The Impact of Female Employment on the Likelihood and Timing of Second and Higher Order Pregnancies

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Abstract: This paper examines the effects of married women's employment on their fertility behavior in the United States. Data from the National Survey of Family and Households are used in a hazard model to determine whether a woman's employment status affected the rate at which she had a second, third or fourth pregnancy. The study finds that the labor-force participation of women does have an important effect on the spacing of pregnancies, although the effect is less pronounced in the transition to third pregnancy. In addition, this paper demonstrates that an appropriate method of modeling the fertility and female employment relationship is one in which employment is seen to influence the rate of childbearing. (JEL J13)

Keywords: Fertility, female employment, hazard models.

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Introduction

For married women, the decision to bear children or to pursue a career is often a difficult one to make, since childbearing and employment place conflicting demands on women who shoulder the primary responsibility for child care. Time devoted in the labor market is potentially time spent away from child-rearing, thus resulting in a strain between mother and worker roles (Weller, 1977). Moreover, the decision to have children is costly in the sense that income is lost when women do not work outside the home in order to give birth (Becker, 1960). Because of the conflicting nature of the female employment and fertility relationship, the relative rates of fertility among women may be different depending on whether a woman participates in the labor market or not. Thus, employment may significantly affect the rate at which women have children.

The existence of a negative relationship between fertility and female employment is well established (Kupinsky, 1977; Groat, Workman, and Neal, 1976). While on the aggregate level, historical trends indicate that fertility rates and labor-force participation rates for women are moving in opposite directions -- particularly for married women with at least one child -- the nature of the relationship is still in question. Many of the controversies regarding the study of fertility and female employment are methodological and are centered around the issues of specification and causal direction (Cramer, 1980; Kupinsky, 1977). The lack of a general consensus of how to model the relationship between fertility and female employment is indicated by a "substantial amount of confusion surrounding the causality issue" (Lehrer and Nerlove, 1986:183). In particular, the issues of causality and specification may be broken down into four possibilities (Weller, 1977):

1. Fertility affects labor-force participation;
2. Labor-force participation affects fertility decisions;
3. Both fertility and labor-force participation affect each other; and,
4. The observed negative relationship is spurious and is caused by common exogenous factors affecting both variables.

Each possibility boasts a rather extensive company of proponents, and these have been adequately summarized and critiqued by Lehrer and Nerlove (1986), Cramer (1980) and Kupinsky, (1977). Although some evidence suggests that the fertility effect is dominant (Bernhardt, 1989; Yeung,

1988; Klijzing, Siegers, Keilman, and Groot, 1988; Halli and Rao, 1987; and Cramer, 1980), the impact of female employment on fertility decisions has been the basis of several important studies designed to illustrate how labor-market trends can explain fluctuations in birth rates. For instance, De Cooman, Ermisch, and Joshi attempt to model the behavior of birth rates in England and Wales relative to the employment characteristics of women following World War II. They find that "in the early stages of family building, births are inhibited by labor markets favorable to women. But conditions in the labor market for men have a reverse effect on early breeding" (1987:266).

Additionally, Hoem and Hoem's study of fertility and female employment in Sweden finds evidence to suggest that one's personal values and life-course strategy are among the strongest determinants of child-bearing behavior, particularly with respect to the emergence of the two-child norm. They argue that the "increase in the number of women in paid employment may have been one of several important features of a process of development which strengthened the two-child ideal and made it become the dominant determinant of family size" (1989:48). Moreover, they find that the strongest impacts on the probability of a second birth occurring are a woman's employment status, educational level and marital status.

These studies suggest that the employment of women does have an important effect on fertility and that the methodological problem of modeling the relationship between female employment and fertility can be understood by examining the problem in this way. While there exists multiple causal effects characterizing the female employment and fertility relationship, an analysis based on the employment-to-fertility effect has become increasingly important during the twentieth century. This is because social conditions have changed giving women "freedom of movement and educational opportunities for participating in the occupational structure" (Hill, 1975), opportunities which did not exist a hundred years ago. The fact that more women have entered the labor market suggests that the potential for employment to influence fertility has increased.

The question of whether fertility affects female employment, or is affected by employment, however, is important only to the extent that traditional values, norms and behaviors -- which dictate that the woman's place is in the home to care for her children (Stovall, 1989; Mintz and Kellogg, 1988; Scanzoni, 1983; Weitzman, 1981; Hareven, 1977) -- continue to be generally adopted by women when they make decisions regarding employment and the bearing of children. Women who embrace such

traditional roles will have already made the decision about the bearing and rearing of children, a decision which presupposes that women would not seek paid employment in the labor market. This is because "traditional" society had predetermined that the roles and responsibilities a woman will take are those of "wife" and "mother" (Welter, 1978). Therefore, any decision regarding employment in the labor market would be made relative to a woman's desire to have or not to have children; that is, her fertility decisions will affect her employment opportunities. In other words, the decision is first one of fertility and second one of employment for this subset of traditional women.

However, as a result of industrialization, large numbers of women began to leave the home in order to seek employment in the labor market. Industrialization shifted many of the woman's productive activities from the home to the market, thus reducing the economic importance of women in the home (Tilly, Scott, and Cohen, 1978; Hareven, 1977; Ogburn, 1933). At first, the entry of women into the labor force was accepted as a necessary extension of the domestic roles of women and did not significantly impact on family life (Mintz and Kellogg, 1988). The necessity to help support one's family became a culturally permissible reason for married women to enter the labor force (Glenn, 1959), although for a time it was only acceptable for women to work in those types of occupations where she could readily combine her roles as mother and worker (Kupinsky, 1977).

As the Industrial Revolution progressed, particularly into the twentieth century, the duties and responsibilities of women as understood by society and accepted by women lost their rigidity. There was "uncertainty about having children, about their care and education if it [was] decided to have them, about the relative advantages of housework and work outside the home" (Ogburn, 1933). This uncertainty contributed to the increase in the number of women who sought paid employment, the result of which constituted the basis for more important developments in the ascribed roles of women in family and in society.

The roles of women in the family changed as women began to enter the labor force in search of paid employment outside of the home. Over time, the percentage of women who participated in the labor market increased to the point that it became relatively common to find women in the labor force. This increase in the participation of women in the labor market -- particularly of married women with children -- is important evidence reflecting a change in the norms and social prescriptions regarding the roles of women in and outside of the home.

Consequently, social values regarding the responsibilities of women shifted in such a way that a woman's employment opportunities now have an important role in her fertility decisions -- an effect which simply was not important a century ago. That is, since society has embraced the position that women could -- or even should -- seek gainful employment, and because contemporary social conditions have made it possible for women to pursue careers, the effect of female employment on fertility has become an important dynamic in modern families. This is not to say that the issue of causality is necessarily resolved, however. A strong pronatal norm remains in the United States. The fact that gender roles and adult expectations are learned long before women either work or have children suggests that a woman's fertility decisions will play an important role in her employment behavior. Additionally, a woman's attitudes regarding children, paid employment and other exogenous factors may jointly influence her fertility and work activities, thus resulting in a perceived negative relationship.

Nevertheless, if the change in social values is such that a woman's decision for employment is temporally prior to her decision to bear children, then the question of causality would lead to the conclusion that the effect of a woman's employment behavior on her fertility decisions is a more important relationship than that of fertility affecting her employment.

Therefore, one way to deal with the problem of modeling the female employment and fertility relationship is to determine whether a woman's employment activities are temporally prior to her fertility decisions. Describing how employment precedes fertility decisions, Mott indicates that "[t]here has been a steady increase in the propensity of women to work after marriage but before their first child during this century" (1972:178). Because a woman's employment comes before her fertility, the use of her employment status as an independent variable will provide important information regarding the employment and fertility relationship. For these reasons, the impact of female employment on fertility will be the basis of the proceeding analysis.

In particular, the analysis presented in this paper will advance the literature on the relationship between female employment and marital fertility in three specific ways. First, the fertility rates of U.S. women will be modeled using a hazard rate approach rather than traditional methods of least squares regression analysis of simultaneous systems of equations. The hazard regression is designed to control more accurately than simultaneous equation models the effects of time-dependent variables, such as transitions into and out of employment and pregnancy.

Second, the model will be applied to data for U.S. women. There appears to be a dearth of research utilizing the hazard model designed to determine the employment effects on fertility patterns of U.S. women. For instance, Hoem and Hoem (1989) and Heckman, Holtz, and Waller (1985) use Swedish data, Newman and McCulloch (1984) use data from Costa Rica, and De Cooman, Ermisch, and Joshi (1987) study British women. A premise underlying this paper is that the fertility behavior of U.S. women will differ from those of non-U.S. women.

Finally, this study will extend the analysis of employment effects through the fourth parity. Most of studies of fertility terminate the analysis through the third birth. This paper extends through the fourth birth in order to determine whether there are relative differences in the patterns of fertility behavior within the childbearing cycle.

Background Evidence

A number of studies have been designed around the problem of how female employment impacts on a woman's fertility -- that is, whether a woman's employment status and labor-market expectations could be used to explain and predict fertility behavior. Some of the early analyses produced somewhat conflicting and inconclusive results. Ridley (1959) found that long work experience is associated with low fertility, even among groups characterized by relatively high fertility, and that wives who have worked five years or more since marriage expect on average about one child less than wives who have never worked. In addition, Ridley notes that it appears that the labor-force participation of wives has a depressing effect upon family size. Furthermore, Ryder and Westoff (1965) stated that women who worked because they "like to work" expected to have fewer children, while Collver (1968) found that women's participation in the labor force tended to reduce birth rates in metropolitan areas within countries due to the increased demand for the employment of women by employers.

However, the study of fertility in Turkey by Stycos and Weller (1967) determined that there was no difference in fertility for women according to labor-force status. They found that although there was a slightly greater tendency for employed women than for non-employed women to hold attitudes more favorable to smaller families, the differences in fertility rates were marginal and not statistically significant. Moreover, Bumpass and Westoff (1970) cautioned that while a wife's labor-force plans and activities were predictors of expected fertility, the relationship was statistically weak.

The discrepancy in findings regarding the effect of female employment on fertility was resolved in part a few years later in a study by Gendell and Marauiglia (1970). Using data gathered in Guatemala City, Gendell and Marauiglia found that economically active women -- those who participated in paid employed -- had a significantly lower level of fertility than women who were not active. They argued that this was due to the effects of modernization, and they suspected that in smaller urban and rural areas the impact of the employment of women on their fertility would indeed be weaker or non-existent.

These findings suggested that one of the problems of the Stycos and Weller study was that the targeted population consisted of a society in which the level of modernization was relatively low, and where "religion and family culture pressures the average woman to devote her energies to the home" (Stycos and Weller, 1967:212). This implies that the effect of female employment on fertility is not an important causal relationship, because the decisions regarding fertility preceded those of employment. Only as a society begins to modernize and make available to women employment opportunities, such as in cities and other urban areas, will the effect of employment on fertility become important. Stycos and Weller conclude, however, by stating that where birth control is available, and where mother and worker roles are incompatible, the relationship between female employment and fertility is one in which employment influences fertility.

More recent evidence illustrates the important effect a woman's employment behavior has on her fertility decisions. Some researchers argue that evidence exists demonstrating that the greater the earning potential is for a women, the greater the chances are that she will consider market opportunities before making fertility decisions (De Cooman et al, 1987; Kupinsky, 1977). Moreover, Semyonov (1980) and Matthaei (1980) link a woman's increased chances for high status employment with lower fertility, as well as with divorce and reluctance to marry.

In recent years researchers have shifted the focus of the analysis of fertility decisions from completed family size, or children-ever-born, to the timing and spacing of births. The reason for the change in focus is that the observed family size reflects desired timing as well as desired numbers, and changes in the timing and spacing of births reveal more accurately aggregate trends in fertility rates (Newman and McCulloch, 1984). Therefore, in this study the analysis of a woman's fertility decisions will be based on how her labor-force participation affects the timing and spacing of subsequent births. The purpose of this study is to examine how a woman’s employment status, educational level, and other

characteristics affect the relative rates at which she has a second, third, and fourth child.

Data

Data for this study are taken from the 1987 National Survey of Families and Households, an interview study consisting of a probability sample of 13,017 respondents representing the non-institutional population of the United States age 19 and older. The survey was administered between March, 1987, and May, 1988, and consisted of questions regarding a wide range of family-related issues, including detailed information on the respondent's employment and fertility histories.

This analysis included women who have had at least one child born to them and who were in their first marriage at the time of the birth of the first child, resulting in a sample size of 3,400. Women who were married more than eight months after the first pregnancy were excluded from the analysis in order to allow the birth of the first child to occur within the marriage, thus restricting the analysis of subsequent pregnancies to that of marital fertility. The analysis began with the second pregnancy because I assume that the decision to have a first child is different from the decision to have a second or subsequent child (see Michaels and Goldberg, 1988; Bourguignon, 1987). Censure occurred if the woman did not have a second, third, or fourth pregnancy which resulted in a live birth by her fortieth birthday, before the date of the interview, or before the marriage was terminated due to divorce, separation or death of the spouse.[1] Additionally, pregnancy was used as the basis of analysis instead of birth since it is pregnancy I assume employed women wish to avoid, not the birth itself. That is, pregnancy is preferred over live-birth as the unit of measurement in order to avoid complications caused by the possibility of anti-natal or post-partum maternity leave.

Information regarding the woman's employment status was treated as a time-varying covariate, since a woman could move in and out of the labor market during the periods between each pregnancy or between pregnancy and censure. The other variables included in the study did not change during the period of analysis and thus were regarded as fixed. The time a woman spent in and out of employment was measured in periods of one-month intervals, and the assignment of an employment status was based on whether the woman was employed full-time or part-time, or whether the woman was not employed. I

[1] Only pregnancies which ended in a live birth were included in the analysis, because information regarding which, if any, pregnancies were spontaneously or intentionally terminated is assumed to be

assume that the probability of a next pregnancy occurring will be lower for women who are employed either full-time or part-time relative to women who are not employed, although the negative effect of working part-time is assumed to be less than that of working full-time.

In addition to employment, many other factors impact on a woman's decision to have a next child and are included as control variables in the model. These include the woman's educational level, the duration between the date of marriage and first pregnancy, age-at-first pregnancy, the length of the preceding interval between pregnancies, number of siblings, birth cohort and social background, which includes the woman's race, religion and parent's socio-economic status (SES).

Education referred to the highest level of schooling the woman received in years. The impact of education on fertility is important, both for its direct effect and for the effect education has on other variables which act on fertility. It is believed that education affects fertility directly by altering the preference for children, and indirectly by influencing the probability of marriage, the health of the woman, and the perceived costs and benefits of children (Cochrane, 1979). Empirically, the relationship between fertility and education is less clear (Cochrane, 1979), although in the United States education has been generally found to reduce the expected fertility of women. Consequently, we would expect an increase in a woman's education to result in a lower probability of pregnancy.

Education is also considered a simple proxy for employment opportunities or occupational status (Cain and Weininger, 1973), and has been found to increase the impact of a woman's employment on her fertility (Hoffman, 1974). For this reason, an interaction term between employment status and education is included in the model.

Birth cohorts were categorized into six different groups as follows: 1) women born before 1920; 2) women born between 1920 and 1929, inclusive; 3) women born between 1930 and 1939, inclusive; 4) women born between 1940 and 1949, inclusive; 5) women born between 1950 and 1959, inclusive; and 6) women born after 1960. The inclusion of birth cohorts is important because it facilitates the analysis of trends in fertility behavior (Whelpton, 1954).

Controlling for other exogenous factors such as social background has been found to mitigate the relative association between female employment and fertility (Kupinsky, 1977). In this study, the woman's social background included the woman's race, religion and parent's SES. Race was categorized

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incomplete.

into four variables: black, white, Hispanic and other. Religion was also grouped into four categories: no religion, Catholic, Protestant, and other. Parent's SES was measured by the total-based index reported in the National Survey of Family and Households, which was taken from the analysis by Stevens and Cho (1985) for the occupational designations of the woman's father, stepfather or guardian. The scale was divided into three categories, indicating low, medium and high SES.

Methodology

A hazard, or intensity,[2] model was developed in order to determine the impact of a woman's employment status on the probability of a second pregnancy occurring. The intensity approach models the instantaneous probability of an event occurring at a particular time, given that the individual was at risk at that time (Allison, 1984), and it is useful in modeling censored time-varying variables such as fertility outcomes.

The essential feature of the intensity model is that it shifts the focus of the problem from one where factors directly cause an event to one where they influence the risk of occurrence (Newman and McCulloch, 1984). Thus, this methodology resolves the temporal priority of causality by looking at rates of child conception by current employment status. In other words, the intensity model is not one in which employment is understood to cause fertility, but rather is used to determine how a woman's employment status, education and other independent characteristics affect the rate of childbearing. Stated differently, given the employment, educational and other characteristics of the mother preceding the occurrence of a next pregnancy, the probability that she will have a pregnancy next month is predicted from the intensity model.

The intensity model for the probability of pregnancy is given as follows:

$$(1) \qquad h_j(t)/h_i(t) = \exp[a_{ij}(t) + b_{ij}(t)X(t) + c_{ij}Z]$$

where i,j=1, ..., 4 indexes the transition from pregnancy i to pregnancy j; t is the time since the beginning of the spell; $h_{ij}(t)$ is the rate of moving from one pregnancy to the next; X represents the covariates that

[2] Following the tradition of other researchers studying a woman's fertility behavior, the term "hazard" will be replaced by "intensity," since the word hazard "evokes images of dangers connected with

vary as a function of time, and Z represents the fixed variables measured at the beginning of the spell; and, $a_{ij}(t)$, $b_{ij}(t)$ and c_{ij} are the parameters to be estimated. The model estimated is a linear regression of the logarithm of the intensity, in which the rate at which married women have a next pregnancy is regressed on employment, education and other independent variables. The parameters indicate the relative impact on the probability of a woman moving to the next pregnancy.

The model estimated is a linear regression of the logarithm of the intensity, in which the rate at which married women have a next pregnancy is regressed on employment, education and other independent variables. The parameters indicate the relative impact on the probability of a woman moving to the next pregnancy. The control of the independent variables was facilitated by the use of a constant baseline, in which variables that were categorized were estimated relative to a particular category which was fixed at a value of one. Thus, the other categorized groups are compared relative to the baseline group.

In addition to the use of employment, education and the other independent variables, I assume that there are other factors that contribute to the fertility process which cannot be observed. The intensity model facilitates the inclusion of an error term in which the unobserved heterogeneity, or differences, of women can be controlled. The inclusion of an unobserved heterogeneity component is important in models of fertility, although the specific form it takes is not as critical (Heckman et al, 1985; Newman and McCulloch, 1984). For this model, a non-parametric distribution was estimated in a second model, the results of which were used to determine the relative impact unobserved heterogeneity had on the rate of pregnancy.

Results of Analysis

An intensity model was used to determine the relative impact of a married woman's labor-force participation on the probability of her having a next pregnancy. The numbers of women who progressed to the next pregnancy are given in table 1. Of the original sample size of 3,400, more than one-fourth were censured with only one pregnancy. Additionally, of those women who had a second pregnancy, a little more than half had a third child and only one quarter had a fourth.

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childbearing" (Hoem and Hoem, 1989:66).

(Table 1 about here)

The yearly rate of advancement to the next pregnancy for women who were at risk to do so by employment status is given in table 2. As expected, women who do not work have a higher rate of pregnancy than women who work either full-time or part-time. In particular, women who work full-time have about half the rate of a second pregnancy as women who do not work. Furthermore, the disparity in pregnancy rates between working and non-working women increases at the higher birth orders to where non-employed women have triple the rate of pregnancies relative to women employed full-time.

(Table 2 about here)

Labor-Force Participation. The results of the estimated intensity model for the transition to the next pregnancy are given in table 3. In general, the effect of a woman's labor-force participation results in a reduction in the rate at which the woman will have a next pregnancy, controlling for other factors. Moreover, women who work full-time are more likely than women who work part-time to delay or not have a next pregnancy. The negative effect of employment, however, is less important for the transition to the third pregnancy than it is for the second or fourth pregnancy.

(Table 3 about here)

Women who work full-time have a second pregnancy at a rate only 27 percent of the rate for those who are not employed.[3] In other words, their rate of pregnancy is only one-fourth as high as non-employed women. At the third pregnancy, the intensity for full-time women relative to non-employed women increases to 50 percent. However, at the fourth pregnancy, the intensity falls again to roughly 35 percent, or one-third the intensity of non-employed women. This trend is curious -- an important impact of employment on fertility for the second and fourth pregnancies, but not nearly so for the third pregnancy -- suggesting that something other than employment may be more crucial in determining the probability of a third pregnancy than a second or fourth one for women who work full-time.

For women who work only part-time, the effect of employment on their fertility follows a similar trend -- important for the second and fourth pregnancies, but almost nonexistent at the third pregnancy. Specifically, these women have a rate of second and fourth pregnancies relative to non-employed women of 55 and 64 percent respectively; the relative effect of part-time employment on the third pregnancy,

[3] The calculated rate of pregnancy for women who are employed full-time relative to women not employed is given as follows: exp[-1.326] * 100 = 26.55. Its interpretation is that women who work

however, is almost insignificant.

The impact of employment status on the rate of pregnancy is changed when control variables are included. This is evident from the relative difference in results presented in tables 2 and 3. In table 2 the rate of pregnancy by employment status is given without the use of control variables. At the second pregnancy, the rate for full-time employed women is roughly half that of women not employed in the labor market, and this difference increases through the third and fourth pregnancies. However, when controls are added, as in table 3, the relative rate of a second pregnancy for women employed full-time is about one-fourth that of rate for non-employed women -- more important than the difference in rates without the benefit of controls. The relative difference decreases at the third pregnancy, but then increases again at the fourth pregnancy to roughly the same difference observed when controls are not added. For women employed part-time, the employment effect is increased when controls are added at the second pregnancy, but then reduced at the third and fourth pregnancies. In other words, it appears that controlling for the other independent variables generally enhances employment effect early on, but at the higher birth orders the inclusion of controls do not appreciably affect the impact of employment.

Thus, the effect of a woman's employment does have an important impact on the fertility of women, particularly for women who work full-time. The impact of employment on fertility is more evident in the cases of women who have either one or three children and who are deciding whether to have a next child. However, for women who already have two children, the effect of employment is much less prominent, suggesting that other determinants play an important -- if not more important -- role for women who are initially deciding whether to have more children than the "two-child norm."

Education and Interaction Effects. Because education and employment status was included as an interaction effect, the effect of education given in table 3 is for women who are not employed in the labor market. For these women, the impact of education on fertility is negative, as expected. Moreover, education displays the same diminishing effect on the third pregnancy. In particular, for women who are not employed, each increase in the number of years of education reduces the intensity of pregnancy by two percent per year for the second pregnancy, and by nearly three percent per year for the fourth pregnancy. The consequence of education on the likelihood of a third pregnancy occurring is almost

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full-time have a second pregnancy at a rate which is 27 percent of the rate of women who do not work.

zero.

For married women who are employed full-time, the effect of education is to increase the intensity of a second pregnancy by roughly four percent of rate of non-employed women for each additional year of education the mother received. For part-time employment, the effect on the second pregnancy is almost half as strong as full-time employment. In other words, for women who work either full- or part-time, the effect of education holding other things constant is to increase the rate of having a second child. This can be interpreted as an attempt to have quickly two children -- that is, to meet the two-child norm -- with the intention of continuing afterwards with a career outside of the home.

Once women have a second child, however, the relative impact of education for women who work becomes negative. Specifically, the effect of education on the rate of third and fourth pregnancies for women who are full-time workers is about two percent lower for each increase in educational level than women who do not work. For women who only work part-time, increases in education result in a rate of third and fourth pregnancies which is about four percent lower than the rate for non-working mothers. The fact that the effect of education for full-time workers who have reached the two-child norm is not as negative as the effect for women who work part-time makes sense if one assumes that women who work full-time may wish to return to the labor market sooner than women who work only part-time in order to renew their job skills. Conceivably, women who work part-time may be able to adapt their fertility decisions around their employment, and thus do not feel a need to compress the span of childbearing years in order to facilitate a return to the labor market.

Childbearing and Spacing Variables. The duration between marriage and first pregnancy and age-at-first pregnancy are both negatively related to the probability of having a next pregnancy as expected. That is, the longer a woman is in a marriage before having a first child, and the later a woman begins childbearing, the lower will be the likelihood that a woman will have a next child.

Generally, the effect of marriage-to-first pregnancy is the same for all transitions; for each month the first pregnancy is delayed, the risk of having a next child falls by about one percent. Although this is not a large effect, the impact on future fertility clearly becomes more important the longer the span is between marriage and the first pregnancy.

The effect of age at first pregnancy appears to follow a similar but opposite pattern found by the consequences of employment and education. That is, a negative relationship between age at first pregnancy and fertility is observed, although it is only important at the third pregnancy. Specifically, an increase in the age of the women in months before she begins childbearing will reduce the risk of a second and fourth pregnancy by about one percent, but will reduce the intensity of third pregnancies by more than six percent for each month. Apparently, the age at which a woman begins childbearing plays an important role in her decision to move past the two-child norm and have a third child.

The relative impact of previous pregnancy intervals also appears to be an important determinant of the intensity of pregnancy. Moreover, the effect is negative at both the third and fourth pregnancy, suggesting that longer birth intervals result in either a lengthening or reduced probability of subsequent pregnancies. Note that for each monthly increase in the time between the preceding pregnancy interval, the risk of a next pregnancy occurring is reduced by approximately two percent -- a noticeable decrease for long pregnancy intervals; and, the effect seems to be roughly identical for the third and fourth pregnancies. This appears to suggest that women who delay a previous pregnancy will also delay subsequent ones, perhaps with the intention of entering the labor market between the births of children, or to invest a greater amount of time with each child.

Number of Siblings. The impact of the woman's number of siblings on the likelihood of her having a next pregnancy is less pronounced in the transition from first to second pregnancy than it is for the probability of a third or fourth pregnancy, although the effect is positive in all cases as anticipated. For each increase in the woman's number of siblings, the risk of having a second child increases a little more than one percent -- an otherwise insignificant amount. However, in the case of the transition from second to third, and from third to fourth pregnancy, the relative risk of pregnancy increases to roughly five and four percent respectively. Therefore, even though the overall impact of siblings is relatively small, the effect is noticeable as the woman begins to have larger families, particularly above the two-child norm.

Birth Cohorts. The relative impact of birth cohort on the risk of pregnancy is also given in table 3. Note that women who were born before 1930 are relatively less likely to have a second child than women born between 1930 and 1939. This could be an effect of the depression years when fertility was low.

Additionally, women born after 1939 are also relatively less likely to have a second pregnancy, evidence of the fact that women are having their first and second children at higher ages than in the past, and an indication of the declining rate of childbearing following the post-baby boom era (see Ryder, 1974).

We also observe that women born between 1920 and 1929 are more likely to have a third pregnancy than women born after 1929. Conceivably, for these women the third pregnancy had occurred after either the Great Depression or World War II, and at the beginning of the baby boom. Moreover, the decline in risk for women born in later cohorts is also evident here. However, for all women born after 1939, the relative risk of having a third pregnancy is essentially lower than that of having a second pregnancy for the same cohort, an indication of the decline in the relative frequency of higher order births.

The effect of birth cohort on the risk of having a fourth pregnancy is similar to the effect found for third pregnancy, with the exception that women born before 1919 are at a greater risk of having a fourth pregnancy than women born between 1930 and 1939, although women born between 1920 and 1929 are at the greatest risk. In addition, the trend of declining risk for women born after 1939 found at the third pregnancy is also evident for the fourth pregnancy.[4]

Social Background. The relative difference in fertility controlling for race, religion and parent's SES are also indicated in the table. In general, the effect of race is as expected -- white women have a relatively lower fertility than women of other ethnic groups. Hispanic women are seen as having the greatest risk of having a second pregnancy, while black women are seen as being most likely to have a third or fourth child. Specifically, the risk of having a next pregnancy increases for black women for each subsequent pregnancy. Black women have roughly the same risk of having a second child as white women; however, the intensity of a third pregnancy for black women increases to a 32 percent greater chance than for whites, and at the fourth pregnancy to an 86 percent greater risk. The relative risk of a second and fourth pregnancy to Hispanic women is respectively 27 and 36 percent higher than white women, but is statistically similar to white women at the third pregnancy.

[4] Caution should be given to the values for the 1960-present cohort -- particularly the one of -.733 at the fourth pregnancy. Conceivably, many of these women were censured before they had completed their fertility plans; thus, comparison with women who have completed their childbearing could be treated as suspect. However, since the model characterizes fertility up to the time of the interview, and

The effect of religion on the probability of pregnancy is found to be as predicted as well, except at the transition to fourth pregnancy. Catholic women have the highest intensity of second and third pregnancies, being respectively 28 and 40 percent more likely than women claiming no religion to progress to the next pregnancy. However, the intensity of a fourth pregnancy for Catholic women is almost identical with non-religious women. Additionally, while Protestant women have a 20 percent greater intensity of second pregnancies than women with no religion, the relative intensity falls to where it is the same at the third pregnancy and nearly 30 percent less at the fourth pregnancy. Apparently, the important effect of religion in the beginning of family formation is lost as the family size increases. In other words, religion appears not to be a factor for women desiring a larger family.

The effect of parent's SES appears to have no appreciable impact on the relative risk of a second pregnancy, but it becomes more important in the transitions to the third and fourth pregnancies. Although women with low SES have statistically the highest relative intensities of third and fourth pregnancies, they are not much different from women with high SES. Specifically, women whose parents have either a low or high SES have roughly a 12 percent greater intensity of third pregnancies than women whose parents have medium SES. For the fourth pregnancy, the relative intensity of for low SES doubles, while the rate for high SES declines by about one-third.

Duration Dependence and Unobserved Heterogeneity. Table 4 presents the results of the impact of employment and education on the fertility of working women for models which controlled and did not control for unobserved heterogeneity. The table also includes the estimated duration dependence for both models, which characterizes the effect of time on the intensity of pregnancy. The form estimated followed a Weibull distribution.

(Table 4 about here)

The model which did not control for heterogeneity was the same model discussed above; however, the results of employment and education have been reprinted for comparison. The effect of time on the likelihood of a second pregnancy is positive, as indicated by the positive coefficient for duration dependence. This suggests that women who have one child are more likely to have a second child, other things being equal. The influence of time on the intensity of third and fourth pregnancies is

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not future childbearing behavior, little bias is expected in the results.

also positive but small, suggesting that, other things equal, a strong two-child norm exists among women with children in the United States.

The control of unobserved heterogeneity appears to have improved the over-all fit of the model for the data used in this study. Inclusion of unobserved heterogeneity improves the fit of the model by nearly 600 points. Moreover, unobserved heterogeneity provides additional insight of the effect of employment on fertility, although it did not appreciably affect the results of the other independent variables.

Particularly, the influence of a woman's part-time employment becomes more important at the transition to the second pregnancy. Also, the negative effect of a woman's full-time employment was reduced somewhat for the transition to the second pregnancy. Furthermore, the impact of education on the rate of second pregnancies increased nearly three times for women who work part-time relative to the model without heterogeneity, while the educational effect for full-time workers fell in half. The results for the rates of third and fourth pregnancies, however, did not significantly change when unobserved heterogeneity was introduced.

Thus, controlling for heterogeneity increased the negative impact part-time employment has on the rate of pregnancy, relative to full-time employment, holding other things constant. This suggests that the general impact of full-time employment and education results in a higher probability of a second pregnancy occurring. In other words, once we control for the unobserved differences between women, those who were more highly attached to the labor market -- as manifested by both full-time employment and a higher educational level -- tended to compress the span of childbearing into a shorter amount of time, perhaps facilitating a return to paid employment outside of the home. However, at higher order births, the effect of unobserved heterogeneity did not appear to alter significantly the relative rate at which a pregnancy occurs.

Discussion of Findings

The findings of this study indicate that the labor-force participation of women does have an important statistical effect on the fertility patterns of married women with at least one child. Specifically, employment reduces the frequency of a next pregnancy, or increases the spacing between pregnancies, although the effect is less pronounced in the transition to the third pregnancy. Only

demographic factors such as the woman's age at her first pregnancy are important in determining the likelihood of a third pregnancy, since decisions regarding employment and education do not play an important role. However, once the two-child norm has been broken -- that is, once a woman has had a third child -- the same factors which influence the fertility norm again become important.

Furthermore, the fact that the effect of employment across pregnancies has a substantial cumulative impact on the likelihood that a woman will have additional children -- especially for women who work full-time -- suggests that the woman's over-all life-course strategy plays an important part in her decisions regarding the bearing and rearing of children. The results imply that women who decide to pursue full-time careers outside of the home continuously throughout the marriage have a rate of transition from the first to the fourth child 20 times lower than women who never work.

These findings suggest that more emphasis should be placed on the importance of the female employment and fertility relationship, since decisions regarding the timing and spacing of children generally affect the nature of the population. Apparently, a woman's personal decisions regarding her life-course strategy play an important role in determining how she will achieve the two-child norm, as suggested by Hoem and Hoem (1989). That is, her plans regarding work in the labor market or in the home will influence the rate at which she has her second child, if she decides to have two children. However, once the decision to have two children has been made and achieved, the important factors in determining whether the woman has a third pregnancy are made relative to her over-all childbearing strategies. This is indicated by the strong effects of the demographic factors on the rate of third pregnancy, relative to the employment and educational variables -- that is, when childbearing began and how the rate of childbearing proceeded. These factors perhaps act as a reminder to the women of the current state of her fertility plans and consequently result in her again using plans regarding employment in determining the risk of having a fourth child.

This implies that theoretical models of fertility in which employment and other factors which characterize the decision-making processes of households should not be based on the premise that these factors affect fertility in a constant or unchanging way. This is indicated not only by the strong-weak-strong effect of employment, but also by the declining influence of the combined employment and education factor. It appears that women are continually reevaluating and up-dating their plans regarding childbearing and employment, based on the situation they currently find themselves in. That is, the

nature of the relationship between fertility and employment changes at different stages of family formation.

Clearly, more work needs to be done in assessing how the female employment and fertility relationship changes over time, and what factors cause the relationship to change. Furthermore, future research should attempt to define in greater detail the process of decision-making, as it relates to the fertility and employment relationship, and incorporate these additional elements into the fertility model. It may be that employment itself does not affect the rate of pregnancy; rather, employment may act as a proxy for a more latent factor which results in a woman adjusting her fertility intentions.

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Table 1. The Number of Women Censured at Each Pregnancy.

Total	First	Second	Third	Fourth
3400	943	1187	650	620

Table 2. Number of Pregnancies per 100 Women at Risk per Year by Employment Status

Employment Status	Pregnancy Second	Third	Fourth
Full-time	5.28	3.48	2.88
Part-time	7.20	3.12	2.40
Not employed	11.16	7.92	7.92

Table 3. Estimated Intensities for the Next Pregnancy

Variables	Pregnancy Second	Third	Fourth
Employment Status			
Full-time	-1.326***	-0.581*	-1.059**
Part-time	-0.594	0.003	-0.442
Not employed	0.000[a]	0.000[a]	0.000[a]
Educational Level	-0.016**	-0.006	-0.027*
Employment and Education Interaction			
Full-time by education	0.053***	-0.012	0.009
Part-time by education	0.037	-0.033	-0.012
Not employed by education	0.000[a]	0.000[a]	0.000[a]
Marriage-to-first pregnancy	-0.007***	-0.005***	-0.009***
Age-at-first pregnancy	-0.009*	-0.053***	-0.003
First-to-second interval		-0.020***	
Second-to-third interval			-0.016***
Number of siblings	0.016***	0.055***	0.041***
Birth Cohort			
1900 to 1919	0.262***	0.819**	1.092
1920 to 1929	0.700***	1.082	1.129
1930 to 1939	1.000[a]	1.000[a]	1.000[a]
1940 to 1949	0.819***	0.796***	0.601***
1950 to 1959	0.698***	0.664***	0.679***
1960 to present	0.522***	0.345***	-0.733
Race			
Black	1.032	1.324***	1.864***
White	1.000[a]	1.000[a]	1.000[a]
Hispanic	1.276***	0.915	1.369**
Other race	1.191	1.057	0.918
Religion			
No religion	1.000[a]	1.000[a]	1.000[a]
Catholic	1.284***	1.407**	0.995***
Protestant	1.204**	1.058	0.726***
Other religion	1.182	1.203	0.579
Parent's SES			
Low	0.993	1.129*	1.267**
Medium	1.000[a]	1.000[a]	1.000[a]
High	1.080	1.123	1.086

[a] Fixed at the relative baseline value
* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level

Table 4. Estimated Intensities for the Next Pregnancy With Duration Dependence and Unobserved Heterogeneity

Variables	Pregnancy Second	Third	Fourth
Without Controlling for Heterogeneity			
Employment Status			
Full-time	-1.326***	-0.581*	-1.059**
Part-time	-0.594	0.003	-0.442
Not employed	0.000[a]	0.000[a]	0.000[a]
Educational Level	-0.016**	-0.006	-0.027*
Employment and Education Interaction			
Full-time by education	0.053***	-0.012	0.009
Part-time by education	0.037	-0.033	-0.012
Not employed by education	0.000[a]	0.000[a]	0.000[a]
Duration Dependence			
Gamma	0.221***	0.019	0.033
Negative Log Likelihood		3027.568	
Controlling for Heterogeneity			
Employment Status			
Full-time	-1.129***	-0.586*	-1.007*
Part-time	-1.940***	0.018	-0.647
Not employed	0.000[a]	0.000[a]	0.000[a]
Educational Level	-0.030***	-0.004	-0.035**
Employment and Education Interaction			
Full-time by education	0.040**	-0.011	0.002
Part-time by education	0.140***	-0.034	-0.002
Not employed by education	0.000[a]	0.000[a]	0.000[a]
Duration Dependence			
Gamma	1.023***	0.028	0.085
Factor loading	3.869***	-0.996***	3.011***
Negative Log Likelihood		2456.038	

[a] Fixed at the relative baseline value
* Significant at the .10 level
** Significant at the .05 level
*** Significant at the .01 level