-time 1995 salary)-log(full-time, full-year1989 income))/6

Appendix Table A-7--Relationship between Early Earnings Growth Rates and Persistence to the SESTAT-BA+ Panel.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Persistence to SESTAT-BA+ 1989-1999 Panel among Eligible 1993 Respondents				Persistence to SESTAT-BA+ 1989-1999 Panel Conditional on Persistence to the 1999 Survey			
Female	-0.089	-0.085	-0.081	-0.078	-0.121	-0.113	-0.104	-0.098
	(0.012)**	(0.013)**	(0.012)**	(0.013)**	(0.013)**	(0.013)**	(0.011)**	(0.011)**
Early Growth Rate	-0.029	-0.018	0.114	0.109	0.159	0.159	0.181	0.173
	(0.059)	(0.059)	(0.070)	(0.070)	(0.045)**	(0.046)**	(0.051)**	(0.052)**
Female* Early Growth	-0.155	-0.129	-0.082	-0.047	-0.336	-0.321	0.095	0.123
	(0.146)	(0.143)	(0.167)	(0.166)	(0.162)*	(0.161)*	(0.161)	(0.161)
Observations	17890	17890	15433	15433	9106	9106	11049	11049
R-squared	0.01	0.02	0.01	0.01	0.03	0.04	0.02	0.03
Early Growth Rate Time Interval	1989-1993	1989-1993	1989-1995	1989-1995	1989-1993	1989-1993	1989-1995	1989-1995
Includes controls for region, hours per week, broad major group, MBA, other master's degree, MD, JD, 5-year age group	No	Yes	No	Yes	No	Yes	No	Yes

* significant at 5%; ** significant at 1%
Dependent Variable: Indicates inclusion in SESTAT-BA+ Panel.
Columns 1-4 Sample: The subset of the Table 1, Column 2 sample with highest degree bachelor's, master's, JD or MD, and early earnings growth observed. Columns 5-8 Sample: The subset of the Columns 1-4 sample who were respondents to the 1999 resurvey and earned no higher degrees as of the 1999 resurvey (Row 10, Column 3-4 sample of eligible 1999 respondents).
Early Growth Rates computed as: (log(cpi adjusted full-time 1993 salary)-log(full-time, full-year 1989 income))/4 and (log(cpi adjusted full-time 1995 salary)-log(full-time, full-year1989 income))/6

Table 1-- College Graduate Gender Earnings Gaps (1989 Full time, full year workers, college graduates age 23-52).
Data from the NSF National Survey of College Graduates, a follow-up survey of college graduates drawn from the 1990 Census

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year &Sample	1989 Census College Graduates	1989 NSCG College Graduates	1989 NSCG College Graduates	1989 NSCG College Graduates	1989 NSCG College Graduates Bachelor's degree only	SESTAT-BA Panel (Also full-time in 1999) Bachelor's degree only	SESTAT-BA+ Panel (Also full-time in 1999)
Female*(age 23-32)	-0.145 (0.005)**	-0.135 (0.009)**	-0.088 (0.009)**	-0.068 (0.009)**	-0.077 (0.010)**	-0.093 (0.027)**	-0.082 (0.022)**
Female*(age 33-42)	-0.291 (0.005)**	-0.286 (0.010)**	-0.224 (0.010)**	-0.195 (0.010)**	-0.214 (0.013)**	-0.208 (0.037)**	-0.158 (0.025)**
Female*(age 43-52)	-0.459 (0.007)**	-0.446 (0.015)**	-0.349 (0.015)**	-0.309 (0.015)**	-0.380 (0.020)**	-0.449 (0.058)**	-0.331 (0.039)**
Master's Degree	0.082 (0.004)**	0.052 (0.007)**	0.067 (0.007)**				
Ph.D. or Professional	0.245 (0.006)**	0.275 (0.011)**	0.298 (0.011)**				
College Major Controls:	No	No	Broad college major, level of graduate degree	Narrow college major, second majors, minors, field and level of graduate degrees	Narrow college major, second majors, minors	Narrow college major, second majors, minors	Narrow college major, second majors, minors, field and level of graduate degrees
Observations	118123	45197	45197	45197	29745	5396	10519
R-squared	0.25	0.26	0.31	0.35	0.32	0.32	0.33

(notes on next page) * significant at 5%; ** significant at 1%

Table 1 notes:

Sample, Columns 1-4: White college graduates age 23-52, born in the U.S., employed full time, full year (at least 50 weeks, usual hours/week at least 35), annual income at least $2000 from Census (Column 1) or NSCG (Columns 2-4). Column 5 further restrict the NSCG sample to bachelor's level graduates only, and column 6 to bachelor's level graduates with selected college majors who were resurveyed, working full-time, and had no graduate degrees in 1999 (SESTAT-BA Panel), Column 7 SESTAT-BA+ Panel. See Data Appendix for complete description of panel samples.

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Dependent Variable: Log of annual wage and salary income as reported in 1990 Census;

College major controls: Column 3: 9 broad categories, Column 4: Detailed college majors (156 categories), 8 categories of college minor or second major, 9 categories of master's degree, 5 categories of Ph.D., and 4 categories of professional license, Column 5: Detailed college majors (146 categories), 8 categories of college minor or second major, Column 6: Detailed college majors (71 categories), 8 categories of college minor or second major. Column 7: Detailed college majors (145 categories), 8 categories of college minor or second major, 9 categories of master's degree, and 2 categories of professional license.

Additional controls included in all regressions: 35-39, 41-48, and 49+ hours/week, geographic controls for 9 census divisions, age controls for 30 possible ages.

Table 2-- College Graduate Gender Earnings Gaps by Field of College Major (1989 Full time, full year workers, bachelor's level college graduates age 23-52) . Data from the National Survey of College Graduates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Compsci	Engin	Math/Sci	SocSci	Bus	Hum	Educ	Health
Female*(age 23-32)	0.017	-0.052	-0.060	-0.114	-0.103	-0.118	-0.092	-0.098
	(0.027)	(0.024)*	(0.035)	(0.034)**	(0.017)**	(0.049)*	(0.039)*	(0.051)
Female*(age 33-42)	-0.090	-0.058	-0.158	-0.219	-0.231	-0.195	-0.276	-0.231
	(0.067)	(0.054)	(0.040)**	(0.038)**	(0.036)**	(0.044)**	(0.034)**	(0.045)**
Female*(age 43-52)	suppressed	-0.443	-0.401	-0.387	-0.404	-0.336	-0.386	-0.136
	(0.284)	(0.171)**	(0.067)**	(0.060)**	(0.068)**	(0.059)**	(0.055)**	(0.084)
Number of College Majors	7	22	26	16	9	7	13	11
Observations	1408	5917	3254	2666	6287	1913	2029	1133
R-squared	0.28	0.27	0.31	0.28	0.27	0.26	0.25	0.25
Detailed # Observations:								
Men, age 23-32	773	2561	717	464	1820	266	162	80
Men, age 33-42	209	1828	1053	831	1863	563	461	144
Men, age 43-52	36	1090	555	361	1060	291	226	55
Women, age 23-32	325	375	436	491	1166	271	317	398
Women, age 33-42	63	57	357	381	303	320	527	332
Women, age 43-52	suppressed	6	136	138	75	202	336	124

* significant at 5%; ** significant at 1%

Sample: White bachelor's level college graduates age 23-52, born in the U.S., employed full time, full year (at least 50 weeks, usual hours/week at least 35), annual income at least $2000.
Dependent Variable: Log of annual wage and salary income as reported in 1990 Census.
Additional controls included in all regressions: detailed college major fixed effects, 8 categories of college minor or second major, controls for 35-39, 41-48, and 49+ hours/week, geographic controls for 9 census divisions, age controls for 30 possible ages.

Information based on cell size less than 5 has been suppressed at the request of the National Science Foundation Division of Science Resource Statistics. The coefficient estimate in the "suppressed" cell has magnitude less than 1/3 of the standard error.

Table 3— College Graduate Gender Earnings Gaps in Repeated Cross-section Regressions, 1989 and 1999.

			Matched Sample		Matched Sample with College Major Controls	
	(1)	(2)	(3)	(4)	(5)	(6)
Year	1989	1999	1989	1999	1989	1999
Female*(age 23-32)	**-0.178** (0.024)**		**-0.186** (0.027)**		**-0.094** (0.027)**	
Female*(age 33-42)	**-0.328** (0.034)**	**-0.236** (0.029)**	**-0.314** (0.036)**	**-0.194** (0.032)**	**-0.208** (0.037)**	**-0.119** (0.032)**
Female*(age 43-52)	**-0.557** (0.054)**	**-0.353** (0.031)**	**-0.580** (0.060)**	**-0.231** (0.034)**	**-0.450** (0.058)**	**-0.132** (0.036)**
Female* (age 53-62)		**-0.394** (0.047)**		**-0.342** (0.059)**		**-0.222** (0.061)**
Observations	6137	6489	5396	5396	5396	5396
R-squared	0.26	0.19	0.25	0.15	0.32	0.22

* significant at 5%; ** significant at 1%

Controls for 35-39, 41-48, and 49+ hours/week, geographic controls for 9 census divisions, and age controls for 30 possible ages are included in all regressions.
Detailed college major & minor controls are included in regressions 5 and 6.
Dependent Variable: Log of annual wage and salary income as reported in 1990 Census, or log of 1999 salary from SESTAT survey.
Sample: White bachelor's level college graduates age 23-52 in 1989 (age 33-62 in 1999), born in the U.S. Column 1: Working full-time, full year in 1989; Column 2: Working full-time in 1999; Columns 3-6: Working full-time, full year in 1989 *and* full-time in 1999 (SESTAT-BA panel, college majors in engineering, science, computer science, or social sciences).

Table 4a—Gender Differences in Earnings Growth, Overall and By 1989 Age. Comparison of Data from SESTAT BA, SESTAT BA+, the National Survey of College Graduates, and the Panel Study of Income Dynamics.

SAMPLE:	SESTAT--BA	SESTAT--BA Subset With 1993 Earnings	NSCG Sestat Majors White BA	SESTAT-- BA+	SESTAT-- BA+ Subset With 1993 Earnings	NSCG All white BA or higher	NSCG Include NW, BA or higher	PSID
	(1-a)	(2-a)	(3-a)	(4-a)	(5-a)	(6-a)	(7-a)	(8-a)
Female	0.001	0.007	0.010	0.001	0.009	0.012	0.011	0.002
	(0.001)	(0.003)**	(0.002)**	(0.001)	(0.002)**	(0.001)**	(0.001)**	(0.014)
Observations	5396	4249	12229	10519	8194	41171	55982	981
R-squared	0.13	0.06	0.05	0.10	0.04	0.03	0.03	0.04
	(1-b)	(2-b)	(3-b)	(4-b)	(5-b)	(6-b)	(7-b)	(8-b)
Female*(1989 age 23-32)	-0.006	0.000	0.005	-0.006	0.001	0.001	0.001	-0.020
	(0.002)**	(0.005)	(0.002)*	(0.002)**	(0.004)	(0.002)	(0.001)	(0.021)
Female*(1989 age 33-42)	0.006	0.014	0.014	0.004	0.016	0.017	0.016	0.016
	(0.002)*	(0.005)*	(0.003)**	(0.002)*	(0.004)**	(0.002)**	(0.001)**	(0.021)
Female*(1989 age 43-52)	0.015	0.017	0.025	0.011	0.013	0.021	0.020	0.024
	(0.004)**	(0.009)	(0.005)**	(0.003)**	(0.006)*	(0.002)**	(0.002)**	(0.036)
Observations	5396	4249	12229	10519	8194	41171	55982	981
R-squared	0.13	0.06	0.05	0.10	0.04	0.04	0.03	0.04
Detailed # Observations:								
Men, age 23-32	1,822	1468	4321	2,786	2,224	9507	12453	252
Men, age 33-42	1,853	1478	3727	3,910	3,088	12968	21902	331
Men, age 43-52	811	627	1883	1,932	1,480	7781	13319	122
Women, age 23-32	463	358	1302	787	604	4590	11620	127
Women, age 33-42	338	242	756	813	594	4297	11456	109
Women, age 43-52	109	76	240	291	204	2028	5604	40
Time Interval over which Annual Growth Rate Measured	1989-1999	1989-1993	1989-1993	1989-1999	1989-1993	1989-1993	1989-1993	1990-1992

Dependent Variable: Per Year Growth in Log Real Annual Earnings

Notes on next page

Table 4a, notes:

Controls: complete set of controls for exact year of age
Sample: College graduates age 23-52 employed full-time at beginning and end of interval. Additional sample restrictions are indicated for each column. Column 1 is the SESTAT-BA sample, with earnings growth measured 1989-1999. Columns 2-3 measure earnings growth over the shorter 1989-1993 window. Column 2 is the subset of SESTAT-BA for which a 1989-1993 earnings growth measure is available. Column 3 is a subset of the NSCG with SESTAT-like sample restrictions imposed (e.g. white, U.S. born, bachelor's degree only majors in engineering, science or social sciences). Columns 4 and 5 are similar to columns 1 and 2, but using the larger SESTAT-BA+ sample including graduates with higher degrees. Column 6 is similar to column 3, but covers all white college graduates with no college major restrictions, and including graduates with higher degrees. Column 7 includes all NSCG observations on college graduates (not restricted to white graduates). Column 8 includes all PSID college graduates, with earnings growth measured 1990-1992.

Table 4b notes:

Controls: complete set of controls for exact year of age
Sample: College graduates age 23-52 employed in 1989 and 1996. Additional sample restrictions are indicated for each column. Column 9 is the hSESTAT-BA sample, including both part-time and full-time workers. Columns 10 and 11 restrict the hSESTAT-BA to workers employed full-time, full-year in both 1989 and 1996 (slight difference in sample is because workers with hourly earnings below $1 or annual earnings below $2000 were dropped). Columns 12 is the hSESTAT-BA+ sample, and columns 13-14 restrict the hSESTAT-BA+ sample to workers employed full-time, full-year in both 1989 and 1996.
note: Consistently Part-Time Worker is defined as working less than 35 hours per week in 1986, 1996 and at least one observation in between.

Table 4b—Gender Differences in Earnings Growth, Overall and By 1989 Age.
Comparison of hourly and annual earnings measures from hSESTAT BA and hSESTAT BA+

SAMPLE:	hSESTAT--BA	hSESTAT--BA Subset Full-time, Full-year in 1989&1996	hSESTAT--BA Subset Full-time, Full-year in 1989&1996	hSESTAT—BA+	hSESTAT—BA+ Subset Full-time, Full-year in 1989&1996	hSESTAT—BA+ Subset Full-time, Full-year in 1989&1996
	(9-a)	(10-a)	(11-a)	(12-a)	(13-a)	(14-a)
Female	0.001	0.000	-0.001	0.004	0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.001)**	(0.001)	(0.001)
Female*Consistently Part-Time Worker	0.006			0.002		
	(0.006)			(0.005)		
Observations	8889	6734	6754	17463	12580	12621
R-squared	0.05	0.07	0.08	0.04	0.05	0.06
	(9-b)	(10-b)	(11-b)	(12-b)	(13-b)	(14-b)
Female*(1989 age 23-32)	-0.005	-0.005	-0.007	-0.002	-0.003	-0.005
	(0.002)*	(0.002)*	(0.002)**	(0.002)	(0.002)	(0.002)*
Female*(1989 age 33-42)	0.003	0.002	0.002	0.006	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.002)**	(0.002)	(0.002)
Female*(1989 age 43-52)	0.021	0.017	0.017	0.016	0.011	0.011
	(0.004)**	(0.005)**	(0.005)**	(0.003)**	(0.003)**	(0.003)**
Female*Consistently Part-Time Worker	0.004			0.001		
	(0.006)			(0.005)		
Observations	8889	6734	6754	17463	12580	12621
R-squared	0.05	0.07	0.09	0.04	0.06	0.07
Detailed # Observations:						
Men, age 23-32	2,823	2,300	2,308	4,281	3,456	3,470
Men, age 33-42	2,652	2,216	2,221	5,654	4,525	4,536
Men, age 43-52	1,350	1,077	1,079	3,176	2,377	2,387
Women, age 23-32	1,039	599	603	1,757	970	975
Women, age 33-42	769	416	417	1,854	919	920
Women, age 43-52	256	126	126	741	333	333
Dependent Variable: 1989-1996 Earnings Growth Rate Measure	Hourly	Hourly	Annual	Hourly	Hourly	Annual

Table 5—Gender Differences in Earnings Growth, by Highest College Degree and Age in 1989.
Data from the National Survey of College Graduates.

	Bachelor's Degree		Master's Degree		Ph.D.	
	(1)	(2)	(3)	(4)	(5)	(6)
Female*(age 23-32)	0.007 (0.002)**	0.003 (0.002)	0.006 (0.004)	-0.002 (0.004)	0.025 (0.014)	0.017 (0.016)
Female*(age 33-42)	0.012 (0.002)**	0.017 (0.002)**	0.014 (0.002)**	0.016 (0.003)**	-0.004 (0.007)	-0.003 (0.007)
Female*(age 43-52)	0.027 (0.003)**	0.022 (0.003)**	0.024 (0.003)**	0.020 (0.003)**	0.018 (0.008)*	0.019 (0.008)*
Age (in decades)	-0.023 (0.001)**		-0.020 (0.001)**		-0.029 (0.004)**	
Constant	0.013 (0.001)**		0.020 (0.001)**		0.041 (0.004)**	
Additional Controls	No	Yes	No	Yes	No	Yes
Observations	26900	26900	9677	9677	1931	1931
R-squared	0.04	0.04	0.03	0.04	0.04	0.07

* significant at 5%; ** significant at 1%

Dependent Variable: **Growth** per year in log real annual earnings 1989 to 1993.
Additional controls: Detailed field of degree and exact age fixed effects included in even columns.
Constant evaluated at age 32 in odd-numbered columns.
Sample: White college graduates age 23-52, born in the U.S., employed full time, full year in 1989 and full-time in 1993.

Table 6—Gender Differences in Earnings Growth, by Field and Highest Degree.
Table 6a—Bachelor's degree graduates from the Survey of College Graduates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Compsci	**Engin**	**Math/Sci**	**SocSci**	**Bus**	**Hum**	**Educ**	**Health**
Female	-0.010	0.005	0.009	0.014	0.006	0.015	0.020	0.013
	(0.004)*	(0.004)	(0.003)**	(0.004)**	(0.003)	(0.005)**	(0.005)**	(0.006)*
Observations	1322	5607	2962	2338	5704	1695	1764	975
R-squared	0.09	0.05	0.06	0.06	0.05	0.04	0.04	0.05

Table 6b—Managers, Lawyers and Doctors from the Survey of College Graduates.

	(9)	(10)	(11)	(12)	(13)	(14)
	MBA exclusive	**MBA inclusive**	**MBA & Manager**	**Manager**	**Lawyer**	**Doctor**
Female	0.024	0.016	0.024	0.012	0.012	0.006
	(0.008)**	(0.005)**	(0.008)**	(0.002)**	(0.011)	(0.013)
Observations	1198	2600	1045	7747	667	1019
R-squared	0.06	0.05	0.07	0.05	0.07	0.19

* significant at 5%; ** significant at 1%

Sample: White bachelor's level college graduates age 23-52, born in the U.S., employed full time, full year in 1989 and full-time in 1993, with indicated field of highest degree. MBA "exclusive" includes only those who indicated a master's degree in "business administration," MBA "inclusive" includes all graduates with a master's degree in any field of business or economics. Doctor and Lawyer samples restricted to those who reported lawyer or doctor as occupation (as well as attainment of a professional degree in the corresponding field) to minimize reporting errors. Similarly, the manager samples incorporate information about occupation (1990 Census occupation codes 3-37) as well as highest degree.

Dependent Variable: Growth per year in log real annual earnings 1989 to 1993. [(log(1993 salary)*.858)-log(1989 income))/4]. Controls for exact 1989 age included in all regressions.

Table 7— Lawyer Gender Earnings Gaps in Repeated Cross-section Regressions Using 1980, 1990 and 2000 Census Data.

	(1)	(2)	(3)
Year	1979	1989	1999
Female*(age 28-37)	**-0.089**	**-0.152**	**-0.024**
	(0.042)*	(0.031)**	(0.034)
Female*(age 38-47)	**-0.559**	**-0.291**	**-0.096**
	(0.132)**	(0.054)**	(0.039)*
Female*(age 48-57)	**-0.374**	**-0.557**	**-0.306**
	(0.132)**	(0.094)**	(0.066)**
35-39 hours/week	-0.188	-0.130	-0.128
	(0.097)	(0.068)	(0.061)*
41-48 hours/week	0.031	0.091	0.150
	(0.043)	(0.036)*	(0.034)**
49+ hours/week	0.094	0.273	0.279
	(0.037)*	(0.028)**	(0.027)**
Observations	1797	3160	3859
R-squared	0.10	0.13	0.11

standard errors in parentheses * significant at 5%; ** significant at 1%

Sample: White college graduates age 28-57, born in the U.S., employed full time, full year (at least 50 weeks, usual hours/week at least 35), annual income at least $2000 (1990 dollars), and occupation listed as lawyer.
Dependent Variable: Log of annual wage and salary income; Geographic controls for 9 census divisions and 30 possible ages included in all regressions.

Table 8a—Further Analysis of Gender Differences in Earnings Growth, Using Contemporaneous Measures of Observable Characteristics in SESTAT-BA Panel Data

	(1)	(2)	(3)	(4)	(5)	(6)
Female*(1989 age 23-32)	-0.006 (0.002)**	-0.006 (0.002)**	-0.006 (0.002)**	-0.006 (0.002)**	-0.007 (0.003)*	-0.005 (0.003)
Female*(1989 age 33-42)	0.006 (0.002)*	0.006 (0.002)*	0.007 (0.002)**	0.006 (0.002)**	0.003 (0.003)	0.001 (0.003)
Female*(1989 age 43-52)	0.015 (0.004)**	0.015 (0.004)**	0.015 (0.004)**	0.015 (0.004)**	0.006 (0.005)	0.002 (0.005)
% change in hours per week if increase		0.016 (0.004)**				
% change in hours per week if decrease		0.058 (0.007)**				
Not full-time all years			-0.006 (0.001)**			
Not full-time all years *(1989 age 23-32)				-0.007 (0.002)**		
Not full-time all years *(1989 age 33-42)				-0.004 (0.002)*		
Not full-time all years *(1989 age 43-52)				-0.007 (0.003)*		
Mother in 89, Empty nest in 99					0.017 (0.005)*	0.020 (0.005)**
Mother in 89, Still kids at home 99					0.003 (0.003)	
New Mother in 99, No kids in 89					-0.002 (0.004)	-0.001 (0.004)
Mother in 89, Young kids home 99						0.005 (0.005)
Mother in 89, only Teens 12+ home 99						0.007 (0.005)
Mother in 89, only Older teens 18+ 99						0.011 (0.007)
Observed as Young Mother						-0.008 (0.005)
Observations	5396	5396	5396	5396	5396	5396
R-squared	0.13	0.15	0.13	0.13	0.13	0.13

* significant at 5%; ** significant at 1%

Dependent Variable: Growth per year in log real annual earnings 1989 to 1999 ((ln(1999 real earnings)-ln(1989 real earnings))/10 .
Sample: SESTAT-BA (see data appendix for detailed description)
Those who worked "full-time all years" also worked full-time in 1993, 1995 and 1997.
Age dummies spanning 30 possible ages included in all regressions
Omitted parenting category: Women (the same age) with no births as of 1990, no older children in 1993, and no kids reported living at home in 1999. Column 6 categories of parenting in both 1989 and 1999 are mutually exclusive (all children are younger than 12 in 1999, all children are at least 18 in 1999, or all children are at least 12, but at least one child is less than 18 in 1999).
Young mother flags women in the 23-32 age group with children in 1989, plus those with new children observed in 1993, 1995 or 1997 who are 32 or younger at the time of observation.

Table 8b—Further Analysis of Gender Differences in Earnings Growth, Using Contemporaneous Measures of Observable Characteristics in SESTAT-BA+ Panel Data.

	(1)	(2)	(3)	(4)	(5)	(6)
Female*(1989 age 23-32)	-0.006 (0.002)**	-0.005 (0.002)**	-0.005 (0.002)**	-0.005 (0.002)**	-0.005 (0.002)*	-0.004 (0.002)
Female*(1989 age 33-42)	0.004 (0.002)*	0.004 (0.002)*	0.004 (0.002)*	0.004 (0.002)*	0.003 (0.002)	0.002 (0.002)
Female*(1989 age 43-52)	0.011 (0.003)**	0.011 (0.003)**	0.011 (0.003)**	0.011 (0.003)**	0.005 (0.004)	0.003 (0.004)
% change in hours per week if increase		0.019 (0.003)**				
% change in hours per week if decrease		0.040 (0.005)**				
Not full-time all years			-0.005 (0.001)**			
Not full-time all years *(1989 age 23-32)				-0.005 (0.002)**		
Not full-time all years *(1989 age 33-42)				-0.005 (0.002)**		
Not full-time all years *(1989 age 43-52)				-0.007 (0.002)**		
Mother in 89, Empty nest in 99					0.012 (0.004)**	0.013 (0.004)**
Mother in 89, Still kids at home 99					0.000 (0.002)	
New Mother in 99, No kids in 89					-0.003 (0.003)	-0.003 (0.003)
Mother in 89, Young kids home 99						0.001 (0.004)
Mother in 89, only Teens 12+ home 99						0.001 (0.004)
Mother in 89, only Older teens 18+ 99						0.008 (0.005)
Observed as Young Mother						-0.004 (0.004)
Observations	10519	10519	10519	10519	10519	10519
R-squared	0.10	0.11	0.10	0.10	0.10	0.10

* significant at 5%; ** significant at 1%

Dependent Variable: Growth per year in log real annual earnings 1989 to 1999
((ln(1999 real earnings)-ln(1989 real earnings))/10 .
Sample: SESTAT-BA+ (see data appendix for detailed description)
(Those who worked "full-time all years" also worked full-time in 1993, 1995 and 1997).
Age dummies spanning 30 possible ages included in all regressions
Omitted parenting category: Women (the same age) with no births as of 1990, no older children in 1993, and no kids reported living at home in 1999. Column 6 categories of parenting in both 1989 and 1999 are mutually exclusive (all children are younger than 12 in 1999, all children are at least 18 in 1999, or all children are at least 12, but at least one child is less than 18 in 1999).
Young mother flags women in the 23-32 age group with children in 1989, plus those with new children observed in 1993, 1995 or 1997 who are 32 or younger at the time of observation.

Table 9a—Earnings Growth of Mothers and Non-mothers, Relative to Men the Same Age, by Age Group, 1989-1999(Change in Log Annual Full-Time Earnings)

	(1)	(2)	(3)	(4)	(5)
1989 Age	23-32	33-42	43-52	23-52	23-42
1999 Age	33-42	43-52	53-62	33-62	33-52
SESTAT-BA Sample					
Mother	-0.009	0.011	0.021	0.003	-0.000
	(0.003)**	(0.003)**	(0.005)**	(0.002)	(0.002)
Non-Mother	-0.003	-0.001	-0.005	-0.002	-0.002
	(0.003)	(0.004)	(0.009)	(0.002)	(0.002)
Observations	2285	2191	920	5396	4476
R-squared	0.07	0.02	0.03	0.13	0.12
# Mothers	258	199	84	541	457
# Non-Mothers	205	139	25	369	344
Proportion of mothers not full-time all years	0.25	0.33	0.36		
Proportion of non-mothers not full-time all years	0.28	0.27	0.28		
SESTAT-BA+ Sample					
Mother	-0.007	0.005	0.015	0.002	-0.000
	(0.002)**	(0.002)*	(0.004)**	(0.001)	(0.002)
Non-Mother	-0.004	0.003	-0.004	-0.000	0.001
	(0.002)	(0.002)	(0.006)	(0.002)	(0.002)
Observations	3573	4723	2223	10519	8296
R-squared	0.04	0.02	0.02	0.10	0.07
# Mothers	466	457	224	1147	923
# Non-Mothers	321	356	67	744	677
Proportion of mothers not full-time all years	0.27	0.29	0.33		
Proportion of non-mothers not full-time all years	0.26	0.29	0.28		

Dependent Variable: Growth per year in log annual earnings 1989 to 1999 ((ln(1999 real earnings)-ln(1989 real earnings))/10 .
Those who worked "full-time all years" were also observed working full-time in 1993, 1995 and 1997. Age dummies spanning all possible ages included in each regression.
Mother is defined as a woman with positive fertility as of the 1990 Census, or children in any observation through 1999. Non-mothers are all remaining women.

Table 9b—Earnings Growth of Mothers and Non-mothers, Relative to Men the Same Age, by Age Group, 1989-1996 (Change in Log Hourly Earnings)

	(1)	(2)	(3)	(4)	(5)
1989 Age	23-32	33-42	43-52	23-52	23-42
1999 Age	33-42	43-52	53-62	33-62	33-52
hSESTAT-BA					
Mother	-0.004	0.005	0.028	0.004	0.000
	(0.003)	(0.003)	(0.005)**	(0.002)*	(0.002)
Non-Mother	-0.005	-0.001	-0.005	-0.003	-0.002
	(0.003)	(0.004)	(0.010)	(0.003)	(0.003)
Observations	3862	3421	1606	8889	7283
R-squared	0.02	0.00	0.02	0.05	0.04
# Mothers	667	523	206	1396	1190
# Non-Mothers	372	246	50	668	618
hSESTAT-BA+					
Mother	-0.003	0.007	0.020	0.006	0.003
	(0.002)	(0.002)**	(0.003)**	(0.001)**	(0.002)
Non-Mother	-0.002	0.005	0.001	0.002	0.003
	(0.003)	(0.003)	(0.006)	(0.002)	(0.002)
Observations	6038	7508	3917	17463	13546
R-squared	0.01	0.01	0.01	0.04	0.03
# Mothers	1169	1230	575	2974	2399
# Non-Mothers	588	624	166	1378	1212

Dependent Variable: Growth per year in log hourly earnings 1989 to 1996 ((ln(1996 real hourly earnings)-ln(1989 real hourly earnings))/7

Age dummies spanning all possible ages included in each regression.
Mother is defined as a woman with positive fertility as of the 1990 Census, or children in any observation through 1999. Non-mothers are all remaining women.

Table 10— Quantile Regresssion By Age Cohort, Gender and 1995 Salary Quintile

Quantile:	.5	.75	.85	.95
SESTAT BA+ 1989-1999				
	(1-a)	(2-a)	(3-a)	(4-a)
Female*(Salary95>80k)	0.010	0.003	-0.006	-0.032
	(0.003)**	(0.004)	(0.004)	(0.011)**
Female*(Salary95≤80k)	0.005	0.007	0.011	0.013
	(0.001)**	(0.001)**	(0.001)**	(0.005)**
(Salary95>80k)	0.004	0.011	0.018	0.038
	(0.001)**	(0.001)**	(0.001)**	(0.005)**
Observations	10085	10085	10085	10085
SESTAT BA+ 1989-1999				
	(1-b)	(2-b)	(3-b)	(4-b)
Female*(Salary95>80k)	0.005	0.002	-0.004	-0.020
	(0.002)*	(0.003)	(0.003)	(0.009)*
Female*(Salary95≤80k)	0.005	0.007	0.011	0.014
	(0.001)**	(0.001)**	(0.001)**	(0.004)**
Observations	10085	10085	10085	10085
Age 23-32				
	(1-c)	(2-c)	(3-c)	(4-c)
Female*(Salary95>70k)	-0.011	-0.017	-0.026	-0.049
	(0.006)	(0.006)**	(0.008)**	(0.016)**
Female*(Salary95≤70k)	-0.000	0.002	0.004	0.008
	(0.002)	(0.003)	(0.004)	(0.010)
(Salary95>70k)	0.017	0.027	0.032	0.051
	(0.003)**	(0.003)**	(0.004)**	(0.011)**
Observations	3424	3424	3424	3424
Age 33-52				
	(1-d)	(2-d)	(3-d)	(4-d)
Female*(Salary95>85k)	0.014	0.010	0.006	-0.023
	(0.004)**	(0.005)*	(0.005)	(0.017)
Female*(Salary95≤85k)	0.008	0.009	0.013	0.015
	(0.001)**	(0.002)**	(0.002)**	(0.007)*
(Salary95>85k)	0.001	0.006	0.013	0.028
	(0.001)	(0.002)**	(0.002)**	(0.006)**
Observations	6661	6661	6661	6661

Dependent Variable: Per Year Growth in Log Real Annual Earnings, 1989-1999.
Sample: SESTAT BA+ restricted to those employed full-time in 1995, with 1995 salary data available. Detailed number of observations (all ages, 23-32, 33-52): Female and high salary: n=151, 85, 91; Male and and high salary: n=1528, 634, 934; Female lower salary: n=1593, 441, 1082; Male lower salary: n=6813, 2264, 4554.
Age dummies spanning 30 possible ages included in all regressions; specifications 1-b through 4-b include dummies spanning 60 categories of age*(Salary95>80k).
Note: In the 33-52 age group, 38 percent of men and 43 percent of women earning more than $85,000 per year in 1995 had topcoded 1999 earnings. Therefore, the growth estimates for this group are only suggestive. Among those with lower 1995 earnings, topcodes affected fewer than 2 percent of men and less than a half-percent of women. (Among the 653 workers with topcoded 1999 earnings, 60 percent were men age 33-52 with high 1995 earnings).

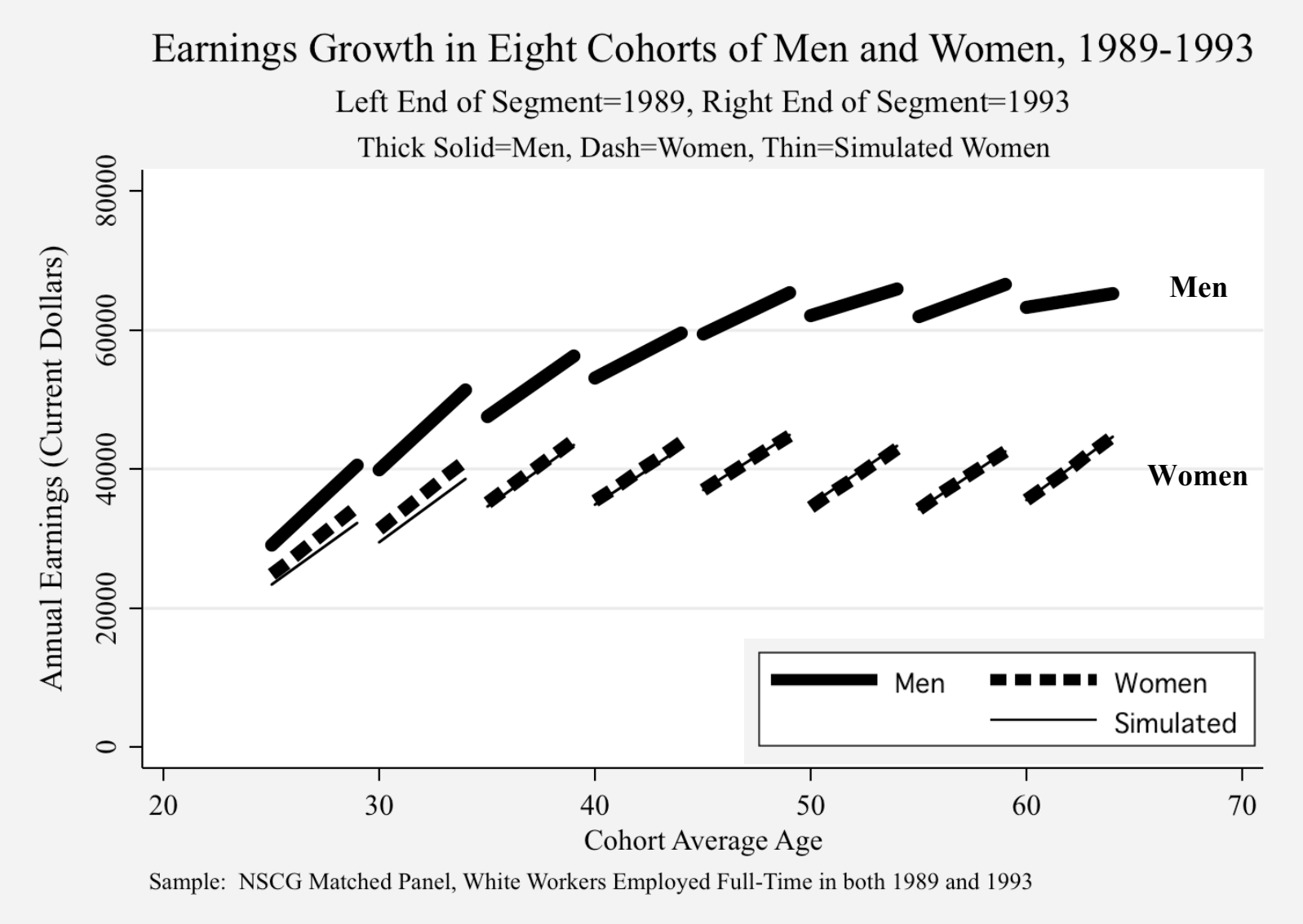

Figure 1—Earnings Growth Paths of Eight Cohorts of Men and Women, 1989-1993, Plus Simulated Growth Paths of Women under the Counterfactual that College Major Distributions Match the Distribution Observed among Women Age 53-62.

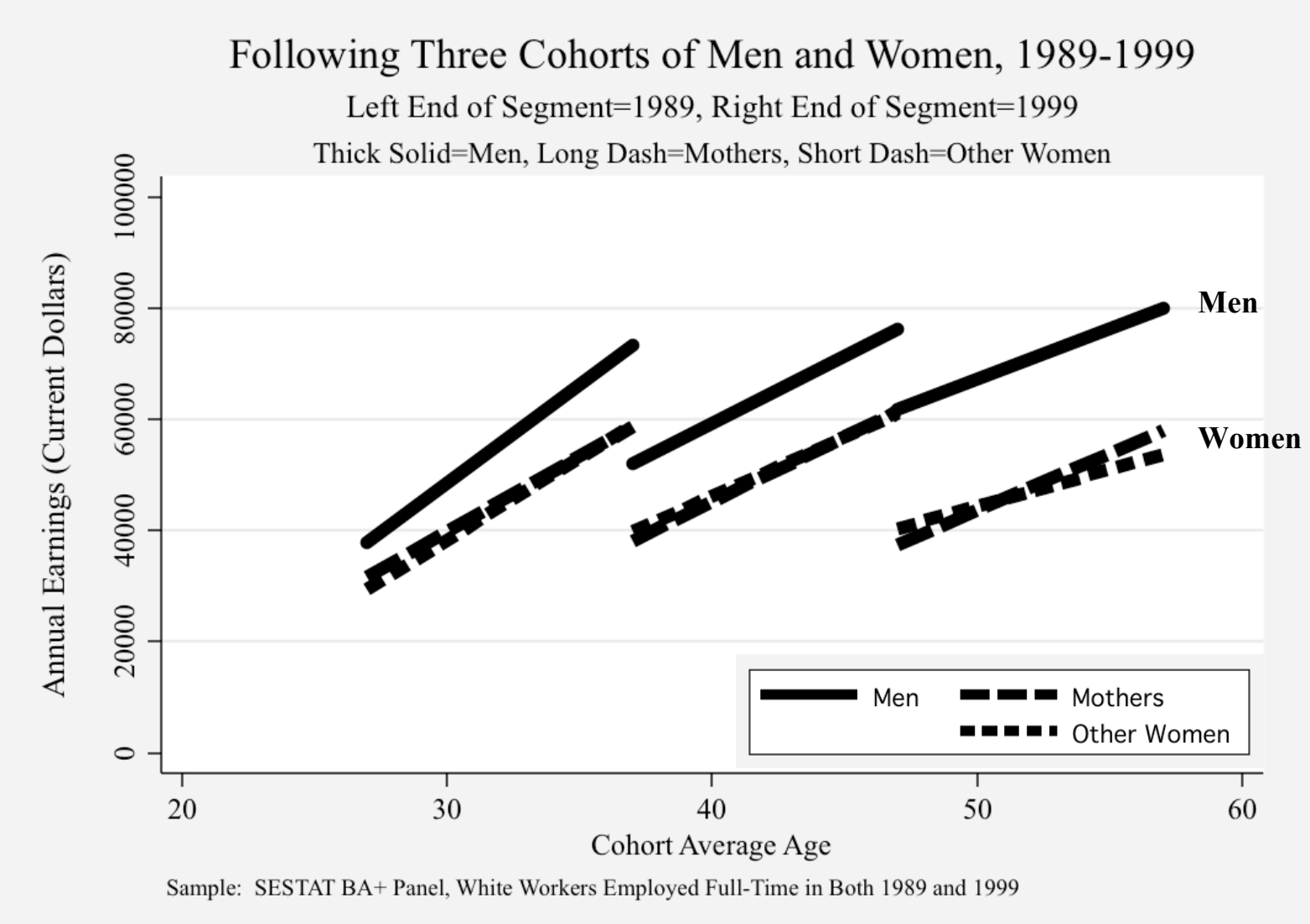

Figure 2—Earnings Growth Paths of Three Cohorts of Men and Women, 1989-1999.

Figure 3—Hourly Earnings Growth Paths of Three Cohorts of Men and Women, 1989-1996.

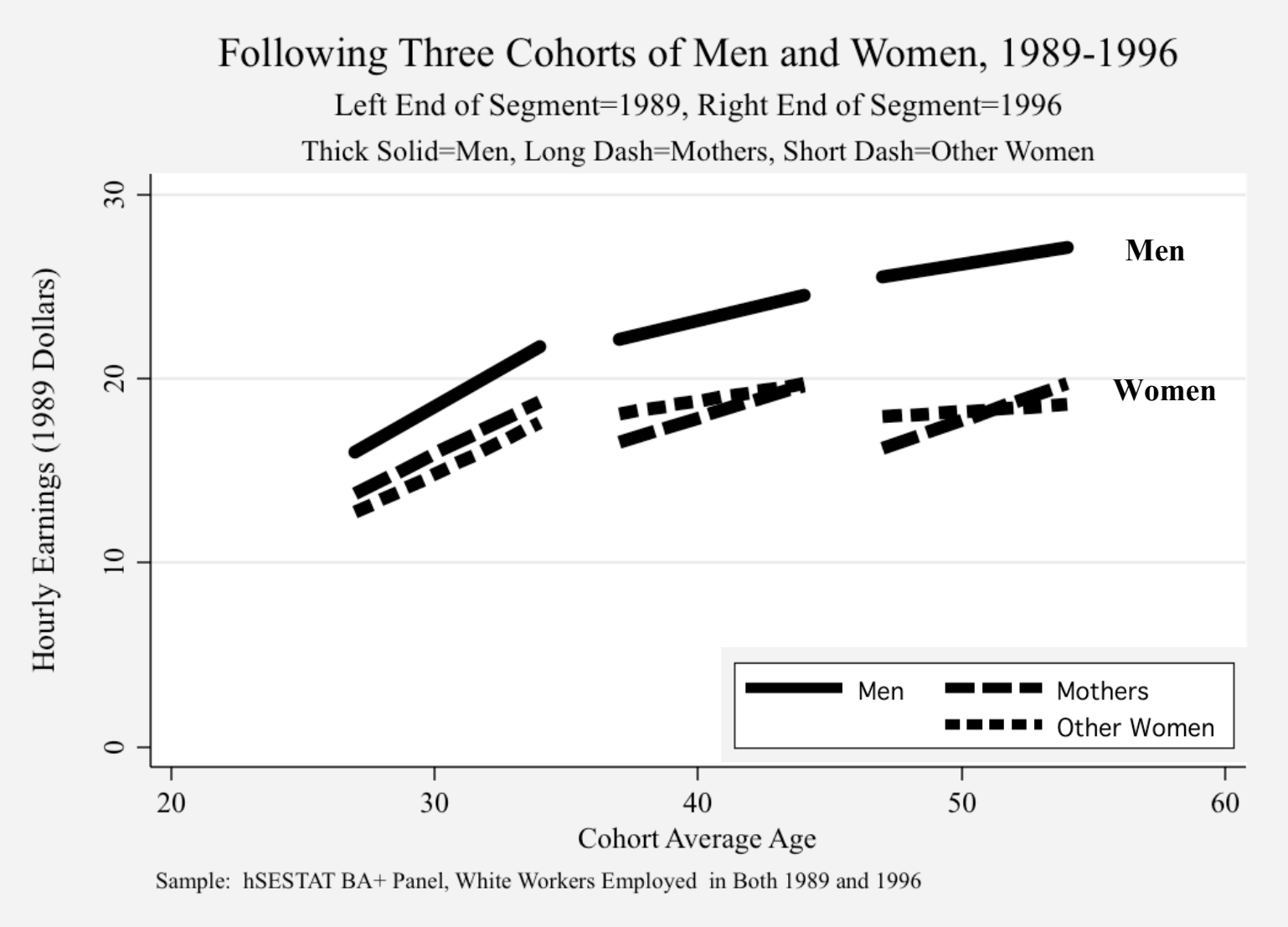

Figure 4—Inflation-Adjusted Hourly Earnings Growth Paths of Three Cohorts of Men and Women, 1989-1996.

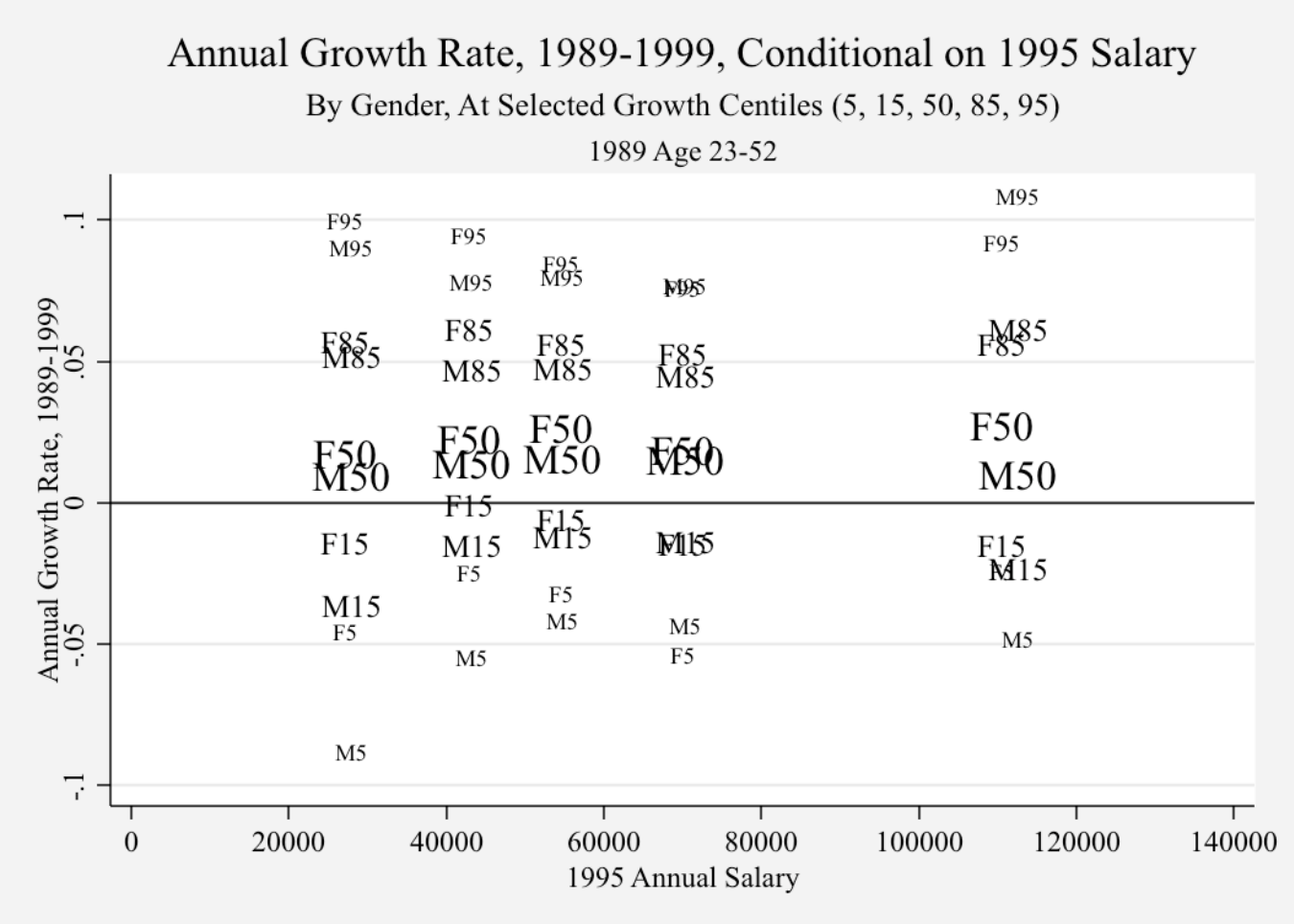

Figure 5—Distribution of 1989-1999 Earnings Growth Rate, by 1995 Salary Quintile and Gender
Legend: M or F indicate Male or Female, followed by a number representing the percentile. For example, M50 represents the median growth rate among men at a given salary quintile, F95 represents the 95th percentile growth rate among women at a given salary quintile. Horizontal placing indicates the mean salary among men or women or men within the salary quintile.
Sample: SESTAT-BA+ (with full-time 1995 salary non-missing).

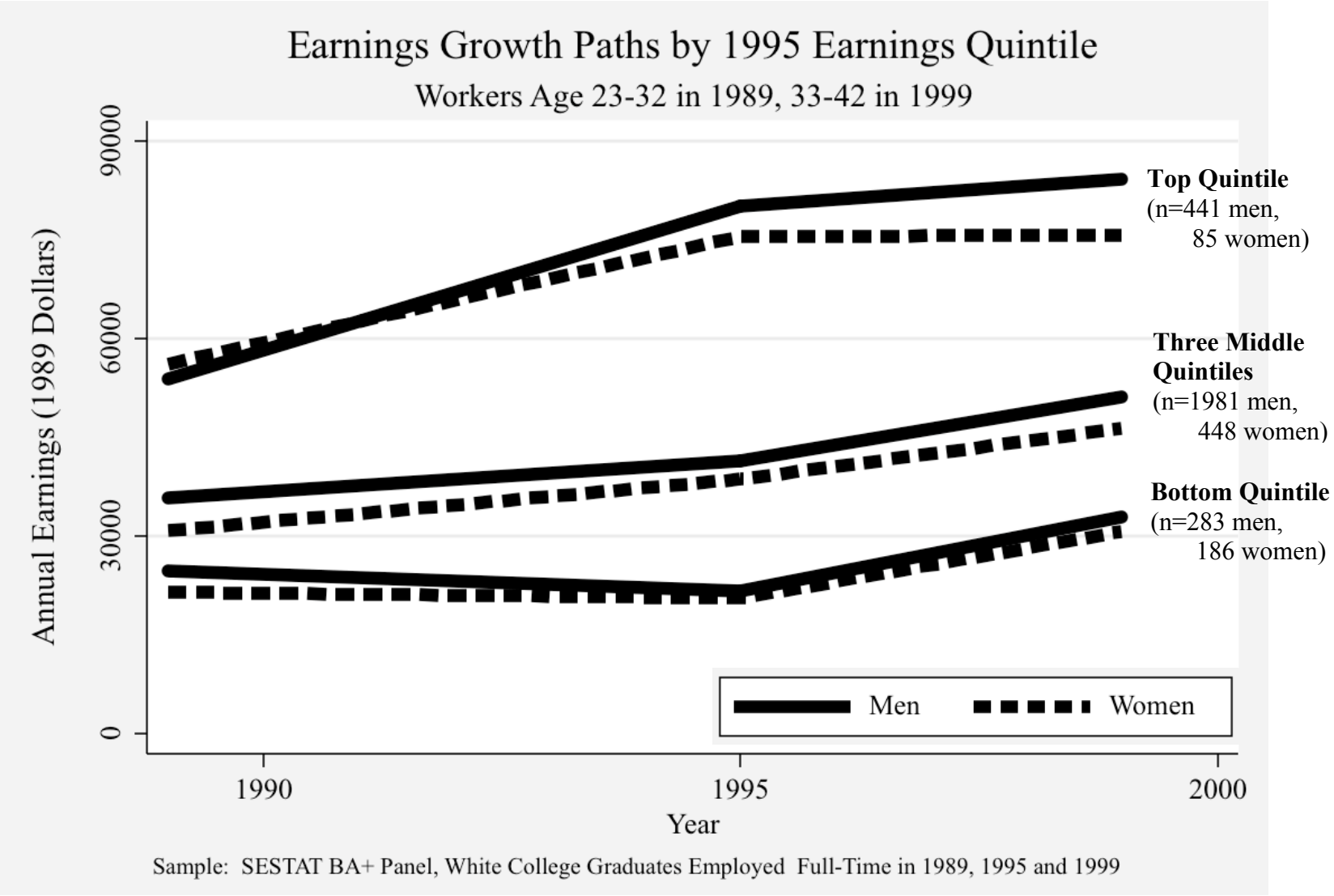

Figure 6—Inflation-Adjusted Annual Earnings Growth Paths of Young Men and Women, 1989-1999.