HUMAN CAPITAL INVESTMENT AND FERTILITY CHOICE AMONG HIGHLY EDUCATED WOMEN IN THE UNITED STATES

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Abstract

This paper focuses on the effect of investment in human capital on the fertility choices of college-educated American women. We propose a measure of human capital based on woman's potential earnings predicted by her highest degree *and* major. Women who have high earnings potential — as measured by these pre-market factors — generally have relatively low fertility. When we restrict attention to women whose highest degree is a Bachelor's, however, we do not find a significant relationship between potential earnings and fertility. These results point to the importance of factors other than the opportunity cost of woman's time in influencing fertility. These factors might include labor market factors (e.g., availability of part-time work and variations in the compatibility of work and family roles across occupations) as well as societal norms on women's roles and status.

I. Introduction

The twentieth century has seen striking increases in women's educational attainment and in their quantitative and qualitative participation in the labor force, and these changes have been coupled with a dramatic fall in fertility rates. In many developed countries, especially in Europe, fertility has fallen below the replacement level and this phenomenon has increasingly become a cause of concern for policy makers. A mix of possible explanations – cultural changes, women's career opportunities, and new gender roles - have been put forth to explain the causes of this reduction in fertility, but none of them seem strong enough to account for the fertility trends currently prevailing in the developed world.

The present study examines the impact of the labor market returns of human capital accumulation on fertility among highly educated women in the United States. The relationship between women's education and fertility has been extensively studied, especially in developing countries, in particular to inform policies aimed at reducing poverty (Goldstein, 1972; Graff, 1979; Caldwell, 1980; Jain, 1981; Cochrane, 1983; Weinberger, 1987; Cleland and Rodriguez, 1988; Schultz, 1994; Castro Martin, 1995; Martine, 1996; Lam and Duryea, 1999; Lloyd, Kaufman and Hewett, 2000). Even though among previous work there seems to be a high degree of consensus on the existence of a significant inverse relationship between education and fertility - consistently with demographic transition theory which postulates a sharp fertility decline in concurrence with the process of socio-economic development – empirical data show considerable differences in the magnitude of such effect at different stages of the demographic transition. In a comparative study of 26 developing countries that participated in the Demographic and Health Surveys (DHS), Castro Martin (1995) concludes that "women's education does not have identical repercussions in every society, but is conditioned by socioeconomic development, social structure, and cultural context" and that "the impact of individual schooling on reproductive behavior is weak in poor, mostly illiterate societies, grows stronger as societies improve their overall education and advance in their fertility transition, and becomes less prominent once a relatively low level of fertility has been reached".

There is not a vast literature documenting the effects of education on fertility in developed countries, characterized by high levels of educational attainment and where fertility rates have already declined to low levels, and the relationship does not seem to be strong: some studies have indeed documented a positive influence of educational attainment on fertility (Schultz, 1973; Hoem and Hoem, 1989; Kravdal, 1990). In the United States, fertility rates in the last 30 years have displayed a remarkable level of aggregate stability, in sharp contrast with most European countries where fertility declined substantially over the same period. Recent research in the United States (Lewis and Ventura, 1990; Morgan, 1991; Rindfuss, Morgan and Offutt, 1996; Martin, 2000) has mainly focused on the association between educational attainment and the timing of births. In a 1990 National Center for Health Statistics report examining the relationship between fertility and education, Lewis and Ventura (1990) find that while women with a college education are likely to begin childbearing at a significantly later age than less educated women, the high rates of births among well educated women in their 30s "suggest that these women are compensating for earlier postponements of childbearing." Rindfuss, Morgan and Offutt (1996) document dramatic shifts towards delaying the age of childbearing, especially for women with college degrees. They conclude that "because of the increasing opportunities for women with advanced education, many now pursue careers in which the costs of early childbearing are high, and the costs associated with taking time out of the labor force to raise children are prohibitive. Rather than abandoning childbearing, American women have responded by postponing marriage and childbearing, and by using organized childcare centers." Noting that the subset of highly educated American women have a fertility rate of approximately 1.5, which is higher than the Total Fertility Rate[1] (TFR) for entire countries in Europe (Italy, Spain), they argue that their results "are consistent with a prediction that American fertility levels will remain higher than those found in many other economically developed countries." Martin (2000), using a hazard function to estimate completed fertility of women childless at age 30, finds a positive relationship between education and birth rates after age 30. He provides evidence of widening educational differences in the timing of fertility between the 1970s and the 1990s, as first birth rates decreased before age 30 for all women, but increased after age 30 only for women with four-year college degrees. He interprets this

[1] The Total Fertility Rate is defined as the number of births that an hypothetical group of 1,000 women would have if they experienced throughout their childbearing years the age-specific birth rates observed in a given year

result as an outcome of growing income inequality, as the "continued low rates of childbearing after age 30 [of women without four-year college degrees] suggest that even if they are strongly committed to having children, they have little flexibility for timing their births across their lives."

This study has three aims. The first aim is to extend previous findings on the relationship between education and fertility to determine if they can be generalized to the population of college educated U.S. women. Second, by focusing only on the college educated, we hope to contribute insights on the future trajectory of fertility in the United States. As the educational attainment of women in the United States continues to increase, understanding the fertility determinants of highly educated women becomes crucial in order to predict fertility patterns that will prevail in the future. Finally, and most importantly, by using extremely detailed educational data, we will try to isolate the return to human capital component of education in order to explore in more depth than previously attempted one of the main mechanisms through which education affects fertility.

As pointed out by Janowitz (1976), the key question we need to ask is: "What does education stand for?" As an individual attends school for a number of years and earns a degree, the knowledge and skills acquired increase his or her stock of human capital. Education therefore *is* human capital, but we believe that a variable indicating years of schooling is by no means a satisfactory measure for human capital accumulation.

Generally, the problem with testing theories that posit how *human capital* affects behavior is that empirical studies can only test how *education* is correlated with observed outcomes. In addition to educational attainment, a measure of women's human capital accumulation can be captured considering their earning potential, which depends not only on their sheer educational attainment but also on the returns that the education acquired generates in the labor market. However, most of the variation in the earning potential related to the educational attainment of women lies in the *type* rather than *quantity* of education: in addition to the level of educational attainment as measured by years of schooling or higher graduate degree, there are enormous differences in the way the skills acquired in different fields are rewarded in the labor market. For instance, the literature on male-female wage gaps has shown that sex-based differences in years of schooling are far less important than the difference in type of education men and women acquire for the explanation of the wage gap. A number of studies (Polacheck 1978, Wood, Corcoran and Courant 1993, Brown and Corcoran 1997) have shown that while women have similar *levels* of education to men, the *content* of the education they acquire often does not provide them with skills that are rewarded in the labor market, and therefore differences in college major seem to be a very important factor that explains the wage differences between men and women.

The data we use, the 1993 National Survey of College Graduates (NSCG), include much more detailed educational data than has been previously used in this literature. The NSCG dataset provides detailed information on degrees received as well as majors associated with each degree. In this study, we propose to estimate the earning potential associated with each major field, thereby using variations in *type* in addition to *quantity* of education as a measure of variation in human capital. To date, there are no studies that have attempted to use labor market returns to different college majors as a measure of variation in human capital in the analysis of the impact of education on fertility. We argue that this will provide a much better measure for human capital accumulation than previously possible with Census data.

The remainder of the paper is structured as follows. In Part II, we will introduce the theoretical background, and especially the so called "new home economics", which provides a framework for the analysis of the relationship between education and fertility. Part III introduces the data and discusses the problem of measurement error in the Census, which may lead to flawed conclusions when Census data are used to estimate the impact of education on fertility. Part IV presents descriptive statistics and two reduced form regressions that estimate the impact of human capital on fertility and on the probability that women had an uninterrupted full time work experience. Part V and VI develop a two-step empirical model used to test the theory that an increase in human capital accumulation, as measured by variation in the potential return to the education in the labor market, leads to a reduction in fertility. Part VII is a conclusion and develops the policy implications of the analysis.

II. Theoretical Framework: the Economic Theory of Fertility Behavior

As noted by Michael (1973), "a negative correlation across households between parents' education and completed fertility is one of the most widely and frequently observed relationships in the empirical literature on human fertility behavior". However, there is no doubt that the relationship between women's education and fertility is extremely complex, and a number of explanations have been formulated to explain this observed correlation.

Sociologists have emphasized the relationship between women's education and women's status, postulating that education increases women's autonomy, leading to later marriage, increased contraceptive use and lower fertility. Bongaarts (1978) defines education and other socioeconomic and cultural variables as *indirect* determinants of fertility, since they would affect fertility only through other economic, biological and behavioral factors such as contraceptive prevalence and age of marriage, which he calls intermediate fertility variables. Janowitz (1976) separates the impact of women's education on fertility into 2 major components. She calls the first component direct effects, consisting of (a) widening horizons which affect women's preference for children and (b) increasing contraceptive knowledge. The second component, defined as indirect effects, works through the influence of (a) market productivity or labor force participation and (b) age at marriage. Not surprisingly, she finds that the direct effects dominate the indirect effects at lower levels of education, while indirect effects increase in importance at higher levels of education.

Economists have focused on the role played by changes in the relative prices in the economy, especially wages, in affecting women's decisions. Wages vary according to women's educational attainment, and as wages rise women tend to participate more in the labor market and to have less children. A framework in which human fertility behavior can be analyzed is provided by the "economics of the family", where fertility is incorporated into the traditional neoclassical theory of household and consumer choice and the principles of economy and optimization are used to explain family size decisions.

The conventional theory of consumer behavior assumes that an individual with a given set of tastes or preferences for a range of goods (utility function) tries to maximize the satisfaction derived from the consumption of these goods subject to his or her income constraint and the relative prices of all goods. In his application of this theory to fertility analysis, Becker (1960) considers children as a special kind of consumption (and in certain cases, investment) good so that fertility becomes a rational economic response to the consumer's (family's) demand for children relative to other goods. Mathematically:

$$C_d = f(Y, P_c, P_x), x = 1,.... n.$$

where C_d, the demand for surviving children, is a function of the given level of household income (Y), the "net" price of children (P_c, the difference between anticipated costs, including the opportunity cost of a mother's time, and benefits, potential child income and old-age support), and the prices of all other goods (P_x). Under neoclassical conditions we would expect $\frac{\delta C_d}{\delta Y} > 0$ (the higher the household income, the greater the demand for children, assuming children are not inferior goods), and $\frac{\delta C_d}{\delta P_c} < 0$ (the higher the net price of children, the lower the quantity demanded).

Given this framework for analysis, the ways in which education may influence fertility work through its impact on family income and on the "price" of children. However, empirical evidence shows that the observed number of children generally falls with education, meaning that the price effect must dominate the income effect. There are two main mechanisms through which education may impact the price of children, one focusing on the interaction between quantity and quality of children, and the other on the value of women's time and women's labor force participation.

a. The interaction between quantity and quality of children.

According to the vast literature documenting the positive correlation between human capital and wage rates, investments in education increase women's earnings potential, and therefore their full income. The direct effect of an increase in income, holding prices constant, is to increase the demand for children if these are normal goods. However, empirical evidence seems to contradict the assumption that the demand for children would rise with income: higher income groups do generally have fewer children.

The reason, according to the theory, must lie in the existence of a price effect significant enough to counteract the income effect. According to Becker and Lewis (1973), this price effect would be attributable to the existence of a trade-off between quantity and quality of children. Even if an increase in income does increase total expenditure in children, just like for any other durable consumption good families with higher income buy "higher quality" children. Assuming that the income elasticity with respect to quantity is low relative to the income elasticity with respect to quality, most of the increase in expenditures for children would be due to an increase in their quality. In addition, Becker and Lewis point out that the level of quality provided to existing children constrains the extent to which parents can vary the expenditures on quality for an additional child: assuming that quality is the same for all children, the cost of an additional unit of quality holding the number constant (the shadow price of quality) is an increasing function of the number of children, and similarly the cost of an additional child, holding their quality constant (the shadow price of quantity) is an increasing function of quality. We would thus be in presence of a non-linear budget constraint that could reduce the magnitude of the income effect.

This interaction between quantity and quality has very important implications for our analysis of the effects of education on the demand for children. An increase in the mother's schooling increases productivity, which in turn decreases the amount of time and resources needed to produce a unit of child quality. This brings about a fall in the shadow price of quality, which induces an increase in quality. But since the price of quantity is an increasing function of quality, an increase in the demand for child's quality increases the shadow price of quantity, which has the effect of reducing the number of children. However, education also increases the market wage, which – assuming income elasticity with respect to quantity is greater than zero – increases quantity demanded and therefore the price of quality, potentially offsetting the productivity gain. The net effect of women's education on the shadow price of children's quality is therefore ambiguous and needs to be tested empirically. Lam and Duryea (1999) using data from Brazil find a strong link between women's schooling and investment in children's quality, especially at low levels of schooling.

b. The value of women's time.

In an alternative explanation, Mincer (1963) attributes the price effect to the opportunity cost of women's time spent in childbearing and childrearing. Assuming that a woman's market work is incompatible with simultaneously caring for her children, families face a tradeoff in the decision about how to allocate scarce time between the labor market and the care of children. In his seminal work on the theory of the allocation of time, Becker (1965) considers time as an input in the household production function, which families use to produce the set of commodities (activities) that enter in their utility function. As posited by Becker, the effects of a change in the "price of time" on the relative price of a commodity depend on its time intensity. Children are generally assumed to be intensive in the use of parents' time, that is, they require a higher ratio of parental time to other inputs than alternative consumption activities. Under this assumption, increases in wages, by raising the opportunity cost of time, raise the full cost of children relative to other forms of consumption, leading couples to substitute out of time-intensive commodities such as children.

An increase in schooling raises market wages for women, and therefore their opportunity cost of time. Higher educated groups have a higher time cost in child rearing in terms of earnings forgone by the woman, and therefore they face a higher price of children than lower educated groups. However, it needs to be emphasized that increases in schooling raise home productivity as well as labor market productivity, which causes both market and reservation wages to increase. Therefore, higher levels of education will increase a woman's participation in the labor market only if the increase in her market wage is higher than that in her reservation wage. Empirical evidence seem to suggest that the effects of schooling on home productivity face diminishing returns: reservation wages would therefore rise as fast as market wages at low levels of schooling (thereby preventing labor force participation to increase), but rise more slowly than market wages at higher levels of schooling, which would increase labor market participation.

The market wages forgone by mothers due to time spent in childrearing are only one of the components of the opportunity cost of children. As posited by Michael (1973), the shadow price of women's time should also include the depreciation rate of human capital, and this cost may differ across specific uses of one's time. More specifically human capital, unlike physical capital, depreciates at a rate inversely correlated to its utilization. If the time spent child rearing involves low rates of utilization of human capital, then the higher rates of depreciation of existing capital should be added to the shadow price of nonmarket time. In an additional explanation of how education may impact the demand for children, Mincer and Polacheck (1974) find that the present value of future earnings lost through the depreciation of human capital is much higher for college educated women: the depreciation rate is higher the higher the accumulated stock of human capital.

III. Data and the Problem of Measurement Error

Data are taken from the 1993 National Survey of College Graduates (NSCG), which was conducted by the National Science Foundation (NSF) and the Bureau of Census to examine the degrees and disciplinary majors of college educated persons in the United States. The NSF and the Bureau of the Census conducted the survey based on the 1990 Decennial Census Long Form, limiting the sampling frame to those who had reported having at least a bachelor’s degree and those who were younger than 72 as of April 1, 1990 (Census date). The NSCG provides detailed information on the type and field of degrees received as well as wage and employment information. Attention was paid to the accuracy of the education responses in the collection of these data, and respondents were asked to provide detailed information about their majors for up to 3 degrees.

For the college educated, a great advantage of using the NSCG over Census data is that it allows to avoid the problem of measurement error present in the Census. Even if no survey can be perfectly reliable, the thorough attention that was paid to the accuracy of the education responses in the NSCG as compared to Census questions leads one to believe that the NSCG educational attainment data have a higher degree of accuracy. By matching the educational measure of the Census to that reported by respondents in the NSCG, Black, Sanders, and Taylor (2003) find that 14,319 respondents, or 6.8 per cent of the sample, had no four-year college degree despite claiming to have one on the 1990 Census. As an especially noteworthy result, they estimate that over half of the women who report having a Professional degree in the Census have in fact no such degree. While they stress the implications that this misreporting has on returns to education, the presence of misreports in education may also lead to seriously flawed inferences when education is used as an explanatory variable in fertility analyses. For example, if women who misreport education tend to have higher than average fertility, Census data would greatly overestimate the fertility of women holding a Professional degree, or underestimate the size of the negative effect higher levels of education have on completed fertility.

Table 1 shows descriptive data on the total number of Children Ever Born (CEB) to women aged 40 and above. We limit our analysis to women older than 40 because using a cross-section of data including younger women who have not completed their fertility would result in an underestimation of these women's completed fertility. To the extent that we believe that women with higher degrees or more highly rewarded majors tend to have children later in life as opposed to those with bachelor's degrees or low earning majors, a difference in their fertility may just be an effect of delayed childbearing for these women. Since fertility varies among US women according to their ethnicity and immigration status, we show children ever born distributions for non-Hispanic White, African-American, and Foreign Born women (Asian, Hispanic and Native Americans are also considered, but they are not presented in the table due to small sample size). For each ethnic group fertility is presented by highest degree obtained as reported in the Census and NSCG data.

The table shows that the two different measures for educational attainment yield very different fertility levels for women with professional degrees: Census data yields a mean CEB value of 2.105, whereas the NSCG yields a mean of 1.5. Conversely, women that report no degree in the NSCG (but provided Census responses interpreted as having at least a college degree) have relatively high CEB. Considering race, highly educated black women have a slightly lower mean CEB than white women of the same educational level. Since overall, the fertility of black women in the United States is significantly higher than that of white women[2], this is quite an interesting result, and one that points to the key importance of education in reducing fertility.

[2] According to the 1990 Census, the TFR of white women in the United States was 1.85, as compared to a TFR of 2.55 for non-Hispanic black women

The two columns of Table 2 show the results of two OLS regressions of children ever born on female education, measured respectively using Census data and NSCG data. In order to control for race, which may be correlated with women's schooling, in the regressions we have included 6 dummies for *ethnicity* (the reference group is Whites). Since we have a cross-section of data, it is also important to control for cohort effects, as women from earlier cohorts may have disproportionately pursued degrees correlated with higher fertility. To control for cohort effects, we have included 5 dummies, for women respectively belonging to the 45-49, 50-54, 55-59, 60-64, 65+ age cohorts (40-44 is the excluded category). Educational level variables are 3 dummies (Master's, Professional's, Ph.D.'s) with Bachelor's degree as the reference category. The second regression also includes a dummy for women that reported no degree in the NSCG survey. Since children are more likely to be born in families, we also include a dummy variable to control for women that have never married.

Since the CEB variable is a "count" variable, linear regression model may not be the most appropriate methodological tool. Possible problems with using OLS with count data are that the assumption of homoskedasticity is most likely violated and predicted values may lie out of the possible range. However, the OLS procedure gives results that are easier to interpret and are useful for exploratory purposes. A possible alternative involves using ordered logit, which avoids the above mentioned problems by using maximum likelihood estimation. Since we find that ordered logit confirms the OLS results, only OLS output is presented here. As we can see by comparing the coefficients for the Professional degrees dummies, using Census data we would have to reject the hypothesis that the fertility of women with a professional degree and a bachelor degree is significantly different. However, NSCG data indicate that women with a professional degree have 0.37 children less than women with a bachelor's degree, significant at the 0.01 level. The regression with NSCG data also shows an inverse relationship between increasing levels of education and fertility which may have been rejected with the use of Census data.

IV. College Degrees and Fertility among Highly Educated Women

Table 3 shows that the fertility of college educated women in the United States varies widely by major of the highest degree they receive. In table 3, college majors were collapsed into 15 broad groups for Bachelor's and Master's degrees[3]. In addition, data for J.D.s and M.D.s are presented separately.

The first column of table 3 shows the total number of children ever born to women aged 40 to 64 at the time of the survey. Mean CEB ranges from 1.2 children for women with a Law degree to 2.4 children for women with a Bachelor in Home Economics. The second column of table 3 presents the mean hourly wage that men and childless women with a continuous work history earned in 1989, also by highest degree held and major field. These figures roughly reflect the earning opportunities associated with each degree and major. Potential wages vary greatly, from less than $ 12 an hour for a BA in Social Work to over $ 37 for an M.D.

As a measure of work commitment, the third column of table 3 shows the percentage of the sample of females used in column 1 in each degree and major category who had a continuous full time work experience[4]. The fourth column shows the same percentage for women that have continuously worked full time or part time. In general, we can see a quite regular increase in work force commitment and decrease in fertility as earning opportunities rise. However, as a striking exception we can also notice that all degrees connected with health care (Health Degrees, Nursing, and M.D.s) are characterized by high fertility and high commitment to the labor force. Interestingly, women that major in these degrees are also those that appear to have been able to work

[3] The NSCG dataset includes information on 146 major fields of study, which we have collapsed into 15 broader fields of study for ease of presentation. In addition, the collapse is necessary for the empirical estimation of potential earnings by major, since we would not have enough observations to separately estimate potential earnings for each of the individual majors.

[4] To construct this measure, we compare the total number of years a woman worked full time (a variable available in the NSCG) with the number of years of her "potential" work experience. Potential work experience is defined as (age – 6 – 16) for women whose highest degree is a B.A.'s, (age – 6 – 17) if a woman's highest degree is an M.A.'s, (age – 6 – 19) for women with a Law Degree as their highest, and (age – 6 – 20) if a woman's highest degrees are Ph.D.s or M.D.s. This measure for potential experience has the drawback of assigning the same number of years of education to women holding the same highest degree, which would result in underestimating the commitment to the workforce for women holding multiple degrees. However, if at all the underestimation is probably higher for women holding higher degrees, since they are more likely to have pursued multiple degrees. Therefore, since the estimate is likely to be conservative at high educational levels, we will need a especially strong result to find significance when using this measure as a dependent variable in our regressions.

part time in a much larger proportion than women who chose different fields. Finally, in the column 5 of table 3 we have calculated the percentage of females in each degree level and major: “femaleness” of degree ranges from 98% for a BA in Home Economics to 12% for BA and MA in Computer Science and Engineering.

We now proceed to estimate the effect of human capital on fertility, using variation in college majors as our proxy for human capital. Table 4 shows the results of three OLS regressions of children ever born on a set of dummy variables for college majors and other control variables for the same sample of women. The first column of table 4 shows the results of an OLS regression of fertility on a set of dummies representing major field. The excluded variable is BA in Home Economics. Clearly, this regression simply reflects differences in the mean values of fertility across the various degrees. As we can see, women in every major except for BA in Social Work have a fertility which differs from that of women with a BA in Home Economics at a 0.05 level of significance. Of course, these coefficients may include the effects of variables correlated with women’s schooling. We also need to control for cohort effects, as women from earlier cohorts may have majored disproportionately in fields correlated with higher fertility. The second column of table 4 shows the results of a regression which uses a set of dummies to control for cohort effects and race. Column 3 also includes a dummy to control for women who have never married. Even if the coefficients are somewhat reduced, we still have a very significant effect of field of highest degree on fertility, with women with J.D. degrees, Ph.D.s, and M.B.A.s choosing to bear around 0.7 children less than Home Economics BAs. An F-test on the majors’ coefficients in regression 3 yields an F (30, 23817 d.f.) value of 15.10, so we can reject the hypothesis that the majors’ coefficients are all equal to zero with a $p<0.0001$. If we look at the effect of race, we can also notice that when accounting for differences in majors, the fertility of highly educated black women is still significantly lower than that of white women. However, when we add the control for “Single”, the coefficient loses statistical significance, suggesting that the lower fertility of highly educated black women can mostly be attributed to lower marriage rates.

As noted above, an alternative estimation procedure when the dependent variable involves count data is ordered logit. We ran ordered logit and the results were similar to those obtained with OLS. Ordered logit can also be used to predict the probabilities of reaching different child parities. Table 5 shows the predicted probability of having 0, 1 or 2, and 3 or more children by college major, calculated for married white women in the 50-54 age cohort. The table shows that women with a Ph.D. or J.D. degree have about a 20% probability of remaining childless. At the other end of the distribution, women with a Bachelor's degree in Social Work have almost a 50% probability of bearing more than 2 children.

Finally, given that fertility decisions and labor supply are to a certain extent interrelated, we also ran a logit for the probability that a woman has continuously participated full-time in the labor force. Proceeding in the same fashion as above, we ran three regressions on a set of dummy variables for college majors and other control variables for the same sample of women, with BA in Home economics as the excluded variable. Table 6 presents the odds ratio calculated from the logit coefficients. There is a wide range of variation in the odds ratios of having an uninterrupted career across degrees and majors, with Ph.D.s showing the highest commitment to full time work with odds of having continuously worked full time over 6 times as large as those of Home Economics majors) and Social Work BAs the lowest. A chi-square (30 d.f.) test on the joint significance of majors yields a value of 788.13, meaning that we can reject the hypothesis that the majors' coefficients are all equal to zero with a $p<0.0001$. In addition, a chi-square (13 d.f.) test on the joint significance of majors for Bachelors' degrees only yields a value of 49.25, meaning that even for women whose highest degree is a bachelors there is a significant difference across majors in the odds ratios of working without career interruptions ($p<0.0001$). It is also interesting to note that women with bachelors in Nursing, whose fertility did not significantly differ from that of women majoring in Home Economics, nevertheless have odds of continuously working full time which are significantly higher.

V. A two-step empirical model of women's potential earnings and fertility

As noted in the theoretical section, the two mechanisms that are widely recognized as the major reason for which increases in women's schooling are associated with declines in fertility are the increase in opportunity cost of children and the "quality-quantity" trade-off in parental time allocation. Unfortunately, our data do not allow us to test the latter theory, which would require some measures of child quality such as child health, child's schooling attainment or direct expenditures in consumption goods per child. However, the NSCG data provides us with a wealth of information that can be used to construct a very accurate measure of human capital accumulation, measured by the potential wage that women could obtain in the labor market. This measure could then be used to empirically test the theory that increases in the opportunity cost of childbearing due to women's improved educational attainment brings about a reduction in fertility, and may have been an important determinant of the reduction of fertility to below-replacement levels in most industrialized countries. The birth of a child usually leads to reduced market activity for the mother, and the cash opportunity cost of childbearing is defined as the income forgone during the withdrawal from the labor force, or during the period of reduced working hours due to childrearing. In addition, the time spent outside the labor force represents a disinvestment or depreciation in accumulated human capital, and therefore a deterioration of earnings potential, which needs to be added to the above defined opportunity cost.

The problem with econometric analysis involving the opportunity cost of childbearing is data availability: it is difficult to obtain a good measure of the opportunity cost a woman faces when she decides to bear a child and not to participate in the labor market. A number of studies have tried to estimate the cash opportunity cost of childbearing, but a good measure of such opportunity cost has proven hard to obtain. Using British data, Joshi (1990) estimated an opportunity cost per child of around 56,000 pounds, with forgone hours equivalent to about 13 full-time equivalent years for a two child family. These estimates are substantially higher than those obtained by Calhoun and Espenshade (1988), using U.S. data, which amount to $25,000, and only one to two full-time equivalent years per birth. Kravdal (1992) finds a loss between $ 127,000 and $ 151,000 (depending on the mother's age at first birth), and 6.6 years of labor market participation, for a two-child Norwegian mother. It is not clear if the considerable variation between these estimates can be explained by the profound differences between the U.S., Norwegian and British societies, or if it should rather be attributed to differences in data and methodology. Calhoun and Espenshade (1988) also find that better educated women reduce labor supply less than women with a lower education, but this lower reduction is more than offset by the higher potential earnings, resulting in greater forgone earnings.

In order to tackle the issue of opportunity cost of childbearing, we produce a variable that approximates the wage women would have obtained in the labor market had they remained childless, and then we use this variable to see if fertility is statistically associated with this measure. This approach requires two stages. First, we estimate a set of thirty-one of the following wage regressions – one for each major *m* - on a pooled sample of men and childless women aged 25 to 65, who have been continuously working full time:

(1) $$ln(Y_{im}) = \beta_0 + \beta_{1k} Cohort_{kim} + \beta_{2j} H_{jim} + \beta_3 Female_{im} + \beta_4 Single_{im} + \\ + \beta_5 (Female_{im} * Single_{im}) + \varepsilon_{im} \quad , m = 1 \ldots 31;\ k = 1 \ldots 8;\ j = 1 \ldots 7$$

where *ln(Y)* is the natural logarithm of the person's wage, *Cohort* are a set of dummies denoting the person's age group (the 30-34 age group is the excluded category), and *H* are a set of dummies denoting ethnicity (white is the reference group). We also include a dummy taking the value of 1 if the person is female, a dummy taking the value of 1 if the person has never been married, and an interaction term between female and never married to control for the different effect of marital status across sexes. We then use the estimated coefficient vector to calculate the predicted wages (denoted OC-hat) that each woman in the sample of women age 40 to 64 would have earned between *age 30 and 34* if she had been continuously participating in the labor market using her degree[5]. These predicted variables represent the potential wage that a woman with a bachelor's degree in a certain major could have earned had she remained childless, and

[5] In order to have one single value of predicted wage for each major, we predict wages using the coefficients for *Cohort*=30-34, *H*=White, *Single*=0 and *Female*=1

are therefore a proxy for the opportunity cost of childbearing. We feed these values into the following regression:

$$(2)\ CEB_i = \beta_0 + \beta_1 \hat{OC}_i + \beta_{2k} Cohort_{ki} + \beta_{3j} H_{ji} + \beta_4 Single_i + U_i\ ; k = 1...5; j = 1...7$$

where *CEB* is the number of Children Ever Born to a woman. The idea behind this regression is that the reason why two married women of a certain race would choose to have a different number of kids is that they chose different majors, and because the returns to these educational majors in the labor market (the opportunity cost) differ. Finally, since employment and fertility affect one another, and are to a certain extent determined together, we also use OC-hat as an independent variable in a logit equation in the following form:

$$(3)\ p_i = \beta_0 + \beta_1 \hat{OC}_i + \beta_{2k} Cohort_{ki} + \beta_{3j} H_{ji} + \beta_4 Single_i + U_i\ ; k = 1...5; j = 1...7$$

where the variable p takes the value of 0 if the woman has not participated continuously in the labor market, and 1 if she has continuously participated in the labor force.

Our decision to use the wage earned by a pooled sample of men and childless women as a measure of the potential wage faced by a woman if she had continuously participated in the labor market may seem debatable, especially if we believe that women face substantial discrimination in the labor market in relation to men. It would clearly be preferable to use just childless women or, alternatively, only men, to estimate their potential wage. Unfortunately, we do not have enough females in predominantly male majors nor do we have enough males in predominantly female majors to be able to produce accurate estimates of women's opportunity cost by major field, so our decision was mainly driven by necessity. However, there is now quite an agreement in the wage gap literature that when occupations are narrowly defined, pay differences within the same occupation do not account for much of the male/female wage gap, with typical female/male earnings ratios ranging between 0.90 and 0.95 (Blau 1977, Siebert and Sloane 1981). The bulk of the earnings gap is instead accounted for by occupational segregation, differences in preferences for certain jobs, and factors originating from outside the labor market, such as *type* of education received, career interruptions and different household responsibilities. In the light of the current wage gap literature, it seems therefore reasonable to assume that a woman's potential wage in a certain major can be proxied by wages earned by men and childless women in the same major. As mentioned above, we have also included a sex dummy in our regressions in order to control for the male-female wage gap existing in the different majors.

The results of the first stage regressions are presented in table 7. As we can see, married women have consistently lower wages than married men across majors – except for Home Economics – but single women have generally wages that are comparable to single men. The left panel of Table 8 shows the results for the first of the two second-stage regressions, which estimates the effect of opportunity cost of childbearing on fertility. The coefficient for potential wage is -0.497, significant at the 0.01 level, meaning that a 100% increase in potential wage reduces fertility by about half a child[6]. The right panel of Table 8 shows the results for the second of the two second-stage regressions, which estimates the effect of opportunity cost of childbearing on the decision to participate continuously in the labor force. The coefficient for potential wage is 8.09, meaning that a 100% increase in potential wage increases over eight times the odd ratio that a woman will have continuous work force participation.

It is important to note that the model we just presented in this section could also be seen as a restricted version of the general model presented in section IV. The unrestricted model presented in regression 3 was:

$$(4)\, CEB_i = \alpha_0 + (\delta_1 M_{1i} + \delta_2 M_{2i} + ... + \delta_{31} M_{31i}) + \beta_{2k} Cohort_{ki} + \beta_{3j} H_{ji} + \beta_4 Single_i + U_i$$

$$m = 1...31;\ k = 1...5;\ j = 1...7$$

where M_{mi} are dummy variables representing the college majors, $Cohort_{ki}$ are a set of dummies representing women's age cohorts, H_{ji} are a set of dummies representing

[6] By using a linear regression on log wage, our functional form implicitly assumes that the absolute impact of an increase in hourly wage on reducing fertility decreases as the overall level of wage increases. While this seems a reasonable assumption, we also run the regression linearly on wage. The latter regression has a very similar fit, and predicts that a dollar increase in hourly wage results in a decrease in fertility of .034 children.

women's ethnicity, $Single_i$ is a dummy taking the value of one if the woman has never married, and U_i is an error term. The restricted model is:

$$(5) \qquad CEB_i = \beta_0 + \beta_1 \hat{OC}_i + \beta_{2k} Cohort_{ki} + \beta_{3j} H_{ji} + \beta_4 Single_i + U_i$$

where:

$$(6) \qquad \hat{OC}_i = M_{1i} \hat{w}_1 + M_{2i} \hat{w}_2 + \ldots\ldots + M_{31i} \hat{w}_{31}$$

As previously noted, the $\hat{w}_m$ were estimated from equation (1) as:

$$\hat{w}_m = [\ln(Y_m) \mid Cohort = 30 - 34; H = White; Female = 1; Single = 0]$$

Substituting (6) in (5) we have:

$$(7) \qquad CEB_i = \beta_0 + \beta_1 (M_{mi} \hat{w}_m) + \beta_{2k} Cohort_{ki} + \beta_{3j} H_{ji} + \beta_4 Single_i + U_i$$

which is equivalent to (4) with the set of linear restrictions:

$$\alpha_0 + \delta_m = \beta_0 + \boldsymbol{\beta_1} \hat{w}_m$$

or:

$$\boldsymbol{\beta_1} = \frac{\delta_1 + (\alpha_0 - \beta_0)}{\hat{w}_1} = \frac{\delta_m + (\alpha_0 - \beta_0)}{\hat{w}_{\mathbf{m}}} \qquad \text{m} = 1,2,\ldots.31$$

The more restricted model implies that the *only* reason why educational major has an effect on fertility is because of the opportunity cost of childbearing associated to it. Using the set of parameter estimates from the restricted and unrestricted regressions, we can test whether the above stated hypothesis is true with a simple F test. We obtain an F-value (30, 23818) of 10.05, which is well above the 5 percent critical value for F (30, ∞). Therefore, our estimates do not satisfy the restrictions implied by the hypothesis, and we reject the hypothesis that educational major matters for fertility only because of its opportunity cost. The data therefore suggest that there has to be something else about educational major that affects fertility which is not captured by the opportunity cost of childbearing[7].

VI. Variations in Human Capital: a pure College Major Measure

While the latter set of empirical estimates have shown an inverse relationship between potential earnings and fertility, thereby confirming the theory that an increase in the opportunity cost of childbearing brings about a reduction in fertility and increases labor force participation, we have also noticed that higher earnings may not be the only reason why women with higher education have lower fertility rates. In this section, we will therefore run the second step regression once again, but restricting our sample to women *whose highest degree is a bachelor's*. There are at least three reasons why this may be an important test.

First, as posited by Blossfeld and Huinink (1991), it is important to distinguish two effects when looking at the dynamic effects of education on events in a life course perspective. First, from an economic standpoint, an increasing *level* of education reflects human capital accumulation and therefore leads to better job opportunities, a higher cost of children, and thereby a reduction in the demand for children. However, from a sociological point of view, there may also be an *institutional* effect for changes in fertility stemming from increases in education: there are normative expectations in society that prescribe entering marriage and parenthood for those who are enrolled in education. Therefore, completing education "counts as one of the important prerequisites for entering into marriage and parenthood". Blossfield and Huinink conclude that "apart from the quantity of human capital investments, we [..] expect that there is also an effect of the simple fact that women are participating in the educational system". Therefore, by implicitly including educational attainment in our measure for human capital we may

[7] As a check for this statement, we also ran the regression including a control for years of education, which can be regarded as an exposure factor since women generally delay childbearing until they are out of school. The potential wage coefficient is significantly reduced (-.17, significant at the 2 per cent level), while an additional year of education reduces fertility by .17 children, with 0.001 level of significance. This may suggest that the mere fact of being enrolled in school may be more important in reducing fertility than potential earnings, a hypothesis that will explore in more depth in the next section.

have inevitably confounded these two effects, running the risk of attributing to an increase in the labor market returns of women's human capital investment what may simply be an effect of women's participation in schooling.

Second, most studies – including this one - that use fertility as a dependent variable implicitly use observed fertility as a proxy for a woman's demand for children. However, it is important to remember that the number of Children Ever Born to a woman by no means represent the demand for children of that woman. As in any other market, actual fertility is a result of the interaction of demand and supply of children, where supply is defined as the woman's physical reproductive capability if fertility were not deliberately limited. Therefore, a woman's observed fertility is not solely determined by income and prices, but also by her ability to "produce" children: a woman that desired three children may not be able to produce more than two, and another that desired three may not be able to produce less than five. This is why demographers have traditionally preferred to rely on measures of desired, ideal or expected family size as an index for demand for children. However, the problem with surveys that try to measure these concepts is that they tend to be biased upwards because children that were not planned are usually reported as desired after they are born.

It certainly seems sensible to assume that in most developed countries where contraception is prevalent demand may well be below supply, so that the demand for children would indeed be the main determinant of actual fertility. It also does not seem plausible to think that contraceptive knowledge or ability may differ by degree level, especially at high levels of education. However, we are worried that for highly educated women the reverse may be true: in some cases fertility may be reduced just because supply is lower than demand. Women with higher degrees that begin childbearing late in life may desire just as many children as women with lower degrees but may simply not be able to produce them because of lower fecundity or because they hit the end of their reproductive life. There may therefore be a supply-side effect through which education affects fertility that studies using level of education as an independent variable would not be able to disentangle from the human capital accumulation effect. We believe that by restricting our sample to women with a bachelor's degree, we should be able to reduce the risk that supply-side effects play a significant role in determining observed fertility.

Finally, using differences in major choice as an independent variable may also help to partially solve the problem of endogeneity of education. All studies that use education as an explanatory variable inevitably run into the problem of endogeneity of education. If we believe that the level of education chosen by women is correlated with their desired fertility, i.e. to the extent that women *jointly* determine their educational level and fertility, the independent variable will be correlated with the error term and coefficient estimates will be biased. Using variation in education as measured by choice of major at the bachelor level should at least to a certain extent be able to avoid this problem. Our argument is that since women generally choose which major to pursue at the bachelor's level very early in life, it is reasonable to assume that this choice may be mainly dictated by taste and therefore at least to some degree be independent from expected fertility.

Of course, the endogeneity problem still remains to the extent that educational choices may be influenced by factors such as teacher's discrimination, or expectations about future labor market discrimination. If, when making her major choice, a woman believed that labor market discrimination was correlated with bearing children, and this belief affected her choice, we would still be in presence of a simultaneous determination of major and fertility. Clearly, the best method to solve the problem of endogeneity would be to find a valid instrumental variable for major choice. However, the search for suitable instruments has proven to be quite unfruitful in the literature, especially due to the difficulty of finding variables highly correlated with education but having no direct casual effect on fertility[8].

In order to determine if college major at the Bachelors level has a significant effect on fertility, we first run an F-test on the Bachelors' major coefficients in the third regression whose results are shown in Table 4. The test yields an F (13, 23817) value of 5.09, so we can reject the hypothesis that the majors' coefficients for the Bachelor

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[8] In our analysis, we tried to use parents' education as an instrument for women's major. Parents' education would seem to possess the features of a good instrument, as it is very likely to be correlated with children's education, without directly affecting children's fertility. Instrumental Variable estimation yields coefficients of the same sign as OLS estimation; however the coefficients are not significant, because parents' education proves to be a very weak instrument for children's major choice. While parents' education may be highly correlated with children's educational achievement, it does not necessarily have much power in predicting their majors. Trying to find suitable instruments is certainly ground for further work in this area.

degrees are all equal to zero with a $p<0.0001$. In table 9, we present the results of the second step regressions of the two-step model for the restricted sample of women whose highest degree is a bachelors'. The left panel shows that, when we only allow for potential wage variations across majors at the bachelor's level, the effect of opportunity cost of childbearing on fertility is not statistically significant. Therefore, while we can certainly state that the choice of major has a significant impact on fertility even among women whose highest degree is bachelor, the differentials in the wages that they can command in the labor market do not seem to be the reason why college majors matter for fertility. Lastly, as shown in the right panel, potential wage has still a significant – although highly reduced – effect on the decision to participate continuously in the labor force, as a 100% increase in potential wage increases over two and a half times the odds ratio that a woman will have continuous work force participation.

Finally, we would like to mention a couple of issues that may potentially be responsible for biasing our coefficient estimates. As we have noted in the theoretical section, the potential market wages mothers forgo due to the time they spend in childrearing are not the only component of the opportunity cost of children, since to this we need to add depreciation rate of human capital due to labor market inactivity. Unfortunately, our measure of opportunity cost only includes forgone wages, due to the difficulty of obtaining reliable empirical estimates of depreciation rates. It certainly seems likely that depreciation rates may be quite variable across specific majors and that they would need to be included in our analysis. However, it also seems likely that depreciation rates may be a lot higher in the more highly paid majors: it is often said that engineering or computer related skills have short lives as technology moves quite rapidly, whilst skills such as teaching or social work are likely to depreciate far more slowly. Therefore, if that is the case, it would seem that our estimates may *underestimate* the negative effect of opportunity cost on fertility.

Our wage estimates may also suffer from the problem of sample selection. When we estimate the wages of a sub-population of people who work for each major, and then assume that their wage could have been earned by the whole population of women in the same major, we are implicitly assuming that the subgroup of working people was randomly selected. However, if this sample was selected according to endogenous factors – factors that may be determined along with wages – then the coefficient estimates will suffer from *sample selection bias* and will not be generalizable to the whole population. This problem arises because when a sample is selected on the basis of endogenous factors the expected value of the error term u in the resulting sample may not be zero, even if it is zero in the whole population. The sample of people who work will only include those individuals whose real wage exceeds their reservation wage, and real wage data for nonworkers will be excluded from the analysis. Therefore, within the sample of workers the expected value of u will be positive, meaning that our sample will include people whose unmeasured characteristics that affect wage (motivation, willingness to work) are higher than in the general population. However, it seems reasonable to assume that the upwards bias in our estimates may be higher in the lower paying majors, where real wage exceeds reservation wage for a smaller number of people, and where only people with very high tastes for work end up working. If this is the case, this problem would again cause our coefficient estimates for opportunity cost on fertility to be underestimated.

VII. Conclusions and Policy Implications

This study examined the interrelated nature of critical decisions in the life of women: educational attainment, fertility and labor force participation. By utilizing individual variations between college majors, it highlighted the critical role played by women's education in affecting their fertility and labor supply decisions. However, while our results suggest that female educational attainment has a direct negative effect on fertility even for highly educated women, we have noted that this effect does not necessarily occur through the wage that these women could potentially receive in the labor market as a result of their education. In fact, our regression results using a sample of women with the same *level* of education would point to the fact that labor market returns to human capital accumulation may be less important than other "institutional" factors: a higher level of schooling may simply raise the age at which women become pregnant, in turn causing a lower fertility.

Therefore, if variations in college majors have a highly significant effect on women's fertility, but this effect does not appear to be due to differences in economic opportunity, we are still left with an extremely important question to answer: what is there about education that accounts for differences in fertility? We propose three possible answers to this question.

The first answer relies on the rational choice, classical economic model and concentrates on the role played by role compatibility on fertility. According to Mincer's view, rising female wages would lead to higher labor force participation and would therefore tend to reduce fertility. However, our results show that even if it is true that women with higher potential wages tend to have a higher commitment to the labor market, this does not seem to result in a lower fertility. Clearly, this would suggest that the income effect overshadows the price effect, as women with higher wages and higher labor force participation earn income, which would enable them to afford more children. In addition, for Mincer's argument to be valid, there would need to be total incompatibility between the female working role and the mother role. However, childbearing may not necessarily constrain a woman's labor force participation, especially as child care can easily be purchased, and role compatibility could also vary greatly according to the type of work women with different educational backgrounds choose to pursue. Clearly, women with higher potential incomes will have a higher ability to afford child care and therefore will be more likely not to be constrained by fertility in their work activity. This may well be the reason why we find potential wage to positively affect labor market activity without significantly affecting fertility. This income effect may also help explain why M.D.s have fertility as high as women with much lower potential earnings[9].

The second explanation relies on the concept of social norms and focuses on women's roles and status to explain differences in fertility. Previous studies (Pinelli, 1971, Kupinski, 1971) have shown that women stating that they worked because they wanted to do so seemed to have lower fertility than women who worked because of necessity. Therefore, women majoring in fields leading to "career" jobs would be more

[9] As a potential limitation of the above argument, it is worth noting that our analysis implicitly assumes that the relationship between women's labor force opportunities and fertility choice does not depend on the economic situation of the family. Unfortunately, the data do not allow us to control for family income, but since it is a well established empirical result that American women tend to marry men of the same socioeconomic status, it seems reasonable to assume woman's potential income as a proxy for family income.

likely to have lower fertility, independently of the wage they could earn. According to this explanation, their fertility choice would be determined more by the adhesion to societal norms and conventions concerning childbearing rather than by a purely economic calculation. In an attempt to test this hypothesis, we have tried to run our fertility regressions including for each observation a variable indicating the sex composition in the chosen field of study at the time the choice of major was made. As shown in table 10, there is significant positive relationship between the percentage number of females in the chosen major and children ever born. When such a variable is introduced, the wage coefficient even becomes positive. Our interpretation is that women choosing predominantly male majors would probably have stronger career motivations and most likely end up in career jobs that offered alternative interests and goals to motherhood. At the same time, they would be complying with a norm mandating a low level of fertility for women in those particular fields. Even if the question of reverse causation may be raised, nevertheless we believe that this could be an important explanation for the correlation between the fall of fertility levels and the increase in women's labor market opportunities in developed countries. According to this explanation, women who in the past majored in predominantly female fields may have chosen so based on expectations of being discriminated in predominantly male majors, and it is likely that the resulting available work would have failed to satisfy their status ambitions. As a consequence, they would have been more likely to lower their labor force participation, and find realization of their status and self-esteem in childbearing. The more women will become able to enter traditionally male fields, the more likely that they may find realization in their careers and the less likely they will resort to motherhood for feeling fulfilled.

The third and final explanation reconciles the demand for children with utility maximization by emphasizing children's value as social capital. Schoen et al. (1997) stress "the ability of children to create access to critical material resources through ties of kinship and other personal relationships" they make possible: children therefore create personal relationships and provide adults with access to strategic social resources and therefore constitute a form of investment capital (*social capital*). Schoen at al. (1997) point out that while the economic value of children to their families has disappeared, having children is still an important way in which people create social capital for themselves: social capital would therefore be a crucial factor motivating fertility in low-fertility populations. If social capital played such an important role in the decision to have children, we would expect that "persons for whom relationships created by children are important will be more likely to intend to have a child than persons for whom such relationships are not important" (Schoen et al., 1997). As long as the social capital value of children was different for women with different *types* of human capital, this would provide an explanation for the different fertility levels we encountered across majors.

Finally, we believe that a better understanding of what motivates choices that concern educational attainment, fertility and labor force participation may have important policy implications towards social policy aimed at promoting fertility. Whether to have children or not may indeed seem to be one of the most private of all decisions, and if children were strictly a private good, there could be little theoretical support for government intervention to try to modify the natural level of fertility. However, there are convincing cultural and economic reasons to believe that children also represent some sort of "public good", and therefore to justify a certain degree of government intervention. Children are our future, and all that constitutes the essence of our societies will be passed along to them. Economically, social security systems are essentially based on pay-as-you-go criteria, and can only work with an orderly succession of cohorts of relatively the same size. Social Security expenditure – mainly health care and old-age pensions – reaches 7 per cent of GDP in the United States and between 20 and 30 per cent in Europe, and is highly sensitive to twists in the age structure. From this point of view, the preservation of a balanced age structure seems to be socially desirable.

Given the presumed importance of the opportunity cost of childbearing in the fertility decision, political authorities in some countries consider a reduction of the costs of childbearing a crucial element of policies aimed to promote fertility. Hoem (1990) shows that the Swedish fertility rate rose from around 1.6 in the early 80s to 2.02 in 1989 at the same time as the government implemented a series of pronatalist social policies. Swedish women benefit from what is probably the most generous maternity leave program in the world. To use Hoem's words: "I know of no other country with a similar political system and at a comparable stage of industrial development that has so consistently tried to facilitate women's entry in the labor market and their continued attachment to it at minimal cost to childbearing and childrearing". Vining (1977) shows how the birth rate in East Germany rose by a third between the mid 70s and the early 80s after the government introduced in 1976-77 a program called "family salary", which extended 100% paid maternity leave from 18 to 26 weeks, granted a paid education leave at the birth of the second and each successive child, and reduced by 4 hours without reductions in pay the work week of mothers in full employment with two children or more. It has however to be noted that while the availability of social policies that reduce the opportunity cost such as paid maternity leave may be an effective tool for increasing fertility, such policies may end up having unintended results: in fact, women that fail to recognize the depreciation cost of human capital due to labor market inactivity may forgo long-term earnings increases by taking extended leaves of absences in order to gain a short term economic advantage.

The provision of public child care or subsidized private child care would seem to be a better tool to reduce the opportunity cost of children and increase fertility while at the same time encouraging mothers' work activity. When it comes to child care, parents that choose to work are in fact trading opportunity costs for direct costs. Assuming that less than 100% of the mother's salary is spent in child care, from a strictly economic point of view providing subsidized child care would be a more efficient policy than paid maternity leave, as it would entail a lower cost for the State, and reduce the depreciation of women's human capital. Of course, this argument excludes any evaluation of possible long term social costs that may be associated with parents not spending much time with their children. We have already noted how women in the health professions seem to have been able to benefit from a higher availability of part time work than women in other fields. Increasing the flexibility of work schedules, finding feasible workplace adaptations that allow parents more time to be home with their children, and encouraging fathers' participation in child care seem to be some alternatives that may allow women to more easily reconcile childbearing with their career opportunities.

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Table 1 – Children Ever Born by ethnicity and degree, women aged 40 and above, Census Data Report vs. NSCG Data

	Bachelor's		Master's		Professional		Ph.D.		No Degree		Total	
	Census	NSCG	Census	NSCG	Census	NSCG	Census	NSCG	Census	NSCG	Census	NSCG
White	2.147	2.124	1.710	1.685	2.075	1.417	1.305	1.268	--	2.405	1.984	1.984
n	*8942*	*8675*	*5554*	*5215*	*836*	*392*	*809*	*702*	--	*1157*	*16141*	*16141*
Black	2.019	1.997	1.701	1.602	2.367	1.673	1.626	1.445	--	2.516	1.891	1.891
n	*1636*	*1481*	*1389*	*1272*	*133*	*60*	*66*	*59*	--	*352*	*3224*	*3224*
F. Born	2.056	2.007	1.756	1.717	2.009	1.880	1.626	1.617	--	2.195	1.955	1.955
n	*2834*	*2406*	*1395*	*1192*	*620*	*421*	*455*	*422*	--	*863*	*5304*	*5304*
Other	2.087	2.052	1.729	1.673	2.367	1.841	1.266	1.175	--	2.403	1.986	1.986
n	*3149*	*2871*	*1609*	*1445*	*339*	*99*	*99*	*92*	--	*689*	*5196*	*5196*
Total	2.128	2.101	1.714	1.680	2.105	1.553	1.366	1.332	--	2.374	1.976	1.976
n	*16561*	*15433*	*9947*	*9124*	*1928*	*972*	*1429*	*1275*	--	*3061*	*29865*	*29865*

Table 2 - Regression Analysis of Children Ever Born for women age 40 and above, Census and NSCG data

	Census Data			NSCG Data		
	Coeff.		Std. Err.	Coeff.		Std. Err.
Intercept	1.939	**	0.017	1.927	**	0.017
45-49	0.162	**	0.022	0.156	**	0.022
50-54	0.490	**	0.029	0.484	**	0.029
55-59	0.740	**	0.036	0.728	**	0.036
60-64	0.895	**	0.041	0.885	**	0.041
65 +	0.595	**	0.037	0.582	**	0.037
Disabled	-0.045		0.031	-0.067	*	0.031
Black	-0.028		0.030	-0.042		0.030
Asian	-0.097		0.057	-0.086		0.057
Native american	0.194	*	0.095	0.172		0.095
Hispanic	0.047		0.049	0.037		0.049
Foreign born	-0.039		0.023	-0.055	*	0.024
Master's	-0.288	**	0.020	-0.294	**	0.021
Professional	0.003		0.045	-0.366	**	0.052
Ph.D.	-0.557	**	0.040	-0.571	**	0.041
No Degree	--		--	0.221	**	0.038
Single	-2.006	**	0.015	-1.993	**	0.015
R Square	0.209			0.213		
Sample Size	29865			29865		
** p<=.001	* .001<p<=.005					

Table 3 – Children Ever Born, Potential Wage, % full time and full+part time work participation, proportion females, by highest degree held and major field, women aged 40 to 64, NSCG data

Degree	Major/Field	CEB(*)	Mean Hourly Wage(**)	% Full time Wk(*)	% Full-Part time wk(*)	% female major(*)	N(*)
B.A.	Home Economics	2.409	$12.14	13.39%	5.33%	98.67%	540
	Social Work	2.273	$11.72	16.70%	5.51%	80.39%	274
	Nursing	2.202	$16.40	27.82%	16.36%	94.41%	726
	Education	2.173	$15.91	22.54%	6.36%	78.18%	4095
	Health Degrees	2.122	$17.24	26.96%	15.01%	60.09%	721
	Mathematical and Physical Sciences	2.117	$21.12	24.78%	3.62%	28.38%	563
	Psychology	2.089	$15.69	20.57%	5.33%	52.86%	522
	Humanities	1.976	$18.46	20.57%	7.63%	57.40%	2003
	Communications/Journalism	1.959	$16.02	30.99%	8.23%	39.45%	207
	Arts	1.942	$14.12	20.92%	12.54%	64.09%	721
	Life sciences	1.909	$16.41	21.63%	9.04%	30.48%	667
	Business and Economics	1.878	$22.90	25.83%	4.38%	17.51%	1397
	Social Sciences	1.835	$18.69	23.97%	6.10%	44.36%	1058
	Computer Science and Engineering	1.788	$21.92	25.26%	3.71%	3.87%	248
	Total	**2.067**	**$19.86**	**22.75%**	**7.56%**	**44.35%**	**13792**
M.A.	Nursing	1.768	$18.51	44.59%	21.93%	96.71%	166
	Education	1.751	$20.18	42.84%	6.71%	60.98%	3711
	Psychology	1.724	$18.56	27.94%	10.36%	59.02%	579
	Life sciences	1.660	$18.38	38.39%	8.48%	32.27%	289
	Mathematical and Physical Sciences	1.625	$23.99	45.49%	7.16%	26.32%	266
	Health Degrees	1.616	$17.96	39.91%	10.28%	66.80%	320
	Humanities	1.585	$16.75	32.61%	8.15%	52.10%	999
	Computer Science and Engineering	1.581	$26.37	46.72%	7.86%	6.09%	146
	Home Economics	1.559	$17.70	34.75%	6.32%	94.22%	103
	Social Work	1.550	$17.01	32.96%	9.70%	69.60%	705
	Social Sciences	1.524	$21.31	36.32%	7.19%	30.79%	274
	Communications/Journalism	1.424	$21.25	39.91%	9.66%	44.65%	63
	Arts	1.410	$18.05	34.31%	17.52%	44.28%	217
	Business and Economics	1.343	$28.85	51.41%	5.86%	14.37%	448
	Total	**1.662**	**$22.96**	**39.96%**	**8.14%**	**45.02%**	**8317**
Prof.	M.D.	1.819	$37.50	45.05%	9.03%	12.02%	453
	J.D.	1.221	$32.27	42.65%	7.62%	17.24%	246
	Total	**1.521**	**$33.78**	**43.12%**	**9.16%**	**16.70%**	**902**
Ph.D.	**Total**	**1.307**	**$27.06**	**53.71%**	**10.28%**	**22.62%**	**1137**

(*) Sample of women age 40 to 64
(**) Sample of men and childless women age 25 to 64 with a full-time continuous work history
In order to avoid double-counting for people with multiple degrees, data are shown only for the *highest* degree received.

Table 4 – Regression Analysis of CEB for women age 40 to 64, by highest degree

	Regression 1			Regression 2			Regression 3		
	Coeff.		Std. Err.	Coeff.		Std. Err.	Coeff.		Std. Err.
Intercept	2.414	**	0.075	2.046	**	0.075	2.109	**	0.073
J.D.	-1.195	**	0.114	-1.022	**	0.110	-0.741	**	0.106
Ph.D.	-1.116	**	0.088	-1.060	**	0.086	-0.784	**	0.082
M.B.A.	-1.081	**	0.102	-0.904	**	0.099	-0.667	**	0.095
MA Arts	-1.010	**	0.133	-0.951	**	0.129	-0.662	**	0.117
MA Communication/Journalism	-0.987	**	0.204	-0.865	**	0.186	-0.590	**	0.159
MA Social Sciences	-0.883	**	0.135	-0.800	**	0.131	-0.583	**	0.122
MA Social Work	-0.865	**	0.103	-0.788	**	0.101	-0.558	**	0.096
MA Home Economics	-0.854	**	0.173	-0.821	**	0.172	-0.566	**	0.150
MA Compu. Science and Engineering	-0.837	**	0.179	-0.679	**	0.160	-0.513	**	0.152
MA Humanities	-0.829	**	0.096	-0.769	**	0.093	-0.520	**	0.088
MA Health Degrees	-0.796	**	0.125	-0.702	**	0.123	-0.525	**	0.116
MA Mathemat. and Physical Sciences	-0.795	**	0.142	-0.697	**	0.138	-0.462	**	0.128
MA Life Sciences	-0.754	**	0.139	-0.610	**	0.135	-0.491	**	0.127
MA Psychology	-0.693	**	0.101	-0.570	**	0.099	-0.412	**	0.091
MA Education	-0.663	**	0.080	-0.587	**	0.078	-0.436	**	0.076
MA Nursing	-0.640	**	0.156	-0.576	**	0.156	-0.387	**	0.140
BA Comp. Science and Engineering	-0.624	**	0.160	-0.495	**	0.153	-0.432	**	0.151
M.D.	-0.607	**	0.126	-0.511	**	0.127	-0.330	**	0.120
BA Social Sciences	-0.581	**	0.092	-0.475	**	0.089	-0.353	**	0.086
BA Business and Economics	-0.535	**	0.088	-0.433	**	0.085	-0.322	**	0.083
BA Life sciences	-0.496	**	0.100	-0.426	**	0.097	-0.309	**	0.092
BA Arts	-0.470	**	0.098	-0.389	**	0.095	-0.289	**	0.091
BA Communications/Journalism	-0.452	**	0.151	-0.384	**	0.146	-0.223		0.135
BA Humanities	-0.438	**	0.085	-0.352	**	0.083	-0.232	**	0.080
BA Psychology	-0.318	**	0.110	-0.227	*	0.106	-0.120		0.100
BA Mathemat. and Physical Sciences	-0.297	**	0.109	-0.244	*	0.106	-0.120		0.099
BA Health Degrees	-0.289	**	0.101	-0.185		0.098	-0.093		0.094
BA Education	-0.242	**	0.080	-0.167	*	0.078	-0.118		0.076
BA Nursing	-0.212	*	0.103	-0.128		0.101	-0.038		0.096
BA Social Work	-0.145		0.130	-0.063		0.126	0.004		0.119
45-49				0.191	**	0.025	0.153	**	0.023
50-54				0.503	**	0.033	0.468	**	0.030
55-59				0.752	**	0.041	0.725	**	0.038
60-64				0.864	**	0.047	0.867	**	0.043
Disabled				-0.217	**	0.038	-0.112	**	0.034
Black				-0.085	**	0.033	-0.045		0.031
Asian				-0.148	*	0.065	-0.075		0.059
Native american				0.187		0.110	0.199		0.105
Hispanic				-0.053		0.057	0.014		0.051
Foreign born				0.024		0.028	-0.014		0.026
Single							-1.916	**	0.017
R Square	0.034			0.081			0.225		
Sample Size	23859			23859			23859		

Table 5 – Probabilities of reaching child parities 0 to 4 and above, women age 40 to 64, by highest degree and major (*).

Deg	Major	Pr (CEB=0 | x)	Pr (CEB=1or2 | x)	Pr (CEB>2 | x)
BA	Social Work	6.20%	44.07%	49.73%
BA	Home Economics	6.74%	45.24%	48.02%
BA	Nursing	7.02%	45.80%	47.19%
BA	Health Sciences	7.33%	46.39%	46.29%
BA	Psychology	7.49%	46.69%	45.82%
BA	Mathematical and Physical Sciences	7.50%	46.69%	45.81%
BA	Education	7.70%	47.06%	45.23%
BA	Humanities	9.47%	49.73%	40.80%
BA	Communications/Journalism	9.67%	49.99%	40.34%
BA	Life Sciences	9.99%	50.39%	39.63%
BA	Business and Economics	10.26%	50.70%	39.03%
BA	Arts	10.27%	50.71%	39.03%
Prof	M.D.	11.17%	51.67%	37.16%
BA	Social Sciences	11.21%	51.70%	37.09%
MA	Nursing	11.33%	51.82%	36.84%
MA	Psychology	11.83%	52.28%	35.89%
MA	Education	12.36%	52.74%	34.90%
MA	Mathematical and Physical Sciences	12.87%	53.14%	34.01%
BA	Computer Science and Engineering	13.17%	53.35%	33.48%
MA	Health Sciences	13.68%	53.70%	32.63%
MA	Life Sciences	13.73%	53.73%	32.53%
MA	Home Economics	14.29%	54.07%	31.65%
MA	Computer Science and Engineering	14.64%	54.27%	31.10%
MA	Humanities	14.78%	54.34%	30.88%
MA	Social Work	15.14%	54.52%	30.34%
MA	Social Sciences	15.54%	54.71%	29.75%
MA	Communications/Journalism	15.80%	54.83%	29.37%
MA	Business and Economics	18.12%	55.59%	26.29%
MA	Arts	18.48%	55.66%	25.86%
Prof	J.D.	19.89%	55.90%	24.21%
Doct	Ph.D.	20.94%	55.99%	23.07%

(*) Calculated from an ordered logit for married white women in the 50-54 age cohort

Table 6 –Logit Regression Analysis of Labor Force Participation for women age 40 to 64

Degree/Major	Odds Ratio		Std Err	Odds Ratio		Std Err	Odds Ratio		Std Err
Ph.D.	7.6129	**	1.1881	8.0821	**	1.2943	6.7794	**	1.1078
M.B.A.	6.9200	**	1.2689	5.7736	**	1.0961	4.9447	**	0.9652
MA Comp. Science and Engineering	5.7736	**	1.5180	5.2593	**	1.3878	4.7782	**	1.3105
MA Mathem. and Physical Sciences	5.5421	**	1.1948	5.2868	**	1.1740	4.5177	**	1.0392
M.D.	5.3145	**	0.9811	5.5013	**	1.0707	4.9094	**	0.9978
MA Nursing	5.2151	**	1.2108	5.2293	**	1.2927	4.6127	**	1.1311
MA Education	4.8386	**	0.7094	4.4816	**	0.6715	4.0658	**	0.6197
J.D.	4.8022	**	0.9760	3.9717	**	0.8323	3.1720	**	0.7072
MA Journalism	4.3153	**	1.4307	3.7789	**	1.2765	2.9978	**	1.1821
MA Health Sciences	4.2972	**	0.8603	4.0147	**	0.8399	3.5361	**	0.7513
MA Life Sciences	4.0392	**	0.8632	3.5341	**	0.7876	3.2730	**	0.7323
MA Social Sciences	3.6545	**	0.7730	3.3633	**	0.7294	2.8079	**	0.6340
MA Home Economics	3.4453	**	0.9934	3.3825	**	1.0196	2.7436	**	0.9122
MA Arts	3.3987	**	0.7522	3.4229	**	0.8139	2.6639	**	0.6749
MA Social Work	3.1731	**	0.5504	2.7942	**	0.4983	2.2810	**	0.4187
MA Humanities	3.1459	**	0.5134	3.0831	**	0.5183	2.4899	**	0.4243
BA Journalism	2.9130	**	0.6565	2.8093	**	0.6480	2.4219	**	0.5702
MA Psychology	2.4952	**	0.4644	2.1778	**	0.4152	1.8679	**	0.3556
BA Nursing	2.4857	**	0.4221	2.3273	**	0.4084	2.1605	**	0.3872
BA Health Sciences	2.3847	**	0.4160	2.1552	**	0.3857	1.9852	**	0.3625
BA Business and Economics	2.2422	**	0.3553	1.9669	**	0.3209	1.7605	**	0.2940
BA Comp. Science and Engineering	2.1754	**	0.5056	1.9912	**	0.4968	1.8832	*	0.4852
BA Mathem. and Physical Sciences	2.1258	**	0.4000	2.0700	**	0.3949	1.8349	**	0.3593
BA Social Sciences	2.0429	**	0.3383	1.7216	**	0.2925	1.5011	*	0.2593
BA Education	1.8797	**	0.2771	1.7068	**	0.2567	1.6298	**	0.2493
BA Life Sciences	1.7742	**	0.3184	1.6406	**	0.2995	1.4368		0.2710
BA Arts	1.7122	**	0.3005	1.5913	**	0.2854	1.4159		0.2584
BA Humanities	1.6781	**	0.2603	1.5415	**	0.2438	1.3366		0.2158
BA Psychology	1.6738	**	0.3219	1.4553		0.2865	1.2690		0.2598
BA Social Work	1.2782		0.3060	1.0743		0.2623	0.9932		0.2398
45-49				0.6391	**	0.0285	0.6466	**	0.0296
50-54				0.4650	**	0.0253	0.4589	**	0.0253
55-59				0.2853	**	0.0194	0.2682	**	0.0188
60-64				0.1702	**	0.0144	0.1466	**	0.0125
Disabled				0.8153	**	0.0505	0.7002	**	0.0480
Black				2.8008	**	0.1407	2.8813	**	0.1544
Asian				1.5845	**	0.1685	1.5056	**	0.1683
Native american				1.4687	**	0.2108	1.4804	*	0.2273
Hispanic				1.4318	**	0.1152	1.3742	**	0.1160
Foreign born				0.7438	**	0.0362	0.7628	**	0.0386
Single							5.6566	**	0.3516
Pseudo R-Square	0.0399			0.0944			0.1363		
Sample Size	23859			23859			23859		

Table 7 – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Bachelor's, with full time work force participation, by major

	Math./Phys. Sciences		Life Sciences		Comp. Sc. & Engineer.		Psychology		Social Sciences	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	2.857 **	0.041	2.591 **	0.035	2.930 **	0.011	2.727 **	0.049	2.701 **	0.033
25-29	-0.301 **	0.046	-0.231 **	0.043	-0.196 **	0.016	-0.356 **	0.050	-0.246 **	0.040
35-39	0.115 *	0.047	0.155 **	0.041	0.144 **	0.020	0.065	0.065	0.126 **	0.040
40-44	0.218 **	0.055	0.119	0.064	0.218 **	0.025	0.023	0.084	0.287 **	0.044
45-49	0.336 **	0.060	0.429 **	0.100	0.266 **	0.031	0.335 **	0.127	0.287 **	0.067
50-54	0.338 **	0.065	0.424 **	0.120	0.301 **	0.029	0.293	0.157	0.426 **	0.112
55-59	0.363 **	0.080	0.323 *	0.148	0.291 **	0.040	0.206	0.216	0.580 **	0.163
60-64	0.237	0.125	0.266	0.166	0.360 **	0.054	-0.131	0.494	0.495 **	0.146
Disabled	-0.087	0.072	-0.116	0.071	-0.138 **	0.042	-0.140	0.076	-0.103	0.067
Black	-0.079	0.048	-0.032	0.042	-0.077 **	0.022	-0.073	0.059	-0.075 *	0.036
Asian	0.040	0.074	0.087	0.047	0.043 *	0.021	-0.053	0.121	-0.026	0.062
Native american	-0.240	0.125	-0.067	0.201	-0.163 *	0.065	-0.309 **	0.098	-0.067	0.152
Hispanic	-0.002	0.069	0.040	0.045	-0.047	0.026	0.020	0.062	-0.038	0.042
Foreign born	0.002	0.041	0.084	0.043	-0.071 **	0.015	0.141 *	0.055	-0.001	0.059
Female	-0.096 *	0.039	-0.126 **	0.048	-0.096 **	0.031	-0.169 **	0.057	-0.143 **	0.043
Single	-0.180 **	0.043	-0.082 *	0.041	-0.057 **	0.016	-0.127	0.067	-0.127 **	0.045
Female*Single	0.200 **	0.073	0.150 *	0.064	0.132 **	0.039	0.131	0.086	0.140 *	0.064
Sample size	2488		2603		11169		923		2164	
R squared	0.230		0.124		0.175		0.190		0.203	
** p<=.001	* .001<p<=.005									

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Bachelor's, with full time work force participation, by major

	Business/Econ.		**Comm./Journalism**		**Home Economics**		**Health Degrees**		**Education**	
Ind. Variable	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	2.817 **	0.016	2.648 **	0.059	1.499 **	0.544	2.857 **	0.051	2.552 **	0.028
25-29	-0.232 **	0.018	-0.180 **	0.054	-0.157	0.120	-0.135 *	0.062	-0.114 **	0.034
35-39	0.125 **	0.023	0.125	0.072	0.084	0.133	0.061	0.061	0.218 **	0.036
40-44	0.178 **	0.030	0.338 **	0.099	0.537 **	0.165	0.064	0.076	0.270 **	0.035
45-49	0.346 **	0.036	0.538 **	0.155	-0.462	0.568	0.129	0.077	0.330 **	0.060
50-54	0.368 **	0.041	0.300	0.154	0.870 **	0.138	0.258 **	0.095	0.335 **	0.069
55-59	0.318 **	0.049	0.409 *	0.192	0.908 **	0.168	-0.005	0.172	0.371 **	0.088
60-64	0.232 **	0.073	0.447	0.271	0.309	0.401	-0.123	0.220	0.316 **	0.097
Diasabled	-0.163 **	0.033	-0.064	0.079	0.174	0.211	-0.070	0.121	-0.210 *	0.094
Black	-0.123 **	0.021	-0.029	0.062	-0.034	0.156	-0.079	0.071	0.034	0.035
Asian	0.000	0.038	-0.022	0.070	0.446 **	0.161	0.004	0.081	0.084	0.070
Native american	-0.216 **	0.054	-0.215	0.166	0.317 **	0.119	-0.089	0.219	0.028	0.115
Hispanic	-0.039	0.025	0.096	0.072	0.345	0.184	-0.091	0.078	0.074 *	0.037
Foreign born	-0.060 **	0.023	-0.048	0.060	0.205	0.215	0.072	0.045	-0.059	0.050
Female	-0.153 **	0.021	-0.082	0.065	0.804	0.578	-0.201 **	0.052	-0.105 **	0.030
Single	-0.161 **	0.025	-0.205 **	0.059	0.987	0.587	-0.196 *	0.092	-0.175 **	0.046
Female*Single	0.153 **	0.035	0.042	0.093	-0.951	0.611	0.172	0.108	0.139 *	0.057
Sample size	8876		1093		161		827		2392	
R squared	0.160		0.176		0.266		0.127		0.142	
** p<=.001	* .001<p<=.005									

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Bachelor's, with full time work force participation, by major

	Humanities		Arts		Social Work		Nursing	
Ind. Variable	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	2.572 **	0.047	2.449 **	0.068	2.499 **	0.074	2.650 **	0.097
25-29	-0.221 **	0.049	-0.050	0.074	-0.189 **	0.055	-0.168 **	0.055
35-39	0.129 *	0.065	0.111	0.077	0.105	0.105	0.053	0.055
40-44	0.258 **	0.054	0.272 *	0.109	0.054	0.125	0.058	0.066
45-49	0.386 **	0.085	0.606 **	0.106	0.177	0.181	0.086	0.089
50-54	0.400 **	0.107	0.330 *	0.139	0.344 **	0.109	0.041	0.345
55-59	0.306 *	0.143	0.587 **	0.219	0.498 **	0.123	0.498 **	0.191
60-64	0.304	0.166	0.547 **	0.164	--	--	--	--
Diasabled	-0.206 **	0.070	-0.128	0.084	-0.175	0.145	0.047	0.062
Black	0.000	0.047	0.057	0.076	-0.012	0.064	-0.040	0.069
Asian	0.050	0.071	0.258 **	0.072	-0.027	0.273	0.255 **	0.056
Native american	-0.211	0.110	0.382	0.350	-0.206	0.133	-0.153	0.341
Hispanic	0.062	0.056	0.028	0.092	-0.019	0.088	-0.081	0.090
Foreign born	-0.008	0.057	-0.021	0.073	0.112	0.104	0.090	0.066
Female	-0.094 *	0.044	-0.141	0.078	-0.154	0.097	0.101	0.090
Single	-0.223 **	0.061	-0.285 **	0.076	0.000	0.165	0.170	0.228
Female*Single	0.291 **	0.077	0.240 *	0.110	0.046	0.180	-0.139	0.230
Sample size	2198		1013		265		409	
R squared	0.117		0.121		0.193		0.101	
** p<=.001	* .001<p<=.005							

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Master's, with full time work force participation, by major

	Math./Phys. Sciences		Life Sciences		Comp. Sc. & Engineer.		Psychology		Social Sciences	
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	2.833 **	0.062	2.649 **	0.052	3.059 **	0.025	2.572 **	0.090	2.827 **	0.065
25-29	-0.206 **	0.072	-0.253 **	0.072	-0.189 **	0.032	-0.133	0.092	-0.181 *	0.079
35-39	0.218 **	0.071	0.229 **	0.060	0.109 **	0.036	0.279 *	0.112	0.105	0.070
40-44	0.244 *	0.112	0.193 *	0.088	0.198 **	0.035	0.248 *	0.117	0.241 **	0.083
45-49	0.329 **	0.074	0.395 **	0.075	0.257 **	0.039	0.329 **	0.121	0.296 **	0.072
50-54	0.535 **	0.084	0.341 **	0.130	0.214 **	0.047	0.282	0.160	0.294 **	0.095
55-59	0.514 **	0.088	0.375	0.308	0.429 **	0.112	0.087	0.142	0.367 **	0.097
60-64	0.120	0.171	0.378 **	0.123	0.441 **	0.086	0.056	0.339	0.133	0.220
Disabled	-0.212 *	0.087	-0.289	0.197	-0.197 *	0.097	0.091	0.084	-0.170	0.103
Black	-0.164 *	0.072	-0.059	0.082	-0.057	0.067	-0.068	0.082	-0.135	0.072
Asian	-0.013	0.119	0.199	0.133	0.007	0.054	-0.384	0.720	-0.012	0.163
Native american	-0.138	0.201	-0.496 **	0.184	-0.189	0.162	-0.175	0.395	-0.204	0.184
Hispanic	0.150	0.094	0.050	0.105	-0.086	0.066	-0.427	0.440	-0.034	0.073
Foreign born	0.033	0.087	-0.031	0.064	-0.079 **	0.023	0.100	0.175	-0.116	0.085
Female	-0.032	0.067	0.017	0.073	-0.155 **	0.053	-0.019	0.137	-0.174 **	0.068
Single	-0.089	0.052	-0.059	0.069	-0.131 **	0.038	-0.042	0.146	-0.112	0.081
Female*Single	-0.060	0.112	-0.061	0.105	0.221	0.135	-0.027	0.200	0.283 *	0.126
Sample size	922		757		3523		514		647	
R squared	0.166		0.169		0.154		0.076		0.147	
** p<=.001	* .001<p<=.005									

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Master's, with full time work force participation, by major

	Business/Econ.			Comm./Journalism			Home Economics			Health Degrees			Education		
Ind. Variable	Coeff.		Std. Err.	Coeff.		Std. Err.	Coeff.		Std. Err.	Coeff.		Std. Err.	Coeff.		Std. Err.
Intercept	3.022	**	0.029	2.761	**	0.171	2.037	**	0.332	2.844	**	0.073	2.726	**	0.038
25-29	-0.202	**	0.041	-0.066		0.141	-0.205		0.101	-0.209	**	0.075	-0.205	**	0.059
35-39	0.136	**	0.039	0.272		0.203	0.210		0.132	0.132		0.075	0.097	*	0.040
40-44	0.240	**	0.038	0.293		0.293	0.634	**	0.155	0.229	**	0.075	0.231	**	0.040
45-49	0.307	**	0.047	0.242		0.216	0.664	**	0.183	0.242	*	0.112	0.290	**	0.045
50-54	0.279	**	0.064	1.043	*	0.489	0.471	**	0.144	0.305	*	0.125	0.266	**	0.050
55-59	0.492	**	0.094	0.258		0.426	1.324	**	0.281	0.303	**	0.081	0.291	**	0.054
60-64	0.411	**	0.130	-0.121		0.706	0.792	*	0.332	0.497	*	0.226	0.176	*	0.070
Diasabled	-0.224	**	0.068	-0.008		0.243	-0.506	**	0.103	-0.157		0.120	-0.056		0.040
Black	-0.202	**	0.044	0.140		0.120	-0.416		0.258	0.093		0.101	0.066	*	0.030
Asian	-0.068		0.042	0.049		0.173	--		--	-0.131		0.157	0.091		0.059
Native american	-0.114		0.143	--		--	--		--	-0.240		0.255	0.037		0.066
Hispanic	-0.101		0.058	-0.336		0.217	--		--	0.040		0.097	0.028		0.041
Foreign born	-0.138	**	0.035	-0.344		0.331	0.685	**	0.088	0.094		0.083	-0.050		0.049
Female	-0.115	*	0.046	-0.146		0.389	0.530		0.340	-0.242	**	0.055	-0.020		0.027
Single	-0.108	*	0.046	-0.610	*	0.282	-0.162		0.100	-0.203		0.108	-0.085		0.057
Female*Single	0.134		0.073	0.471		0.461	--		--	0.281	*	0.123	0.022		0.067
Sample size	3420			164			37			374			2735		
R squared	0.106			0.182			0.627			0.302			0.087		
** p<=.001	* .001<p<=.005														

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Master's, with full time work force participation, by major

	Humanities		Arts		Social Work		Nursing	
Ind. Variable	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Intercept	2.165 **	0.078	2.387 **	0.110	2.654 **	0.05227	3.005 **	0.303
25-29	-0.020	0.105	-0.222 *	0.103	-0.127	0.07213	-0.247 **	0.084
35-39	0.332 **	0.103	0.201	0.129	0.080	0.06094	-0.355 **	0.121
40-44	0.470 **	0.089	0.217	0.181	0.177 **	0.06756	-0.085	0.141
45-49	0.544 **	0.111	0.713 **	0.204	0.365 **	0.07305	-0.064	0.091
50-54	0.377 **	0.112	0.602 **	0.126	0.373 **	0.138	0.114	0.109
55-59	0.361 **	0.119	0.542 **	0.150	0.198 **	0.07197	0.123	0.123
60-64	0.246	0.218	0.733 **	0.191	0.522 **	0.19581	0.285 **	0.073
Diasabled	-0.141	0.111	0.060	0.124	-0.155	0.12339	0.303 *	0.138
Black	0.094	0.089	0.158	0.124	0.048	0.05555	0.415 **	0.099
Asian	0.130	0.161	0.048	0.183	0.114	0.09005	0.253	0.292
Native american	-0.501	0.341	-0.506 *	0.256	-0.470 **	0.10945	0.409	0.337
Hispanic	0.249	0.147	-0.018	0.268	0.049	0.0822	-0.066	0.221
Foreign born	0.062	0.069	0.267	0.149	-0.133	0.19292	-0.117	0.362
Female	0.212 **	0.058	-0.089	0.152	-0.051	0.05447	-0.143	0.295
Single	-0.271 *	0.118	-0.031	0.108	-0.058	0.10453	0.202	0.273
Female*Single	0.147	0.141	0.201	0.185	-0.029	0.11956	-0.001	0.291
Sample size	831		322		461		65	
R squared	0.981		0.179		0.209		0.356	
** p<=.001	* .001<p<=.005							

Table 7 (Cont.) – Wage Regressions Results, men and childless women age 25 to 64 whose highest degree is a Professional or Ph.D., with full time work force participation, by major

	M.D.		J.D.		Ph.D.	
Ind. Variable	Coeff.	Std. Err.	Coeff.	Std. Err	Coeff.	Std Err
Intercept	2.866 **	0.056	3.052 **	0.047	2.825 **	0.029
25-29	-0.461 **	0.069	-0.124	0.07	-0.264 **	0.094
35-39	0.512 **	0.076	0.147 *	0.064	0.189 **	0.039
40-44	0.726 **	0.088	0.221 **	0.084	0.262 **	0.036
45-49	0.841 **	0.085	0.300 **	0.104	0.305 **	0.038
50-54	0.696 **	0.100	0.451 **	0.134	0.331 **	0.043
55-59	0.722 **	0.098	0.501 **	0.119	0.405 **	0.047
60-64	0.745 **	0.093	0.484 **	0.145	0.451 **	0.066
Diasabled	-0.145	0.157	-0.010	0.186	-0.027	0.057
Black	-0.196	0.124	-0.162 *	0.069	-0.010	0.061
Asian	-0.053	0.082	0.051	0.091	0.161 *	0.069
Native american	0.095	0.134	0.052	0.142	-0.463	0.266
Hispanic	0.055	0.105	-0.087	0.089	0.006	0.12
Foreign born	0.036	0.044	-0.032	0.101	0.102 **	0.025
Female	-0.165 *	0.080	-0.203 *	0.08	-0.252 **	0.052
Single	-0.120	0.080	-0.191 **	0.073	-0.155 **	0.053
Female*Single	0.009	0.121	0.254 *	0.116	0.175 *	0.086
Sample size	2160		1226		3588	
R squared	0.254		0.085		0.087	
** p<=.001	* .001<p<=.005					

Table 8 – OLS Regression Analysis of Children Ever Born and logistic regression for probability of working full time, women age 40 to 64

	Children Ever Born			Prob. Working FT		
	Coeff.		Std. Err.	Odd R.		Std. Err.
OC*	-0.4975	**	0.0690	8.0945	**	1.0332
45-49	0.1466	**	0.0236	0.6688	**	0.0300
50-54	0.4752	**	0.0304	0.4836	**	0.0260
55-59	0.7281	**	0.0379	0.2883	**	0.0198
60-64	0.8666	**	0.0432	0.1573	**	0.0131
Disabled	-0.0951	**	0.0341	0.6808	**	0.0587
Black	-0.0573		0.0314	2.8759	**	0.1505
Asian	-0.0596		0.0591	1.4155	**	0.1337
Native american	0.1788		0.1089	1.4945	*	0.3035
Hispanic	0.0009		0.0513	1.3723	**	0.1089
Foreign born	-0.0240		0.0253	0.7376	**	0.0352
Single	-1.9798	**	0.0164	5.9095	**	0.3858
Intercept	3.0864	**	0.1782			
Sample Size	23859			23859		
R Square	0.2094			0.1161		

Table 9 – OLS Regression Analysis of Children Ever Born and logistic regression for probability of working full time, women age 40 to 64 whose highest degree is a Bachelor's

	Children Ever Born			Prob. Working FT		
	Coeff.		Std. Err.	Odd R		Std. Err.
OC*	-0.1015		0.1099	2.5226	**	0.5046
45-49	0.1583	**	0.0309	0.6179	**	0.0383
50-54	0.4927	**	0.0408	0.4807	**	0.0361
55-59	0.7269	**	0.0493	0.2416	**	0.0251
60-64	0.9343	**	0.0558	0.1396	**	0.0181
Disabled	-0.1062	*	0.0440	0.6678	**	0.0615
Black	-0.0352		0.0443	2.7569	**	0.2024
Asian	-0.1044		0.0724	1.8310	**	0.2440
Native american	0.1841		0.1355	1.5029	*	0.2979
Hispanic	-0.0537		0.0671	1.1922		0.1403
Foreign born	-0.0443		0.0333	0.8286	**	0.0553
Single	-2.0599	**	0.0232	5.7831	**	0.4938
Intercept	2.1845	**	0.2766			
Sample Size	13742			13742		
R Square	0.1892			0.1022		

Table 10 – OLS Regression Analysis of Children Ever Born, women age 40 to 64 whose highest degree is a Bachelor's

	Coeff.		Std. Err.
Intercept	1.0312	**	0.3432
OC*	0.2558	*	0.1276
Female Comp.	0.4221	**	0.0674
45-49	0.1446	**	0.0310
50-54	0.4688	**	0.0409
55-59	0.7159	**	0.0493
60-64	0.9279	**	0.0557
Disabled	-0.1130	**	0.0440
Black	-0.0299		0.0442
Asian	-0.0928		0.0726
Native american	0.2029		0.1353
Hispanic	-0.0474		0.0671
Foreign born	-0.0229		0.0332
Single	-2.0466	**	0.0236
Sample Size	13742		
R Square	0.1926		